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Contents

Foreword

The *Commodity Market Review* (CMR), a biennial publication of the FAO Trade and Markets Division, examines in depth issues relating to agricultural commodity market developments that are deemed by FAO as current and crucial for FAO's member countries. Global agricultural commodity value chains have become more complex as production and processing activities turn out to be increasingly fragmented. Moreover, concentration and the prospective of market power, as well as the emergent scope of food standards add to this complexity.

For poor developing countries, domestic market liberalization and the abolition of marketing boards, in conjunction with trends towards freer trade in a globalized environment have created opportunities for enhanced competition, efficiency and export growth. Multinational enterprises invest in developing countries and engage in outsourcing food for markets in developed countries. Although there are marked benefits to producers in developing countries, the potential of market power and the possibility that this power may result in a contraction of the primary producers' share of the final product price requires careful analysis. This biennial CMR is devoted to exploring in depth a variety of issues relevant to the impact of imperfect competition and food standards on developing markets. The articles that are included focus on both cross-commodity issues, such as strategic trade, foreign direct investment and the effectiveness of technical regulation, as well as on characteristics of individual commodity value chains, such as coffee, cocoa and frozen concentrated orange juice which are of particular interest in terms of industrial organisation.

The articles included in this CMR are all written by staff and collaborators of the FAO Trade and Markets Division and have undergone both internal and external review. They are published as a contribution of FAO to the ongoing policy research in food and agriculture value chain analysis, as well as to increase general awareness of the relevant issues and provide overall policy guidance.

Alexander Sarris
Director
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Rome, December, 2007

Introduction

In recent years, market liberalization in developing countries reduced considerably the capacity of governments to regulate commodity markets. The abolition of marketing boards and parastatal agencies that employed policy instruments such as price controls and stock-holding or that often enjoyed a monopsonistic and monopolistic standing in commodity markets, has resulted in the entry of private traders and a significant transformation in commodity supply chains. Moreover, the upsurge of globalization has added a new dimension to this issue, with the processing of some commodities taking place at an international level and developing countries' producers being linked with, and coordinated by, firms that are located abroad. The process of domestic market liberalization and integration into the global trade system has had a number of positive effects such as exposing producers in developing countries to international market price signals, contributing to a better allocation of resources and encouraging the influx of private capital. Nevertheless, although the shift towards unregulated markets aimed at increasing efficiency and competition, it has been argued that in some cases, the abolition of marketing boards hindered the performance of the supply chain in terms of delivery of the output, its quality, the provision of credit, research and development, extension services and other aspects. Perhaps, more importantly, liberalization of domestic markets has been thought of as giving rise to imperfections in terms of market power on behalf of traders both domestic and international. Concerns about the rise of oligopsonistic power in developing countries' commodity markets are deepened in line with the globalization process and vertical integration of supply chains by large multinational firms. The consequences of market power in terms of income distribution and development have led to a large literature that focuses specifically on commodity supply chains and the share of the producer of the primary commodity in the final product price. The papers in this issue of the *Commodity Market Review* focus on a number of key issues that characterize agricultural commodity chains and the global dimension of production, processing and retailing. The impact of market power, the role foreign direct investment, issues related to imperfect competition in international markets, quality, standards and the impact of the effectiveness of technical regulation and contractual arrangements along the chain are examined in this *Review* by papers that are either cross-cutting in scope, or that are commodity specific.

The first paper by Gilbert focuses on the impact of market power in the primary producers' share of the final product price of coffee and cocoa. These two tropical commodity chains are characterized by small primary producers in liberalized domestic markets and considerable concentration at the processing level. Gilbert starts by critically examining the methodology followed in global value chain analysis (GVC). An important observation consists of the zero-sum nature of most of the GVC analysis, where increases in the value at one link of the chain are often viewed as being at the expense of value at other links. In tropical commodities, GVC analysis often purports such a relationship between links and agents, which according to Gilbert lacks substantive causal interpretation. The paper contributes to our understanding of value added in each link by presenting an accounting framework for GVC analysis, as well as its economic counterpart in terms of a model. Gilbert utilizes the model to simulate a number of scenarios, including an increase in monopsonistic power. His results show that although market power influences the value shares, these are determined by a plethora of factors, the impact of which should be carefully examined in applied work. The analysis of coffee and cocoa producer value shares shows that there is no general

tendency for the producers' shares of wholesale prices to fall, whereas there is clear evidence that producers' shares of final product price have contracted. This result leads to the conclusion that, in general, the decline in the producers' share in retail prices reflects changes in the cost structure of the processing industries and is not the outcome of market power in spite of the high level of concentration in the coffee roasting and cocoa conversion industries.

Stiegert reviews an important aspect of the globalized food sector in a paper that focuses on imperfect competition, agriculture and development. He reviews the research on imperfect competition and the theory of strategic trade and examines its applications to the agricultural sector in the context of developing economies. Strategic trade entails governments that engage in rent seeking activities and select trade policy tools so that they distort trade and shift rent from the international market to the home firms. Examples include export subsidies and strategies pursued by state trading enterprises in oligopolistic international markets. Although empirical work on this topic is scarce, the evidence suggests that state trading enterprises may be able to distort international markets, given that their oligopolistic power is considerable. Stiegert shows that the behaviour of the Canadian Wheat Board may be identified with a strong leadership position in the international durum wheat market. However, in general, the complexity of strategic trade behaviour and the requirement that the government should be capable designing policies for the efficient and accurate extraction of rent from intricate commodity markets may indicate that governments are constrained in achieving such an objective. Nevertheless, strategic trade behaviour is plausible within the World Trade Organization special safeguards, as the imposition of an import tariff that aims to safeguard domestic producers' welfare in the event of import surges may be subject to strategic manipulation by domestic firms.

Foreign direct investment (FDI) has assumed a central role in shaping the food industries in both developed and developing countries. Rama and Wilkinson provide a critical review of the relevant literature and examine the impact of FDI on the agricultural and food sectors of developing countries. They analyze a number of aspects in this relationship, namely the impact of FDI on market structure and competitiveness, its effect on technical change and innovation and the implications for trade. It is argued that the relationship between FDI and competitiveness is bi-directional. FDI is, in general, attracted to non-competitive industries, while its effect on competitiveness is difficult to unravel. Often, foreign investment takes the form of acquisitions and mergers that may have a negative impact on the sector's competitiveness. However, there are cases where FDI inflows have strengthened monopolistic competition, as domestic firms adapt their strategies to compete with the foreign investors in the new differentiated product market environment. Perhaps more important is the impact of FDI on primary producers through contracting and outsourcing for developed country markets. Here, the authors stress that contractual arrangements may benefit the farmer through price premia and access to new markets, although investment in the production of specific products may result in locking smallholders into specific markets thus reducing their options. Technical change and innovation is found to be fostered by FDI, if domestic firms in the host country have the capacity to imitate the foreign entrants. The relationship between agricultural trade and FDI is also uncertain as it is determined by the entrant firms' strategies and the host countries' efficiency in agricultural commodity production. The empirical evidence reviewed suggests that FDI may result in an increase in the exports of the host country, given a dynamic and competitive agricultural sector.

Technical regulation and standards have received considerable attention in the literature. Cuffaro and Liu focus on credence goods' trade and the effectiveness of regulation which, they stress, includes its scope, the quality and relevance of the standards and the efficacy of the monitoring system. Credence goods, such as organic

or fair trade foods are of particular interest to developing countries in terms of employment, export earnings and smallholder livelihoods. In the importing markets, consumer perceptions on quality are important and the effectiveness of standards and regulation is critical in influencing consumers' trust in credence foods. Cuffaro and Liu review the literature and develop a theoretical model for credence goods' trade. They show that low effectiveness of regulation and prejudice against food produced in, and exported by developing countries results in reduced exports and a missing market for high quality products. Such a result implies that developing countries not only may experience low export earnings, but may also remain locked in the production and consumption of low quality food. From a potential exporter's point of view, certification by international institutions in which consumers in importing developed countries have faith, may offer a solution to the trust problem. The authors discuss the costs and benefits that relate to such an international certification body and stress that smallholders may run the risk of being excluded from higher value markets. Most importantly, it is argued that international certification institutes may not be immune from possible conflicts of interest, a condition that may undermine their effectiveness.

The paper by Fava Neves focuses specifically on the frozen concentrated orange juice supply chain in Brazil, an industry that currently faces a number of challenges in terms of coordination and the transmission of price signals to the primary producer link. The chain is characterized by highly concentrated retail and processing links and high asset specificity from the orange juice extraction level upstream. A unique aspect in this supply chain is the presence of various contractual arrangements between the processing industry and the orange farmers that are used to vertically coordinate the production of oranges and their processing into juice. The paper stresses that prices paid by the processing firms to contracted primary producers depend on many factors, such as location specificity, valuations of risk, quality and timing, which therefore determine the transmission of price signals from the international frozen concentrated orange juice market to the orange farmers. In this market, in spite of the location specificity, the geographical concentration of the processing firms results in orange farmers having the ability to select, up to a certain extent, where they sell their produce on the basis of relative prices and other factors. An analysis of the orange production sector shows that increases in tree density and scale are important factors in reducing costs, while stronger forms of chain coordination and the emergence of farmers' cooperatives are necessary in order to achieve more efficient outcomes.

As globalization deepens and trade policy negotiations progress towards freer markets, there is need to address specific concerns of developing countries with regard to issues that are related to the international character of commodity supply chains. The papers in the 2007-2008 FAO *Commodity Market Review* contribute to the discussion on the impact of globalization and market liberalization on primary producers and provide a systematic examination of a number of important issues that emerge within the new market environment, illustrating the implications for developing countries.

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Value chain analysis and market power in commodity processing with application to the cocoa and coffee sectors

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Value chain analysis extends traditional supply chain analysis by locating values to each stage of the chain. This can result in a "cake division" fallacy in which value at one stage is seen as being at the expense of value at another. Over the past three decades, the coffee and cocoa industries have witnessed dramatic falls in the primary producer share of the retail price. Both industries are highly concentrated at the processing stage. Nevertheless, developments in the producer and retail markets are largely unconnected and there is no evidence the falls in the producer shares are the result of exercise of monopoly-monopsony power. The explanation of declining producer shares is more straightforward – processing, marketing and distribution costs, incurred in consuming countries, have tended to increase over time while production costs at origin have declined.

1. INTRODUCTION

This paper has both a methodological and a substantive agenda. At the methodological level, I examine the potential contribution of Global Value Chain (GVC) analysis in the commodity sector. Substantively, I aim to resolve the apparent paradox that retail coffee and chocolate prices have declined at most modestly over the past three decades while producer prices for coffee and cocoa have fallen more dramatically. This has resulted in substantial falls in the producer shares of retail prices. Some commentators see these declines in producer share as the result of exercise of monopoly and monopsony power in processing industries which indeed show high levels of concentration.

The term "global value chains" appears to be originally due to Hopkins and Wallerstein (1977, 1986, 1994) who proposed to analyse a sequence of processes culminating in the production of the final product. This endeavour was in part motivated by the realization that many industrial goods are processed in multiple countries prior to final retail sale, and that trade in intermediate products has become a major component of all international trade.

Production processes for many traditional tropical agricultural products are often much less complicated. In some cases, the retail product may appear to be little more than a repackaging of the raw material input. Roast coffee appears to conform to this paradigm. In cases such as these, GVC analysis simply extends traditional supply chain analysis by locating values to each stage of the chain. In this light, Marshall's (1983) discussion of the coffee trade was an early example of commodity value chain analysis without his being aware of the GVC concept.

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GVC analysis is a framework, not a hypothesis (see Samper, 2003, p.122, who states "Some authors believe that they [commodity chains] are simply an analytical tool"). On this view, GVC analysis lacks substantive implications. According to its proponents, it is well-adapted for posing particular classes of question, arguably neglected in traditional economic analysis, rather than others, more favoured by traditional analysis. In particular, GVC analysis has been used to analyse the geographical, often international, distribution of activities and value creation in the production of a final good (see, for example, Korzeniewicz and Martin, 1994). In this respect, GVC analysis links to the contemporary discussion in international economics of the extent of and effects of outsourcing (see Feenstra and Hanson, 1996, 1999).

The GVC framework also has some disadvantages. Samper (2003) notes that by focussing on a specific commodity, GVC analysis underemphasizes interactions with other crops (particularly subsistence crops). In what follows, I suggest three further problems.

a) GVC discussions can be prone to a "cake division" fallacy in which value at one stage is seen as being at the expense of value at another. That view can make sense in the context of a mineral commodity chain where there is a scarcity rent to be appropriated, but is less useful in competitive or near-competitive industries where, in the long run, price equates to production cost. In sections 7-9, I argue that cocoa and coffee conform to this latter paradigm.
b) By basing the chain on the progress of the physical commodity, GVC analysis can overlook important processes which take place in other, more distant, locations. Although the commodity must be physically present where value is added, the amount of value added may be determined elsewhere and outside the physical value chain. To that extent, GVC analysis offers an incomplete and possibly misleading account of value determination. In the cases of cocoa and coffee the London and New York terminal markets are important. I discuss the role of these markets in section 4.
c) GVC analysis can result in reification of the value chain. A value chain is an assembly of diverse activities which take place on farms and in warehouses, ships, factories and supermarkets across the world which social scientists classify together for analytical purposes. This constructive classification can generate useful insights. However, there is a danger that the classification itself assumes an identity, such that the value chain can take on responsibilities and require a governance structure.

It is perhaps fair to say that many applications of GVC analysis to tropical agricultural commodity markets have been polemical rather than scholarly. Agricultural commodity prices have tended to be low over the two decades in which GVC analysis has been under development, and the primary purpose of many GVC contributions in this sector has been to lament the low share of the value of final products received by developing country farmers (see, for example, Oxfam, 2002a, 2002b). These low producer shares are presented as posing an ethical problem, but the absence of causal structure makes it difficult to discuss the origin of the changes in value share and therefore to consider policies which might alleviate the position in which the farmers find themselves.

Coffee and cocoa are both tropical tree crop commodities produced largely (cocoa) or substantially (coffee) by smallholder farmers. A number of countries (most importantly Brazil, Côte d'Ivoire and Indonesia) are important producers of both crops. Intermediation structures are similar. Coffee has the feature that the value chain is relatively simple while, at the same time, there is considerable concentration at the processing stage giving rise to the potential for the exercise of monopoly and monopsony power. I describe the coffee value chain in section 2. Coffee prices were very low during the so-called Coffee Crisis years of 1999-2003. The cocoa-chocolate industry is more complicated because the final product, chocolate, exhibits greater

variety than roast and soluble coffee, and because chocolate incorporates other raw material inputs. Price fluctuations over recent decades have been less extreme than in coffee. However, cocoa processing ("conversion") is as, or more, concentrated than coffee roasting. I discuss the cocoa-chocolate value chain in section 3.

In both industries, it has been suggested that market concentration has allowed value to be appropriated by multinational processing companies at the expense of developing country farmers and that this was one of the factors underlying the Coffee Crisis. I argue that there is no merit in this argument. In sections 6-8 I show that there is very little evidence of monopoly or monopsony power in either industry, and whatever such powers were present have generally been eroded over the most recent decades. Most important retail coffee markets and many of the most important producer markets are now close to be fully competitive. There is less comprehensive evidence on the retail chocolate markets but it seems likely that the same is also true there.

The decline in the producer share of the retail coffee price is not therefore due to the exercise of monopoly or monopsony power, even though roaster (processor) concentration is high. Instead, it results from the fact that only a proportion, perhaps around one half, of the costs underlying retail coffee prices are attributable to the price of green (i.e. unprocessed) coffee. The proportion of chocolate production costs attributable to cocoa is even lower. The remaining costs are incurred in consuming countries. Productivity gains have reduced coffee production costs but coffee processing and distribution costs have risen, at least until the start of this decade. The result is that retail coffee and chocolate prices have only fallen modestly implying a decline in the producer shares of the retail price.

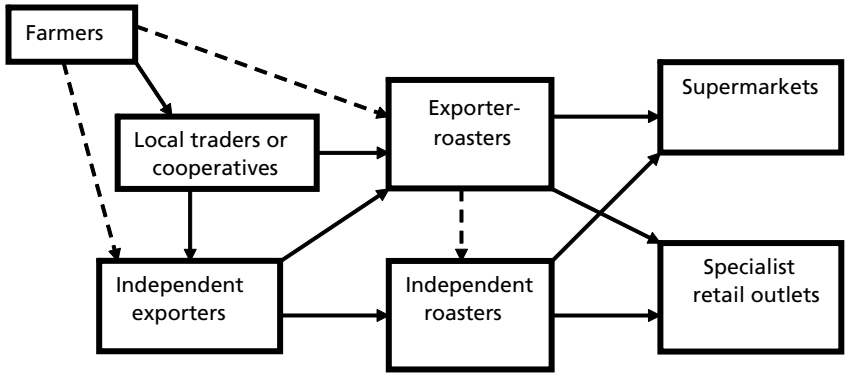
The structure of the paper is as follows. Sections 2 and 3 respectively describe the coffee and cocoa-chocolate supply chains. In section 4, I discuss the role of the coffee and cocoa terminal markets and in section 5 I build on this discussion to set out an accounting framework for GVC analysis. Section 6 develops this framework into a simple GVC model. The model does not have predictive power but amounts instead to an analytical device for understanding changes in value shares. Sections 8 and 9 set out the facts in relation to the evolution of producer value shares in the coffee and cocoa industries respectively over the past three decades. In section 10 I summarize the evidence on the retail coffee market. Section 11 discusses governance issues and section 12 concludes.

2. THE COFFEE SUPPLY CHAIN

Coffee is a tropical tree crop commodity. There are two principal tree varieties – arabica and robusta – the beans from which give coffees with very different characteristics. Robusta coffees, which are grown at low altitudes, have less flavour but greater strength than arabicas, which are grown at higher altitudes and often on volcanic soils. To further complicate matters, arabica beans can either be wet or dry-processed. Wet processing, used throughout Spanish-speaking America and in most of East Africa, results in mild arabica coffee which is ideally suited to filter coffees. Dry processing, which is the standard practice in Brazil and Ethiopia, gives a more bitter coffee which is particularly-suited to the preparation of espresso. Arabica is more difficult and costly to grow than robusta, and quality variations are more considerable. Some high quality arabicas fetch large market premia, in particular from the speciality coffee retailers. By contrast, most major roasters blend coffees from different origins in order to obtain a quality which is consistent over time. The blends typically use arabica for flavour with robusta as a filler, the relative proportions of the two determining the overall cost of the blend.

Coffee is produced both by smallholders and on large farms and estates. Estates are particularly important in Latin America but also in Kenya. Most of the remainder of African production is from smallholders.

FIGURE 1
The basic coffee supply chain



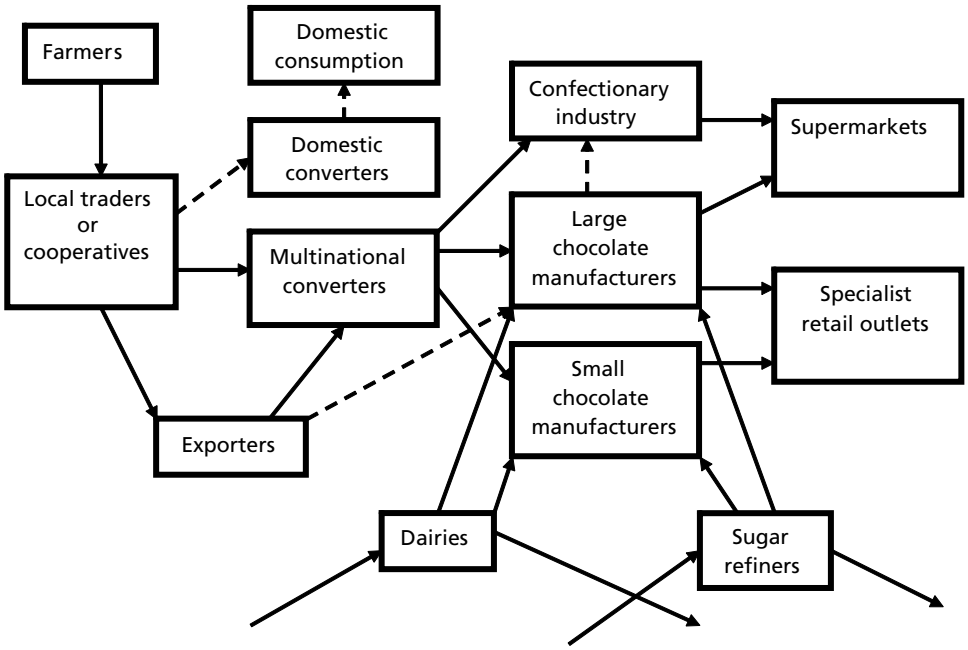
Coffee processing firms are called roasters. Roasters sell directly to retailers (supermarkets and bars or restaurants). The retail product may either be in the form of roasted coffee (beans or as ground coffee) or soluble (instant) coffee. There are two technologies for the production of soluble coffee – spray drying, which has low costs but results in considerable flavour loss, and freeze drying, which conserves flavour but is more costly and requires access to proprietal technology. Figure 1 illustrates the simplest case in which farmers sell (often via cooperatives or local buyers) either to independent exporters or to exporters owned or controlled by multinational exporters.

The two principal variants of the structure illustrated in Figure 1 arise in certain Latin American countries, most notably Colombia, where a parastatal (or state supported) roaster competes with the multinational exporter roasters, even to the point of selling directly to supermarkets and through specialized outlets; and the East African structure in which all, or almost all, sales for export pass through a national coffee auction (Kenya and United Republic of Tanzania). Brazil is both a major coffee-producing and coffee-consuming nation and there is also a supply chain relating to domestic consumption.

Coffee roasting is a concentrated activity. In 1998, the two largest roasters accounted for 29 percent of total world coffee roasting, and the top six roasters for 60 percent (van Dijk *et al*., 1998). This concentration is principally the result of branding. Heterogeneity among coffee varieties and across origins allows roasters to produce differentiated products geared to tastes in specific markets and specific market sectors. Brands are often heavily promoted and this gives rise to a barrier to market entry (see Sutton, 1991, ch.12). Economies of scale are important only in the production of soluble coffees.

The coffee market has been controlled for much of the post Second World War period, most notably by the sequence of International Coffee Agreements (ICAs). The first ICA was negotiated in 1962. It and the succeeding three agreements limited exports to keep prices at levels deemed fair to both producers and consumers. Intervention ended in July 1989. Gilbert (1996, 2004), who follows Law (1975) in describing the ICAs as "internationally sanctioned cartels", concluded that the agreements raised coffee prices but had little effect on variability. Subsequent to the breakdown of coffee controls, the coffee market has seen two extended periods of low prices. The first, from 1989-93, resulted from the release onto the market of producer inventories, previously held back by ICA export restrictions, while the second, from 1999-2002, was the consequence of large production increases in Brazil and Viet Nam against a backdrop of slow consumption growth (Gilbert, 2005).

FIGURE 2
The cocoa-chocolate supply chain



3. THE COCOA-CHOCOLATE SUPPLY CHAIN

Cocoa is a tropical tree crop produced almost entirely by smallholder farmers. Cocoa beans are cleaned, roasted and ground to produce cocoa liquor. This operation is known as converting (or grinding) and the firms which do this are the converters (or grinders). The liquor is then further processed to give two further intermediate products, cocoa butter, and cocoa powder. Cocoa butter and liquor are recombined with cocoa powder, in varying proportions, to make chocolate which also incorporates other inputs – most importantly milk and sugar. Cocoa powder is also used without the butter in confectionary products. Butter and powder are produced in fixed proportions, given the fat content of the beans, and powder is now normally seen as a by-product.[2] Cocoa butter is highly homogeneous and, once processing has taken place, origin is at most a minor consideration.

A simplified version of the cocoa-chocolate supply chain is illustrated in Figure 2. Developing country farmers sell their cocoa beans (perhaps indirectly via a cooperative and/or a local buyer or *traitant*) to an exporter. In many producing countries, some or all of the largest exporters will either be the multinational converters themselves or local companies controlled by the converters. Once shipped to Europe or North America, the beans will be converted to cocoa butter (the basis for chocolate) and cocoa powder (used in both the chocolate and confectionary industries). The large converters tend to be trading companies and are not involved in chocolate manufacture. Some large chocolate manufacturers may also have conversion capacity and so be able to buy directly from exporters. (Figure 2 shows less important links as broken arrows). Otherwise, exporters will find themselves selling to the major converters, often prior to shipping. Chocolate is sold both through supermarkets and through smaller specialist

[2] Historically, chocolate was drink rather than eaten. In the late nineteenth century it became possible to press the cocoa butter from the cake used to make powder, resulting in a surplus of butter. Subsequent growth in the market for eating chocolate, which, crudely and on average, uses the butter from two beans and the powder from one, has resulted in butter becoming the more valuable product – see Othick (1976) and Clarence-Smith (2000).

outlets. A small amount of (generally low quality) cocoa may be processed locally but it is costly to export the butter which is therefore sold locally.[3]

Figure 2 is more complicated than Figure 1, which shows the archetypical coffee supply chain, because chocolate derives from milk and sugar as well as cocoa. Depending on the prices, cocoa accounts for around one half of the raw material costs of chocolate averaging across all types of chocolate confectionary. While coffee is recognizably the same commodity at the top and bottom of the supply chain, this cannot be said of cocoa and chocolate. The supply chain which originates with cocoa interacts with those that originate with milk and sugar. Chocolate is one of a number of final nodes of these combined chains. As noted in the introduction, the value chain concept is a social science construct. While cocoa farmers see themselves as producing the raw material for chocolate, chocolate manufacturers may see cocoa as just one of a number of ingredients in their recipes. The cocoa-chocolate value chain construct is therefore inherently more tenuous than the coffee value chain construct.

Turning to industrial structure, with a few important exceptions, the cocoa markets in the producing countries are free and competitive either because they have always been this way or because of recent moves to liberalize tropical agricultural markets. By contrast, converting exhibits massive economies of scale both in the conversion process itself and in transportation. Figure 2 underlines the pivotal position of the converters in the cocoa value chain. The conversion industry is highly concentrated. Five large oligopolists dominate the industry – ADM, Barry Callebaut, Blommer, Cargill and Petra Foods. These big converters do not manufacture chocolate, and the two most important – ADM and Cargill – see themselves primarily as trading companies. The chocolate industry is much less concentrated and in many countries artisanal production remains important. Chocolate producers have the choice between buying butter and powder from an independent converter or buying beans and undertaking the conversion themselves. Traditionally, they have opted for the latter route but increasingly they are moving towards purchase of butter and powder from the major converters.

4. THE TERMINAL MARKETS

Cocoa and coffee are both traded on futures markets in London and New York. Arabica coffee futures are traded on the New York Board of Trade (NYBOT) while robusta futures are traded in London on the Euronext-LIFFE market. Both markets also trade cocoa futures. Arabica coffee is also traded in São Paulo and Tokyo. Futures markets facilitate hedging and speculation, but crucially for our concerns, these markets also furnish reference prices for international commerce. Because it is this, and not the futures trading function, which is primarily relevant to the discussion in this paper, I refer to these markets as terminal markets.

Although only a relatively small proportion of international commerce in cocoa and coffee is physically delivered to a terminal market, and for this reason the terminal markets do not appear on the coffee and cocoa supply chains sketched in Figures 1 and 2, the terminal markets play the decisive role in determining the values and value shares of almost all the coffee and cocoa traded throughout the world. As noted above, only exceptionally will these futures transactions involve delivery to or from an exchange warehouse. The importance of delivery is that it is this possibility that ties futures to physical prices and thereby allows the futures market to play its triple roles of price discovery and the facilitation of hedging and speculation. I argue below that the threat of delivery is also important in inhibiting the exercise of monopoly power.

[3] There are two major departures from this scheme. Ghana, the second largest cocoa producer and exporter, the Cocoa Marketing Board (Cocobod) is a monopsony buyer. Cocobod exports either directly or through major exporters. Second, one of the five large cocoa converters, Singapore-based Petra Foods, is one of the major chocolate manufacturers in Indonesia, itself a cocoa-producing country.

The main significance of terminal markets for value chain analysis is that they separate the production and retail markets. A coffee roaster in Hamburg sees himself as buying robusta coffee from Uganda basis the LIFFE price and arabica from Kenya basis the NYBOT price. He/she does not need to know anything about producer prices in either country which are irrelevant to his/her calculations. Similarly, the Ugandan robusta exporter sells to roasters in Germany and the United Kingdom basis the same LIFFE price. Retail coffee price in the two countries are irrelevant to him. The implication is that we can consider the producer and retail markets separately. This would not be true for exports of bananas or pineapples where there are no terminal markets.

A possible objection is that there is an increasing degree of vertical integration between coffee exporters and roasters, and even more so between cocoa exporters and converters. Nevertheless, the same argument holds, albeit with qualifications. We can think of integrated exporter-roasters as making separate and independent purchasing and roasting decisions, evaluating the profitability of each basis in terminal market prices. The quantity of beans that they find optimal to purchase from farmers, given producer prices and the terminal market price, may differ from the quantity of beans that they wish to process, given terminal market and retail prices. If that is the case, they can close the gap by purchasing from or selling to independent exporters or by delivering to or taking delivery from the terminal market itself. These expedients impose costs but the costs are likely to be sufficiently low that the producer-retail separation remains valid to a good approximation. In any case, it is an approximation that can be tested (see Gilbert, 2007a).

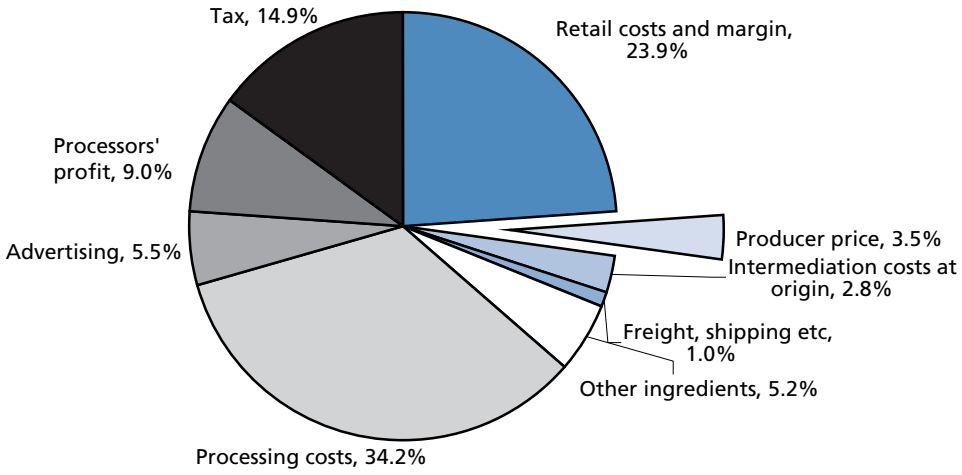
"Fair-trade" and other non-market arrangements violate the proposed separation. In such transactions, prices are set more or less independently of the terminal markets. Such transactions remain a small proportion of total coffee commerce and an even smaller proportion of cocoa commerce. It may also be the case that some small roasters of high quality coffees rely on their own estates for reasons of quality control. Such roasters may put a very different value on their own beans than that available on the free market. This will invalidate producer-retail separation. In what follows, I suppose that these circumstances are exceptional and that it is possible to analyse the two markets separately.

The existence of terminal markets has a second important implication. In the case that monopolistic processors limit purchases in the hope of raising retail prices, exporters have the option of selling and delivering the cocoa or coffee beans to the terminal market. By depressing the terminal market price these deliveries will provide the incentive for either incumbent or entrants to expand purchases for processing. Correspondingly, if monopsonistic exports attempt to limit sales, processors can buy and take delivery of additional quantities from the terminal market. The resulting higher terminal market prices will encourage exporters to increase their sales. The ability of exporters to deliver to, and of processors to take delivery from, the terminal market limits the exercise of monopoly and monopsony power. Both groups of agents are likely to find that their best strategy is to act as price takers on these markets. This is the assumption I will make in what follows.

There cannot be a guarantee that this assumption will be correct. If processors or exporters do have sufficient size to affect aggregate sales or exports, the futures market will not *per se* prevent them from doing this. Nevertheless, where terminal markets are associated with futures trading, and this is the case with the London and New York coffee and cocoa terminal markets, futures market regulatory legislation will make it illegal for any party to manipulatively attempt to create an artificial exchange price, whether this results from activities on or off the exchange itself.[4] The line between

[4] The relevant legislation is the Commodity Exchanges Act in the United States and the Financial Services Act in the United Kingdom.

FIGURE 3
Indicative cost breakdown, UK milk chocolate, 2004



what is legal and what is illegal is often finely drawn. It will always be acceptable for processors and exporters to make quantity decisions, but it will be unacceptable for them to enter the market with price objectives. In economic terminology, Cournot strategies will be legal, but it will be illegal for a monopolist to enter the market to buy up supplies delivered to the market in the absence of a commercial requirement for this material.

5. AN ACCOUNTING FRAMEWORK

To move from a supply chain to a value chain we need to attach values to each stage in the supply chain. A prerequisite for doing this is an accounting framework. This framework is facilitated by the separation of producer and retail markets implied by the existence of liquid terminal markets.

Simple value share discussions often appear to be based on the identity:

retail price of processed coffee = producer price of coffee + gross margin, or,

$$p = \pi + m \qquad (1)$$

Within this structure, the producers' value share is just $\omega = \frac{\pi}{p}$.

It is obvious but not always made explicit that the producer price π of a commodity is at most an upper bound on the return obtained by the producer. The production of many commodities requires inputs and these can account for a large proportion of the price the farmer receives. Production may also involve hired labour inputs. Finally, there is the opportunity cost to the labour that the farmer and his/her family provide. The farmer's net return is likely to vary across commodities and producing countries depend on the importance of these various factors. It is not clear a priori that one should expect a very strong relationship between the gross producer shares implied by identity (1) and the net returns obtained by the producers, which is presumably our ultimate concern.

Suppose that we are nevertheless happy to interpret the producers' value share ω as implied by identity (1) as a measure of producer welfare. Does it follow that a decline in this share is due to the exercise of monopoly or monopsony power? The accounting identity (1) aggregates the processors' profit margin with processing and intermediation

costs in the same way that it includes input and labour costs in the producers' gross receipts. For other commodities, such as cocoa, other raw material inputs (milk, sugar) may be as or more important than the cocoa input.

Figure 3 shows an indicative cost breakdown for UK milk chocolate in 2004.[5] Milk chocolate is made from milk and sugar in addition to cocoa. The cocoa producer is seen as obtaining only 3.5 percent of the final retail price. Total raw material costs (including transport etc.) are estimated as 12.5 percent of the retail price. Processing and retail costs are responsible for the largest share of the total (34 percent and 24 percent respectively).

A more complete framework which can accommodate this degree of complexity is the following:

retail price of processed product = producer price (domestic currency)
+ internal transportation and other fobbing costs
+ taxes at origin
+ costs and margin of internal traders]/exchange rate
+ cif-fob margin and other export costs
+ costs of other raw material inputs (2)
+ processing cost
+ processing margin
+ advertising cost
+ retail costs and margin
+ sales or value added tax

GVC analysis tends to ascribe much of the variation of the producer value share ω to changes in the processing margin which reflect, in part, changes in processors' monopoly power. Identity (2) emphasizes that many other factors can contribute to changes in producer value shares. Trade liberalization can affect the cif-fob margin.[6] In particular, market liberalization should decrease intermediation costs – see Akiyama (2001) and Varangis and Schreiber (2001) for the effects of coffee and cocoa market liberalization respectively.

We can simplify discussion of the producer value share by examining two components:

the producer's value share of the final retail price $\omega = \frac{\pi}{p}$ and

$\sigma = \frac{\pi}{f}$, the producer's share of the fob price *f*.

The two measures are related through the identity

$$\omega = \frac{\pi / f}{p / f} = \frac{\sigma}{1+\mu} \tag{3}$$

where μ is the processor's gross margin over the fob price. The result is to divide the identity (2) into two components:

retail price of processed product = terminal market price
+ premium
+ processing cost
+ processing margin
+ advertising cost (4)

[5] Source: confidential (private communication).

[6] If exchange rate changes are not fully and immediately reflected in both producer and retail prices, the producers' value share will exhibit some exchange rate dependency.

+ retail costs and margin
+ sales or value added tax

producer price (domestic currency) = [terminal market price+ premium
– cif-fob margin and other export costs] x *exchange rate*
– costs and margin of internal traders (5)
– internal transportation and other fobbing costs
– taxes at origin

This reformulation is definitional. However, in conjunction with the substantive assumptions that both producers and roasters are price takers on the terminal market (see section 4), and that any premium is small, it allows us to see the retail price as the terminal market price *plus* the processor margin and other costs, and the producer price as the same terminal market price *less* intermediation costs and margins.

The change of perspective is important. Identity (2) invites us to view the retail price as the sum of production, intermediation and processing costs plus margins. Identity (5) turns this equation round and invites us to see producer prices as the residual resulting from the subtraction of intermediation costs and margins from the terminal market price. One way of seeing the fair-trade movement is an attempt to revert to the approach reflected in identity (2): farmers are paid a "fair" rather than a residual price, but, since other costs do not fall to offset these extra payments, the terminal market price is overridden and the fair-traded retail price is determined on a cost plus basis.

6. AN ECONOMIC FRAMEWORK FOR GVC ANALYSIS

In order to discuss the economic determinants of changes in value shares, I need to embed the GVC concept in a simple economic framework. I use the most simple possible linear supply and demand framework.

In Figure 4, demand for the processed product, price p, is given by the demand function D. S' is the supply function of the commodity raw material, price π. There is a constant processing cost k (which includes the processing margin and retail costs and margin) and an intermediation cost c, both of which are common to all firms. There is no quantity loss in processing and, in this simple example, no other raw materials are used. This implies a competitive supply function S for the processed product which satisfies the equation $p = \pi + c + k$. The terminal market price $f = \pi + c = p - k$.

Under competition, production is q^c with commodity price π^c and processed good price p^c. As we have seen, however, commodity processing tends to be concentrated and processing firms have monopoly power. This will imply a lower level of production q^m with commodity price π^m and processed good price p^m. Conditional upon this reduction, the product price rises from p^c to p^m while the commodity price falls from π^c to π^m. The extent to which the product price is high is governed by the slope of the demand curve D, while the extent to which the commodity price is depressed depends on the slop of the supply curve S'.

A formal model for the determination of these three ratios in both a competitive and a oligopoly-oligopsony market structure can be found in an earlier version of this paper (see Gilbert, 2007b). The original feature of this model is that it includes a terminal market on which exporters and roasters are price-takers. This device makes it easy to allow different degrees of monopoly and monopsony power resulting from different numbers of roasters (n) and exporters (m). Here, I illustrate the model by considering a simple example.

The demand function is

$$Q = 125 - \tfrac{1}{4} p \tag{6}$$

and the supply function is

$$Q = 2\pi \tag{7}$$

FIGURE 4
The GVC decomposition in a simple supply-demand model

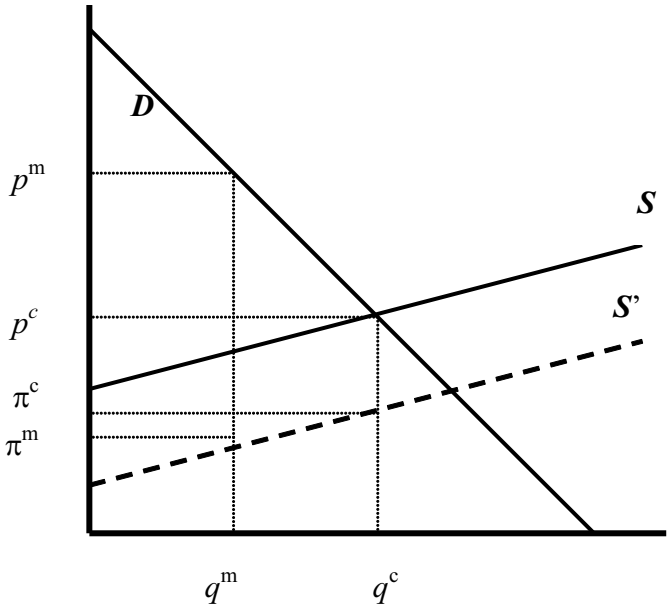


TABLE 1
Results – Base Case

		Competition	Oligopoly
Quantity	*Q*	100	80
Retail price	*p*	100	180
Terminal market price	*f*	75	75
Producer price	*π*	50	40
Producer share of retail price	ω	50.0%	22.2%
Producer share of terminal market price	σ	66.7%	53.3%
Processor gross margin	*μ*	33.3%	140.0%
Processor net margin (profit)	ν	0.0%	106.7%
Consumer surplus	*CS*	20 000	12 800

I take both intermediation and processing costs to be 25 (i.e. $c = k = 25$) and, in the oligopolistic case, suppose that the numbers m and n of firms in the producer and retail market are both equal to 4. The processors and exporters both maximize profits taking the terminal market price f as given. Market equilibrium sets the terminal market price such that the quantity exported is the same as that purchased. The processor's net margin is $\nu = \mu - k/f$.

Consumer surplus, the standard measure of consumer benefit from consumption of a good, is measured by the area under the demand curve:

$$CS = \frac{1}{2}\left(\frac{\alpha}{\beta} - p\right)Q \tag{8}$$

Table 1 gives the outcomes. In this example, the supply elasticity is unity while the demand elasticity rises from 0.25 in the competitive case to 0.56 in the oligopolistic case. Since demand is less elastic than supply, the effect of the oligopolistic restriction of output is greater on the retail price than on the producer price, as illustrated in Figure 4. Because the number n of processors is equal to the number m of exporters,

TABLE 2
Results – Variations

	Base case	(a) Demand shock	(b) Market liberalization	(c) Technological advance	(d) Increased monopoly	(e) Increased monopsony
Quantity Q	80.0	83.6	80.9	80.9	75.5	79.4
Retail price p	180.0	185.8	176.4	176.4	197.9	182.4
Terminal market price f	75.0	77.2	70.6	75.6	72.2	77.9
Producer price π	40.0	41.8	40.4	40.4	37.8	39.7
Producer retail share ω	22.2%	22.5%	22.9%	22.9%	19.1%	21.8%
Producer terminal market share σ	53.3%	54.1%	57.3%	53.5%	52.3%	50.9%
Processor gross margin μ	140.0%	140.6%	150.1%	133.5%	174.1%	134.0%
Processor net margin ν	106.7%	108.2%	114.6%	107.1%	139.5%	100.9%
Consumer surplus CS	12 800	13 963	13 086	13 086	11 408	12 612

monopoly and monopsony power have an offsetting effect on the terminal market price which remains at the competitive level. Oligopoly halves the producer share of the retail price from 50 percent to 22.2 percent, but most of this impact comes from the higher retail price – the producer share of the terminal market price declines more modestly from 66.7 percent to 53.3 percent. The actual decline in the producer price, presumably what matters to the farmers, is 20 percent, from 50 to 40. The massive fall in the producer share of the retail price confuses the issue by exaggerating the possible price for which farmers might look.

We may use this framework to consider a number of scenarios. I consider the following:

a) a demand shock, reflected in a change in the intercept of the demand function (6) from 125 to 130;
b) market liberalization, resulting in a fall in intermediation costs c from 25 to 20;
c) technological advance in processing, resulting in a fall in processing costs k from 25 to 20;
d) an increase in concentration at the processing stage, modelled as a fall in the number n of firms from 4 to 3;
e) an increase in concentration at the exporting stage, modelled as a fall in the number m of exporters from 4 to 3.

Results, taking the second column of Table 1 as the base case, are summarized in Table 2.

a) A demand shock raises the quantity transacted and all prices. Producers obtain an increased share of both the retail and the terminal market prices, the proportional increase being larger in terms of the terminal market price.
b) Producers gain little from market liberalization. The 25 percent reduction in intermediation costs from 25 to 20 only raises the producer price by 1 percent, from 40.0 to 40.4. However, because the terminal market price falls by nearly the full amount of the cost reduction, the producer share of the retail price is sharply higher. The long term incidence of cost reductions in the commodity industries is on consumers (consumer surplus rises by 2.2 percent) and processors rather than producers (see Gilbert and Varangis 2004).[7]
c) A reduction in processing costs has the same impact on prices and quantities as the same reduction in intermediation costs. The only difference is in the

[7] Oxfam (2002a, p.21) appears to assert that market liberalization may actually worsen the position of farmers: "However, the impact of ill-imposed liberalization on international prices often negates any short-term positive benefit to farmers." This statement is only correct if "negates" is translated as "partially offsets".

terminal market price itself. Again, the incidence is primarily on consumers.[8]

d) Increased retail market concentration pushes up the retail price, in this instance by almost 10 percent, and also depresses the producer price, here by 5.5 percent. Processing margins are sharply higher.[9]

e) Increased monopsony power has much smaller effects. This is because I have assumed a high supply elasticity which prevents the monopsonists from pushing producer prices down by very much. Paradoxically, the indirect effect on terminal and hence retail prices is larger, as these are pushed up by the monopsonistic reduction in exports. Processing margins are slightly squeezed.

Viewing the value chain as a geographically distributed network, Gereffi *et al.* (1994, p.4) assert that the GVC "approach explains the distribution of wealth within a chain as an outcome of the relative intensity of competition within different modes". They subsume factor remuneration to the cake division problem. The model set out above shows that this is, at the very least, an over-simplification. It is true that the extent of monopoly and monopsony power are factors which do influence value shares, but it is not true that, by themselves, they determine value shares. The level of demand, the state of technology and the size of processing and intermediation costs are also important factors in determining these shares. It must be an empirical question as to whether these or the monopolistic factors are more important in practice. One cannot automatically infer from the fact that because one set of actors obtains a greater value share than a second set, this is because the former is operating in a less competitive environment.

7. THE PRODUCERS' VALUE SHARE IN COFFEE

There have been a number of applications of GVC analysis to the contemporary coffee market (see in particular Talbot, 1997, and Daviron and Ponte, 2005).[10] Some of these analyses have been provoked by a feeling of crisis in the industry resulting from low market prices, first in the early 1990s in the immediate aftermath of the ending of coffee controls, and more latterly over the period 1999-2002 when prices again became very low. With specific reference to this later period, Oxfam (2002b) asserted that coffee farmers were averaging 5 percent of the value of retail coffee. By contrast, Talbot (1997) estimates producers' share of final value to have been around 20 percent over the period in which the ICAs remained economically active.

The decline in the producer share in value added over the post-ICA period is taken as implying that the market process has been unfair. Daviron and Ponte (2005, p.123), for example, state that "the proportions of generated income were relatively fairly distributed between consuming and producing countries" under the ICA regime, but that, starting from the 1990s, farmers have been "squeezed" (p. 209) with the result that value has been "transferred from farmers to consuming-country operators" (p. 246). It is undeniable that the majority of smallholder coffee farmers have not obtained satisfactory returns over much of the past twenty years, while the roasters have enjoyed much greater prosperity. The danger with discussions of this sort is that they can give a misleading impression that the prosperity of the processors is a cause of the difficulties experienced by the farmer. We saw in section 6 that exercise of monopoly or monopsony power is only one of a number of factors which can result in changes in the producers' value share.

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[8] An increase in labour costs increases processing costs and so has exactly the opposite impact – the producer share of the retail price falls but there is little impact on the producer share of the terminal market price.

[9] Discussing the cocoa market, Oxfam (2002a, p.5) states, "The fact that processing is controlled by powerful multinationals … means that corporations can use monopolistic buying practices to artificially inflate prices. This in turn reduces demand for cocoa … and exerts a downward pressure on producer prices."

[10] The framework has also been adopted by some economic historians – see Samper (2003) for a historical reconstruction of the coffee chain in Costa Rica.

TABLE 3
Value shares for arabica coffee producers, 1980-2005

	Brazil	Colombia	Guatemala	Kenya	United Rep. of Tanzania	Average
1980-88	27.3%	27.4%	37.4%	43.6%	35.9%	34.3%
1989-2005	22.6%	23.4%	21.1%	27.0%*	16.5%	22.1%
1989-93	28.1%	22.6%	18.9%	18.4%	16.8%	20.9%
1994-98	21.6%	27.2%	24.3%	40.9%	22.3%	27.2%
1999-2003	17.6%	20.0%	18.4%	22.3%	12.7%	18.2%
2004-05	23.7%	24.3%	25.9%	24.9%**	10.6%	21.7%

Source: ICO
Note: The table gives the producer price for coffee beans as a share of the US retail price of coffee. All prices are measured in US dollars. The final column gives a simple average of the five country shares. Years are calendar years.
* Kenya: 1989-2004, ** Kenya: 2004.

TABLE 4
Value shares for robusta coffee producers, 1980-2005

	Brazil	Côte d'Ivoire	Indonesia	Uganda	Viet Nam	Average
1980-88	14.4%	17.5%	19.2%	16.5%	43.6%	23.8%
1989-2005	14.7%	10.3%*	11.9%	15.1%**	13.6%	13.2%
1989-93	12.3%	12.5%	10.4%	8.1%	14.5%	11.6%
1994-98	21.8%	12.1%	19.5%	24.5%	19.1%	19.4%
1999-2003	10.5%	7.2%*	7.0%	12.2%**	8.6%	9.1%
2004-05**	13.2%	6.5%	8.7%	-	10.1%	12.1%

Source: ICO
Note: The table gives the producer price for coffee beans as a share of the US retail price of coffee. All prices are measured in US dollars. The final column gives a simple average of the five country shares. Years are calendar years.
* No figure is available for 2001 in Côte d'Ivoire,** I have disregarded the figures reported by the ICO for Ugandan producer prices in 2003-05 as being implausibly high.

In what follows, I look at the producers' value shares for five major arabica producing countries (Brazil, Colombia, Guatemala, Kenya and United Republic of Tanzania) and five major robusta producers (Brazil, Côte d'Ivoire. Indonesia, Uganda and Viet Nam). In each case, I compare the producer price in the producing country to the retail price of coffee in the United States. All prices are measured in US dollars.[11] Table 3 gives the value shares for the arabica producers and Table 4 for the robusta producers.

In each case, I compare the producers' value shares in the final decade of ICO controls (row 1) with the post-ICA period (row 2), but I also break down the post-ICA period into four sub-periods:

1989-93 This was the initial low price period during which the market was obliged to absorb stocks previously held back in producing countries as the result of ICO quota restrictions on exports.

1994-98 1994 saw prices surge as the result of frosts in Brazil. Prices remained above normal levels through the following three years.

1999-2003 These were the Coffee Crisis years. Low prices resulted from the emergence of Viet Nam as a major robusta exporter and from the substantial expansion of mechanized production in Brazil.

2004-05 These two years show recovery to normal prices in the context of a more general commodity price boom.

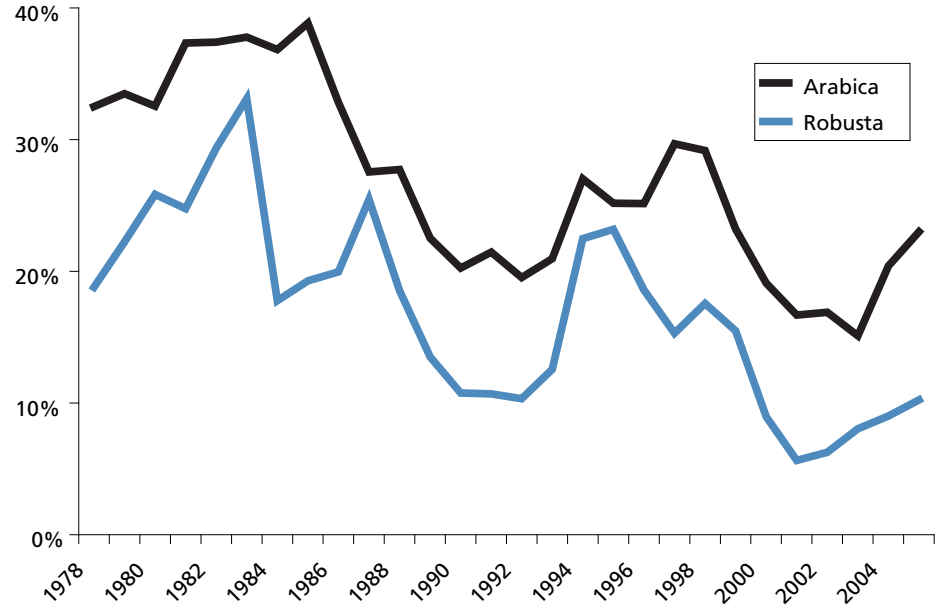
A number of features are apparent from Tables 3 and 4.

a) In all periods, and for almost all countries, the producers' value share was higher for arabicas than for robustas. It seems likely that this reflects the higher costs incurred by arabica farmers and hence does not imply that they necessarily obtained a superior return.

b) There is considerable variation across producers within each group. In arabicas, producers in Kenya and the United Republic of Tanzania have seen

[11] Source: International Coffee Organization.

FIGURE 5
Average arabica and robusta producer value shares, 1978-2005



much greater share variability than have their counterparts in Latin America, particularly Brazil and Colombia. There is greater consistency in the pattern exhibited by the robusta producers. In common with the East African arabica producers, Uganda has experienced the greatest share variability, but Côte d'Ivoire, Indonesia and Viet Nam have seen the greatest erosion of share.

c) Although it is true on average that most arabica and robusta producers have lost value share in the post-control period, this is not uniformly true. In particular, Brazilian robusta producers are seen as having experienced a small value share gain[12] and the loss of share in Uganda is very small.

d) Value shares did fall to very low levels for robusta producers over the Coffee Crisis years. There has subsequently been some recovery for a number of these producers, but the recovery has not been uniform.

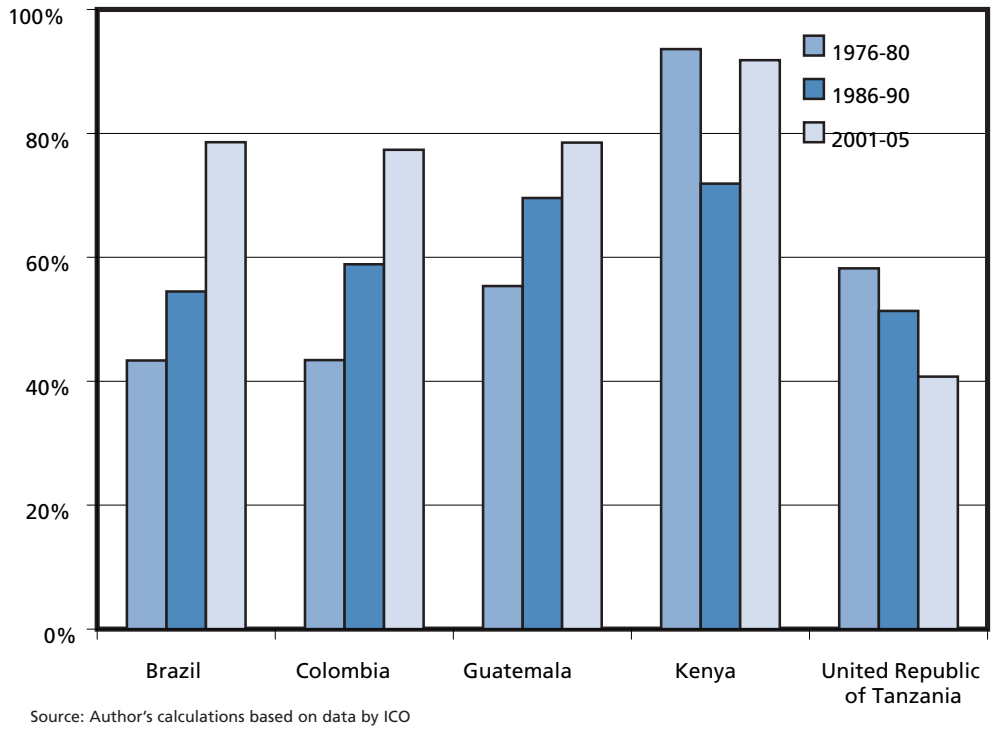
These diverse patterns underline the argument advanced in section 5 that the accounting framework which underlies much GVC analysis over-simplifies the allocation of overall value. One should be cautious about drawing strong conclusions from changes in the value share of a single producer or even from an average. The most one can conclude simply from inspection of the information in Tables 3 and 4 is that there has been some general loss in producer value share in the post control period, that these value shares were indeed very low for robusta producers over the Coffee Crisis years, but that there has been a general but non-uniform recovery over the most recent years. This is illustrated in Figure 5 which shows the average value shares across the five arabica and robusta producers considered in Tables 3 and 4 respectively.[13]

The perspective changes completely once one looks at the producer value shares of terminal market prices. Here I consider the numerator of the ratio of equation (3), i.e. $\sigma = \frac{\pi}{f}$, in relation to the ten coffee producer prices distinguished above.

[12] The bulk of Brazilian robusta is consumed domestically so a value share relative to US retail prices is perhaps not very interesting.

[13] The figures are simple averages.

FIGURE 6
Arabica producer prices as a share of ICO arabica price indices



Source: Author's calculations based on data by ICO

I follow standard practice in measuring the terminal market price by the relevant ICO price index.

Figure 6 shows average producer share of the relevant ICO index[14] for the five arabica producers over the most recent five year period (2001-05) by comparison with the five years 1986-90 at the end of the ICO control period and the five years 1976-80 which covered the coffee boom. Figure 7 shows the comparable share of the ICO Robustas index for the five robusta producers.

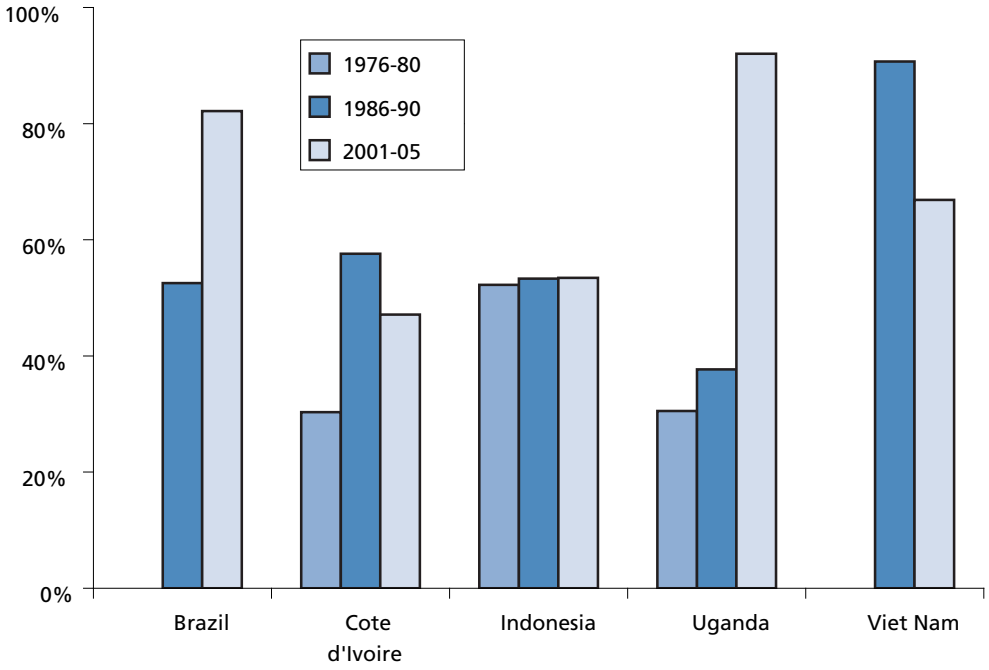
There is considerable variation in both the levels of these ratios and the change over the 25 year period considered.

- The three Latin American coffee producers exhibit a steady increase in producer share.
- Tanzanian farmers obtain the lowest share of the fob arabica price. Furthermore, this share has tended to decrease over time while arabica producers in other countries have seen increased shares.
- There is no general tendency evident in the producer share for robusta farmers. Brazilian and Ugandan robusta producers have benefited from a high and rising share, while farmers in Côte d'Ivoire and Viet Nam have witnessed a decline in their shares of the world price, albeit from a high level in the case of Viet Nam.

Overall, however, it is clear that there has been no general downward tendency for the producer's share of terminal market prices. Rather, the evidence is consistent with the view that market liberalization, reduced taxation and quality improvements have tended to generate higher producer shares of world prices than was the case under the "fair" regulated ICO regime.

[14] Arabicas: Brazil – Brazilian and Other Naturals; Colombia – Colombian Milds; Guatemala, Kenya and United Republic of Tanzania – other Milds.

FIGURE 7
Robusta producer prices as a share of the ICO robustas index[1]



[1] Brazil 1987-90, Uganda 2001-02 and Viet Nam 1988-90.

Source: Author's calculations based on data by ICO

8. THE PRODUCERS' VALUE SHARE IN COCOA

Cocoa has received less academic attention than coffee.[15] A clear albeit brief recent discussion of the cocoa and chocolate value chain may be found in Oxfam (2002a). According to that report, "farmers receive at best about 5 percent of the retail value of chocolate" (p. 23). The report also remarks that retailers have considerable market power in chocolate and that they obtain high margins. The most thorough discussion is that reported by ICCO (1990).[16] This study is highly detailed but it relates exclusively to the United Kingdom and covers the period 1975-88. It is beyond the scope of this paper to update the detail of these results or to extend them to other consuming countries. However, in what follows, I rely heavily on the ICCO calculations.

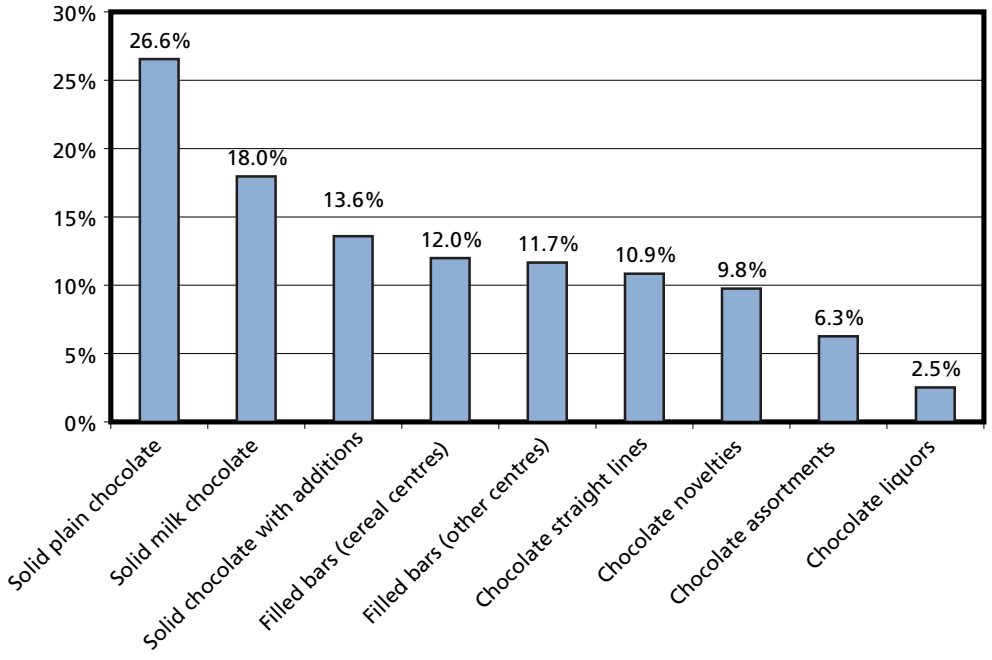
It is more difficult to calculate the producers value share for cocoa than coffee because chocolate is a more heterogeneous product than roast or soluble coffee. In particular, and unlike roast coffee, chocolate incorporates other raw material inputs, notably milk and sugar. The cocoa content of a particular chocolate item therefore depends on the "recipe", and there is substantial variation in these recipes across chocolate product varieties and consuming countries. We may infer UK chocolate recipes over the period 1975-88 from the figures in ICCO (1990).[17] Average cocoa contents over this fourteen year period are charted in Figure 8. Cocoa content varies from 26.5 percent in solid plain chocolate to just 2.5 percent in chocolate liquors. The weighted average across the nine product varieties is 11.3 percent. On average, cocoa accounted for 39.4 percent of the raw material input cost into chocolate products.

[15] In an apparent parody of commodity chain analysis, Clarence-Smith (2000, pp.1-2) recounts "In its 'youth', cocoa was a small and handsome tree, …. In 'middle age', cocoa took the form of fermented and dried brown beans ….In its 'old age', cocoa was transformed again, acquiring the name of chocolate. … The chocolate died, in the act of being consumed". An Italian might add, *la morte del cacao è il ' bacio'*.

[16] Authored by Henri Jason.

[17] These figures relate to the chocolate sector and exclude confectionary which also uses some cocoa.

FIGURE 8
Cocoa content of different UK chocolate products, 1975-88



Source: ICCO (1990)

ICCO (1990) provides an estimate of the average retail price of chocolate products in the United Kingdom over the period 1975-84 based on detailed cost analyses of the nine product lines illustrated in Figure 8. I have updated these estimates to 2005 on a much more crude basis by using the "sweets and chocolates" component of the UK Retail Price Index.[18] The results of these calculations are shown in Figure 9 which charts the retail price of chocolate in the United Kingdom deflated by the UK producer price index, the ICCO Indicator Price converted into sterling and similarly deflated, and finally producer prices of cocoa in Côte d'Ivoire and Ghana on the same basis.[19] The figure shows the chocolate price rising from a 1984 low of £2.88 per lb to a high in 2005 of £3.61 per lb. Over the same period, cocoa producer prices have tended to fall in real terms from around £0.40 per lb in 1984 to around £0.20 per lb in 2005.

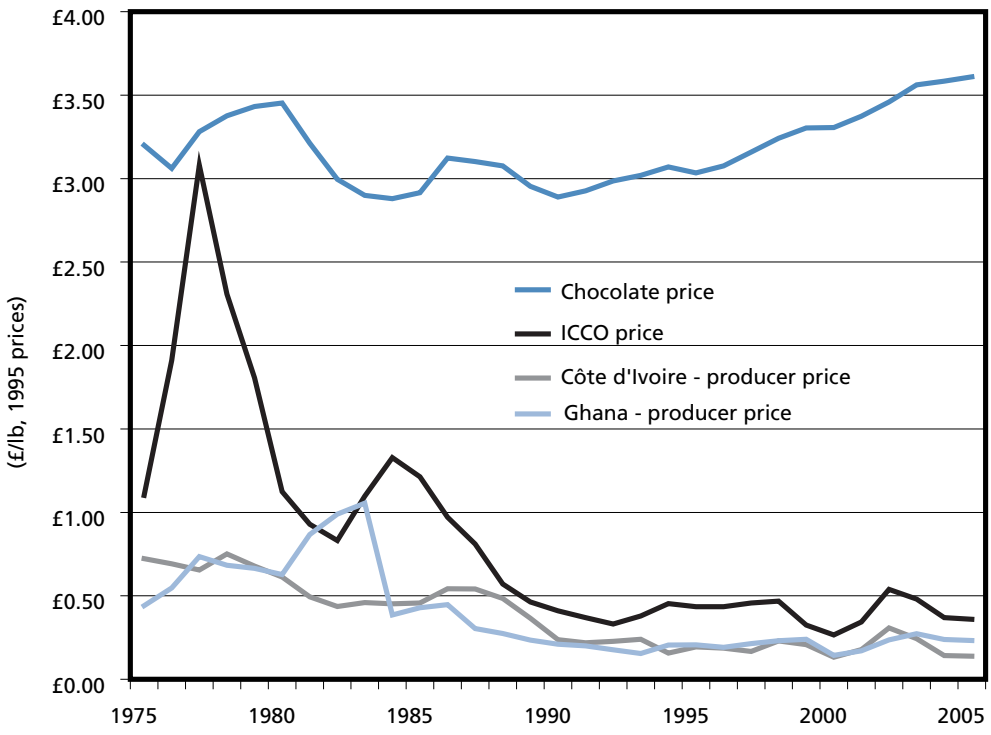
Table 5 gives 10 year averages of the ratio of sterling cocoa producer prices for eight major cocoa producers to the UK chocolate price over the period 1976-2005. The table confirms the visual impression of Figure 9 – a sharp drop in the share of cocoa producers in the chocolate price over the 1976-85 decade, followed by a much more modest fall from 1986-95 to 1996-2005. Lacking similar retail price data for other consuming countries over a comparable period, it is not possible to be absolutely confident that the trend illustrated in Figure 9 and Table 5 is general, but calculations for the United States (not reported here) from 1985 tell a similar story.

Again, however, the story changes once we move to look at the producer share of terminal market prices. Figure 10 reports the analogous calculations for cocoa as those for coffee reported in section 7. The general tendency was for producer shares to rise over the 1980s, from an average of 55 percent in 1976-80 to 69 percent in 1986-90.

[18] Source: UK National Statistics StatBase. This series was no longer calculated after 2005. Note that the coverage of this index is broader than the chocolate index developed in ICCO (1990).

[19] I am grateful to the ICCO for access to their data on cocoa producer prices used in this figure and reported in Table 5. While it would be more natural to deflate the chocolate price by a consumer price index, this would be a less appropriate deflator for the producer prices.

FIGURE 9
Real retail price of chocolate in the United Kingdom and real sterling cocoa prices



Source: Author's calculations based on ICCO (1990) and UK National Statistics

TABLE 5
Cocoa producer price as a share of the UK chocolate price, 10 year averages[1]

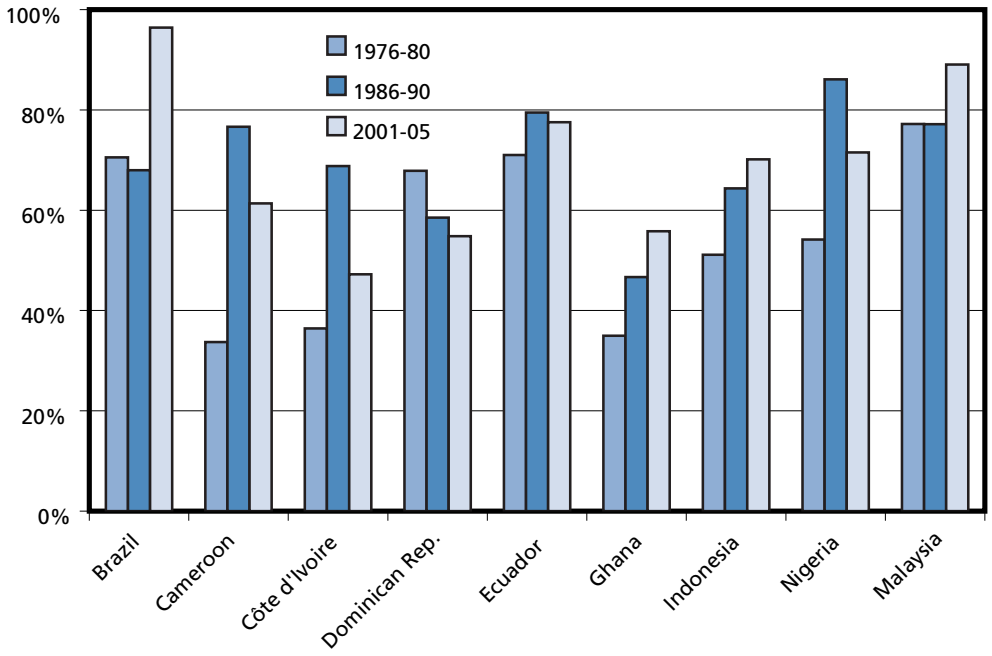
	1976-85	1986-95	1996-2005
Brazil	34.9%	11.9%	10.8%
Cameroon	17.5%	11.7%	7.1%
Côte d'Ivoire	17.9%	10.6%	5.7%
Dominican Republic	34.9%	9.9%	7.5%
Ecuador	34.7%	13.3%	9.1%
Ghana	22.3%	8.0%	6.4%
Indonesia	23.7%	11.2%	8.1%
Malaysia	28.9%	13.6%	10.3%
Nigeria	31.2%	18.8%	18.7%
Average	*27.3%*	*12.1%*	*9.3%*

Source: Author's calculations based on data by ICCOand IMF, International Financial Statistics.
Note: Producer prices (source: ICCO) converted into Sterling at annual average £:US$ exchange rate (source: IMF) as a proportion of the UK chocolate price (£ per tonne)
[1] Cameroon: no producer price for 2004-05; Dominican Republic: no producer price for 2003 and 2005; Ecuador: no producer price for 1976-77; Indonesia: no producer price for 2003-05; Malaysia: no producer price for 1976-80.

There was little overall change over the more recent decade with increased shares in Brazil, Ghana, Indonesia and Malaysia offset by falls elsewhere.

Notable in Figure 10 is the convergence of producer shares in the West African countries with those elsewhere in the world. West Africa is responsible for approximately 70 percent of world cocoa production. Côte d'Ivoire is the largest producer with 40 percent of world production followed by Ghana at 20 percent. Cameroon and Nigeria are also significant producers. Historically, West African cocoa was marketed through monopoly-monopsony market boards (Ghana and Nigeria) or sold through *caisses de stabilisation* (Cameroon and Côte d'Ivoire). These arrangements were absent in other

FIGURE 10
Cocoa producer prices as a share of the ICCO cocoa price



Source: Author's calculations based on data by ICCOand IMF, International Financial Statistics.
Certain averages are curtailed over a reduced number of observations. See Table 5 for details.

cocoa exporting countries, of which the most important is Indonesia, responsible for approximately 10 percent of world production. The West African marketing systems have been comprehensively liberalized starting with the 1986 abolition of agricultural marketing boards in Nigeria.[20] As a consequence, the region operates under broadly the same structure as the remainder of the sector, although a slimmed-down marketing board continues to function in Ghana.

As in the case of coffee, there has been no tendency for the producer's share of terminal market prices to fall. Indeed, on the limited evidence available cocoa producer shares have risen consistently across almost all producing countries over the 1980s, in part because of market liberalization.

9. THE RETAIL MARKET

The results discussed in sections 7 and 8 appear paradoxical. The producer value share in both the coffee and cocoa markets has declined over the past three decades while, at the same time, the producer share in terminal market prices has increased. The immediate implication is that explanation for the declining value share ω must be sought in the retail and not the producer market. In terms of the ratio

$$\omega = \frac{\pi / f}{p / f} = \frac{\sigma}{1+\mu}$$

given in equation (3), since ω has fallen and the producer share σ in the terminal market price has risen, arithmetically, we must expect to find a rise in the retail margin μ.

[20] The cocoa liberalization experience is discussed in Gilbert (1997), Varangis and Schreiber (2001) and Gilbert and Varangis (2004).

TABLE 6
Gross retail coffee margins, 1980-2005

	France	Germany	Italy	Japan	Netherlands	Sweden	UK	USA
1980-88	167%	201%	190%	549%*	135%	165%	594%	115%
1989-2005	261%	385%	611%	1 461%	326%	342%	1 576%	324%
1989-93	336%	479%	685%	1 717%	347%	380%	1 387%	311%
1994-98	146%	251%	351%	1 134%	200%	250%	1 035%	207%
1999-2003	297%	420%	751%	1 693%	404%	407%	2 177%	458%
2004-05	273%	395%	726%	1 064%	389%	315%	1 896%	312%

Source: ICO
Note: The table gives the margin μ of the retail coffee price over the ICO Composite Index for the pre- and post-ICO control periods and for four sup-periods in the post control period. * 1982-88.

Table 6 gives the gross margins[21] of retail coffee prices over the ICO Indicator Price for seven major coffee consuming countries for the same sub-periods as the producer value shares in Tables 3 and 4. The table may be analysed either by looking down the columns or across the rows.

- Looking down the columns, we find that roasters' gross margins have indeed increased in the post-control period – excluding Japan and the United Kingdom, where margins are exceptionally high, the average increase is from 162 percent to 375 percent.
- Margins were particularly high in the two sub-periods in which world prices were exceptionally low – the initial five year period 1989-93 when consuming countries were absorbing inventories previously held back in producing countries, and the Coffee Crisis years 1999-2003. Gross margins fell back dramatically following the Brazilian frosts of 1994 and more modestly in the recovery from the Coffee Crisis over the past two years.
- Considerable diversity across countries is evident in looking across the rows of Table 6, although there has been some convergence over the period examined. Leaving aside Italy, Japan and the United Kingdom, gross margins ranged between 273 percent (France) and (395 percent) Germany in the final sub-period examined (2004-05). Margins in Japan and the United Kingdom have always been very much higher than in other consuming countries and this situation persists. This possibly reflects the very different Japanese and UK coffee product format. In Italy, gross margins were comparable with those in other European countries in the 1980s but over the subsequent period retail prices have risen much more than elsewhere.

There are three possible explanations of rising retail margins over world coffee prices:

a) Rising retail prices reflect increases in other production costs. In coffee, these are costs associated with transportation, processing and marketing, while in chocolate they also include other raw material costs, notably those of milk and sugar.
b) Rising retail prices are the consequence of increased profit margins induced by high levels of industrial concentration.
c) Rising retail prices reflect use of higher quality beans with the consequence that terminal market prices do not adequately reflect the cost of the raw material used.

While the third of these explanations might be important for an individual roaster, it is not possible that all major consumers are buying increasingly high quality coffee over time. I therefore concentrate on the first two explanations.

[21] i.e. margins gross of all other costs including other raw material costs. Absence of comprehensive retail chocolate price data prevents repetition of this analysis for cocoa.

Direct inference on profit margins requires access to cost information but, for obvious reasons, this is not available on a comprehensive basis.[22] Indirect inference is possible from analysis of the pass-through of world coffee prices to retail prices. This is possible since exercise of monopoly power raises retail prices above costs in relation to the extent of this power. This allows us to infer the existence and extent of monopoly power whenever a rise or fall in world coffee prices results in greater than unit pass-through to retail prices. This observation forms the basis for a number of recent tests for monopoly power in the retail coffee market:

- Bettendorf and Verboven (2000) examined the Dutch retail market using monthly data over the five year period 1992-96. They noted the "relatively large share of costs other than bean costs" and conclude that market conduct is "relatively competitive".
- Feuerstein (2002) analysed monthly retail prices in Germany from 1971 to 1995. He concluded that "cost shocks lead to price changes of approximately the same amount, leaving price-cost margins unchanged".
- Durevall (2004) used quarterly data from the Swedish market from 1978 to 2002. He found some evidence that roasters have market power in the short run but none in the long run.
- Leibtag *et al.* (2007) have access to detailed data on the US retail market for the period 1993-2004. They find that retail prices respond slightly less than one-to-one to bean costs.
- Gilbert (2007) uses annual data for eight coffee consuming countries over the period 1980-2005. He finds that the extent of market power in France, Germany and the Netherlands is zero or very low. Sweden and the United States showed moderately high levels of monopoly power in the 1980s, but these have declined, in the case of the United States to continental European levels. By contrast, there appears to be a high level of monopoly power in the non-traditional markets in Japan and the United Kingdom, with monopoly power seen as increasing over time in the United Kingdom.[23]

The conclusion from these five studies is that the retail coffee industry is predominantly competitive. There is multiple evidence that this is the case for continental Europe although major question marks remain for Japan, the United Kingdom, and, to a lesser extent, Sweden. The US market now appears competitive although this may not have been the case historically. The implication is that, since retail prices have risen while green coffee prices have fallen, given that retail prices only rise in proportion to costs, then non-bean costs must have risen by more than sufficient to offset falling green coffee prices. It is only in relation to the United Kingdom that one can argue that increased monopoly power has been a factor in the declining producer share of retail coffee prices.

10. CAN PRODUCERS ADD VALUE?

We can distinguish three types of strategy which producers might use to increase their share of the value of the retail product:

a) Working against the market: producers obtain a high share of terminal market prices but these prices are too low for many producers to make a satisfactory living. This motivates the strategy of overriding market forces by imposing a "fair" price on consumers. This was the producers' objective in the active International Coffee Agreements which extended (with breaks) from 1962

[22] An exception is the 1991 report on the UK market for soluble coffee, in which the dominant producer (Nestlé) enjoyed a 48 percent share by volume. The regulatory agency (the Monopolies and Mergers Commission, MMC) failed to find any "weaknesses in price competition to justify intervention" (MMC, 1991).

[23] He was unable to estimate the extent of monopoly power in the eighth country considered, Italy.

to 1989 and the International Cocoa Agreements from 1981 to 1988. This objective was met with considerable success in the former case but very little in the latter (see Gilbert, 1996).[24] It is also the approach advocated by Robbins (2003). Working against the market requires considerable unanimity on the part of governments of major producing countries but probably also the active consent of consuming country governments.

b) Working outside the market: producers who do not like world cocoa or coffee prices can attempt to sell at higher prices to consumers who are willing to accept these prices. This is the basis for the fair-trade coffee and chocolate. As noted in section 5, under fair-trade retail prices are calculated on a cost-plus basis from "fair" producer prices instead of producer prices resulting as a residual from the subtraction of intermediation costs from terminal market prices. Fair-trade is one component of the strategy advocated by Daviron and Ponte (2005). Robbins (2003) is sceptical that fair-trade can make more than a marginal contribution.

c) Working with the market: Coffee, particularly arabica, is heterogeneous, and consumers are willing to pay premia for what they perceive as particularly fine beans. These premia allow producers to obtain acceptable prices even when the terminal market prices for standard grades are low. This suggests that producers should strive to increase quality so that roasters, particularly speciality roasters, can further expand the quality market. (This strategy has less potential for robusta coffees and cocoa where beans are closer to being homogeneous). Daviron and Ponte (2005) suggest that certification of coffee as organic, sustainable or shade-grown coffee offers further potential for differentiation and hence for producer premia (see Kaplinsky, 2006 for a similar argument).[25] As with fair-trade coffee, there must be a question as to the extent to which initiatives of this sort can capture a major segment of the market.

Coffee and cocoa prices have fallen relative to historical levels for two reasons. The first is rising productivity, most notably in the Brazilian coffee industry which has seen extensive mechanization. The consequence of higher productivity is that the same coffee revenues are required to support a smaller number of people. Producers in countries which have attained productivity growth can remain competitive at prices which cause problems for producers in other countries. The second reason for low cocoa and coffee prices is the lack of development in many African and Central American producing countries which implies that farmers have few alternative market options. The consequence is that farmers in these low development countries continue to produce coffee and cocoa even at low prices.

All businesses need to focus both on maintaining or raising margins and on reducing costs. In relation to tropical commodities, exponents of the GVC approach have looked only at the former question – for example, Kaplinsky (2006) poses the question, "How can agricultural commodity producers appropriate a greater share of value chain incomes?" This can be an appropriate question for those producers who can sell into profitable niche markets but is unlikely to be a helpful approach for the large number

[24] The official objective of the agreements was price stabilization, but producers interpreted the stabilization to at fair prices and in these and other agreements, they resisted downward adjustment of the price stabilization range in line with market prices. The agreements have continued but without activated "economic" (i.e. intervention) clauses.

[25] Smallholder cocoa is grown within the rain forest and, when young, under the cover of the forest. It is almost always sustainable in the sense that the land can revert to forest after the life of the trees. It is non-sustainable in a different sense – cocoa is a "migratory crop" and it is difficult to successfully replant cocoa in forest previously used for cocoa production. Coffee is naturally organic in certain producing countries, in particular Ethiopia and Uganda. In other countries, failure to use fertilizer or insecticides may result in considerable deterioration in coffee quality and any organic premium will need to be offset against a possibly lower quality premium. This is not a problem in cocoa.

of cocoa or robusta coffee farmers. For these producers, it is better to ask how they can adapt to lower prices. In the coffee industry, one answer is to consolidate holdings and mechanize so as to be able to attain Brazilian levels of productivity. It is important to recognize that the majority of trade in commodities will be in bulk and will fetch closer to world prices. The focus of policy should be on equipping farmers to produce efficiently at these prices. This requires improved extension, more efficient transportation and port handling and reduction of corruption. It will also be assisted by consolidation of land holdings and clearer land title both of which will facilitate increased mechanization, even at a modest level (more important for coffee than cocoa).

Nevertheless, I recognize that land title is complex and credit availability is limited in much of Africa and this is to reduce the possibilities for productivity enhancement. These constraints will both be eased if the producing economies develop more rapidly providing non-farm opportunities for the labour currently employed in the cocoa and coffee sectors. But this is to see enhanced prosperity in tropical export agriculture as a consequence and not a cause of development.

11. GOVERNANCE ISSUES

GVC analysts often emphasize the positive contribution that can arise from improved governance in the value chain. Over the past decade, the multilateral development agencies have laid emphasis on the role of good governance as a precondition for growth and it may therefore appear difficult to suggest that a call for improved value chain governance may be misplaced. After all, good governance is surely better than poor governance. Nevertheless, governance imposes costs, and an economist is bound to ask whether even good governance is better than no governance, leaving it to the political scientist to ask whether good governance is, in any case, a likely outcome.

Daviron and Ponte (2005) assert that the coffee value chain has "moved away from a public-controlled system where producers had a substantial say towards one that is more private and buyer-dominated". It is true that producer country governments have lost many of the powers they previously enjoyed in both the cocoa and coffee sectors to determine prices, exports and the distribution of rents in the era of monopoly-monopsony marketing boards, *caisses de stabilisation* and, in the case of coffee, an effective quota-based international agreement policed by consumer governments on their behalf. Producers, on the other hand, who are now free to choose how much they produce and to whom they sell, have gained in power. Some will wish to account this as generating a democratic surplus. Roasters, the "buyers", are also free to organize their purchases with fewer restrictions, although, since they were able to pass high prices onto consumers, the controls probably had little effect on their profitability. In any case, since the evidence for coffee is that both retail and producer markets have become more and not less competitive over the post-control period, it is difficult to sustain the view that this market has become "private or buyer-dominated". Competition dissipates power. The correct judgement is that producer governments have seen their power redistributed towards the millions of coffee consumers and farmers. This is the context in which we need to view calls for "improved governance".

What, then, are the specific governance proposals? Robbins (2003) is the only recent proponent of turning back the clock to supply management and hence returning power to the producer governments. Daviron and Ponte (2005) make more modest suggestions. They wish to see increased regulation within producing countries, in particular in relation to quality and indicators of geographical origin, regulation of sustainability certification and improved labelling in consumer countries and international anti-trust regulation. These proposals are in part reasonable but in part misconceived and even potentially dangerous.

Indicators of geographical origin and sustainability certification are both useful instruments which have the potential of improving consumer choice. They need to

be constituted within a minimal regulatory structure, and the international cocoa and coffee organizations are well-placed to fill this role. It is less obvious that they require any legal backup in either producing or consuming countries. Voluntary adhesion is preferable to compulsion and false or misleading claims can be prosecuted under existing national consumer protection legislation. Further, the view that market liberalization has, as a general matter, resulted in erosion of quality standards is mistaken, and there is no market failure in the production of quality which makes regulation necessary. Cocoa and coffee exporters are always concerned with the quality of the beans they export and, as Gilbert and Tollens (2003) showed in relation to Cameroon's exports of cocoa, they can be relied upon not to purchase beans which fall short of the required standard. These elements of Daviron and Ponte's (2005) proposals stem from the mistaken view that the only direction for producing cocoa- and coffee-countries is to add value together with a mistrust on their part of the ability of market agents (farmers, intermediaries, exporters, processors and consumers) to make those decisions that are in their best interest.

The final proposal made by Daviron and Ponte (2005), that for international anti-trust regulation, is the most seriously misconceived. Even if there were evidence for the exercise of monopoly and/or monopsony power in the cocoa or coffee industries to the detriment of consumers and/or producers, national competition authorities would be sufficient to regulate these abuses. Microsoft, probably the most powerful company in world business, has been prosecuted in courts in the United States and European Union. No one has suggested that a multilateral competition agency is required in the IT industry. Why then should it be required in the much less important tropical commodities industries? By the same token, producing countries have set up their own regulatory authorities to deal with possible abuses in purchasing – an example is the twin structure of the *Autorité de Regulation du Café et du Cacao* (ARCC) and the *Bourse du Café et du Cacao* (BCC) established as part of the 2000 liberalization in Côte d'Ivoire. Again, there is no need for multilateral action which would add to costs without any likely increase in effectiveness. Once created, such an international competition authority would need to justify its existence by taking some actions – a large budget and high salaries would call for results. There is a clear worry that such an authority might initiate frivolous actions where there is little or no evidence that these may be required.

In any case, the evidence assembled in this and a number of other recent papers[26] is that, despite concentration in coffee roasting and cocoa conversion industries, monopoly and monopsony power are both either absent or have diminished with the consequence that most producer and retail markets are now close to fully competitive. The exceptions, in particular the Japanese and the British retail markets, can easily be dealt with by national competition authorities. The premise for increased regulation is therefore absent.

The quality of the institutional structure will determine the efficiency of a supply chain and its capacity to deliver to its stakeholders. Any proposal which goes in the direction of enhancing institutional quality is to be welcomed. Much of what Daviron and Ponte (2005) propose under the heading of improved governance falls under this heading. There are additional possibilities, for example improved functioning of producer representative organizations, which are perhaps equally valuable. Industry-specific regulation, however, is neither necessary nor desirable, either within producing and consuming countries or at an international level. One of the main objectives that the multilateral agencies have pursued in pushing the liberalization agenda is that of reducing what was seen as an excessive involvement of government in the commodity

[26] Feuerstein (2002), Bettendorf and Verboven (2003), Krivonos (2004), Durevall (2006), Leibtag *et al.* (2007), Gilbert (2007).

export sectors. The pre-reform regulatory structures, now largely swept away, raised costs, inhibited competition and innovation and redistributed revenues away from farmers. There is a danger that the slogan "improved governance" may be a camouflage for rolling back some of these reforms.

12. CONCLUSIONS

Because value chain analysis is only a framework for analysis, it does not, by itself, have substantive implications. The issue is whether it is useful, not whether it is correct. Gereffi *et al.* (1994) assert that GVC analysis "… allows us to pose questions about contemporary development issues that are not easily handled by previous paradigms …" (p.2). In this paper I have argued that the application of GVC analysis has indeed usefully highlighted a number of issues that traditional economists are prone to neglect, but that it in turn also encourages its proponents to over-simplify other important issues where traditional economic analysis is more useful.

Despite the claims of its proponents, GVC analysis is not useful in explaining value shares, and indeed, the producer's value share of the retail product is not always a useful concept. This is for two reasons. First, the concept of a commodity value chain is not always well-defined. The notion of a cocoa-chocolate value chain may seem natural to cocoa producers but is less so for the chocolate and confectionary industry which sees itself as sourcing raw materials from a much wider range. In cases such as these, the entire value chain concept over-simplifies and, in so doing, poses misconceived questions. Second, terminal markets, and specifically the NYBOT and Euronext-LIFFE coffee and cocoa markets, separate producer and retail markets. The pivotal role of these exchanges has not been recognized in the value chain literature. Although only a small proportion of the total volume of sales and purchases passes through the exchanges, the terminal markets provide reference prices for almost the entirety of world commerce in coffee and cocoa. This has not always been the case historically, and there is no guarantee that it will remain so in the future, but it is the current situation. Terminal markets increase competition since producers can always sell to the exchange and processors can always purchase there. A likely outcome is that both sets of actors become price takers on the terminal markets and this is the source of the producer-retail separation. Given such a separation, it makes much more sense to look separately at the producer share of the terminal market price and the processor margin over the terminal market price than to combine the two into a single, difficult-to-interpret, measure. This approach also successfully overcomes the problem noted above of complex value chains – the producer share of the cocoa terminal market price is a well-defined concept; the producer share of the retail chocolate price is not.

Nevertheless, although unable to win on its home ground of explaining value shares, GVC analysis can win some away matches. For example, Daviron and Ponte (2005) are to be congratulated on their discussion of possibilities for producers to add value, although they may be over-optimistic about the extent of these possibilities. However, one should beware of their suggestion that regulatory structures should be created (or re-created) to further these objectives, which are best pursued within a voluntary framework.

Turning to substantive findings, there have been a number of claims that coffee and cocoa processors have exerted monopoly-monopsony power with the result that producers' shares have been squeezed. This impression is given credence by the high levels of processor concentration in some of these industries. The analysis of the coffee and cocoa industries in this paper has failed to provide any evidence supportive of this view. Producer value shares in terminal market prices have generally increased as the consequence of market liberalization and reduced levels of taxation. The decline in producer value shares in retail prices is seen to reflect an evolution of the cost structures in the processing industries. The conjunction of lower raw material (coffee and cocoa bean) prices with a continuing rise in the real labour and other costs incurred in the

consuming countries has resulted in real retail prices declining only modestly (coffee) or remaining broadly stable (chocolate). Despite the high levels of concentration in both cocoa conversion and coffee roasting, there is little evidence that this shift in cost structures has anything to do with relative intensities of competition. It follows that there is no case for creating an international anti-trust authority for the coffee and cocoa industries. Problems of monopoly power, which may be present in Japan and the United Kingdom, can be adequately addressed by national competitive regulators.

The explanation for the decline in the producer share of the retail coffee price is simpler – only a proportion, perhaps around one half, of the cost of roast coffee is attributable to the coffee beans themselves. The other half is the result of processing, transportation and marketing costs incurred in the consuming countries and these costs have tended to increase or remain broadly constant. The fall in the world price of coffee had no effect on these consumer country costs. Retail coffee prices reflect all production costs, not just those incurred in producing countries.

Some commentators suggest that market liberalization in the cocoa and coffee producing countries, often seen as imposed and/or poorly executed, has contributed to the decline in producer shares of retail prices. This is not the case. The general tendency has been for producers to obtain an increased share of the terminal market price and has offset the tendency for terminal market prices to decline as a proportion of retail prices. Absent market liberalization, producers (particularly West African cocoa producers) would have seen an even larger decline in their share of retail prices.

Coffee prices, in particular, have been weak, and even disastrously, over the two most recent (post-control) decades. There are two reasons for this weakness – major advances in productivity through mechanization in Brazil, and the chronic lack of alternative earning possibilities in many African and Central American producing countries. Producing countries which cannot compete with the modern coffee sector in Brazil are obliged either to exit from coffee production or to endure lower levels of real remuneration. Since the exit option is only attractive in countries which are experiencing growth in other sectors, most poor farmers are forced to take the second alternative. A prosperous tropical export crop sector can contribute to overall prosperity and poverty reduction but, in the current environment, the sector is unlikely to generate growth and development in a way that may have seemed feasible 50 years ago.

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Imperfect competition, agriculture and development

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This paper reviews the subset of literature that confronts imperfect competition in internationally traded agricultural commodities and food products. The role of government in developing a strategic trade policy is delineated from the firm's straightforward exercise of market power. Additional discussion includes a review of the literature that is specific to trade with developing countries. The empirical results are mixed with most concerning events seemingly related to first, active participation of multinational firms in illegal cartels and second, various forms of tacit collusion scattered among different food industries. The changes occurring in the international economic arena that deal with imperfect competition are simply staggering. Overlaid with complex and delicate agricultural trade policy negotiations and the important role that agriculture maintains in the developing world, much more analyses of these markets are called for.

1. INTRODUCTION

The global food economy has undergone unprecedented changes over the past three decades. The emergence and increasing acceptance of agricultural biotechnology, tariffication of quotas and subsequent reductions in border tariffs for agricultural products, implementation of the World Trade Organization (WTO) hard law dispute settlement process, elimination of import-oriented state trading enterprises, numerous regional trade agreements and rapidly advancing foreign investment from the developed to the developing world are a subset of these new developments. In addition, since 1980, nations primarily in developing, newly industrialized, and former Soviet bloc regions have privatized over 100 000 firms (Nellis and Birdsall, 2005). As nations embraced market reforms within the context of globalization, in most every case, new competition agencies were established to deal with impending issues such as mergers, cartels, vertical arrangements, and abuse of dominance. While the new regulatory order in these nations appears to head toward some measure of transnational antitrust harmonization through the International Competition Network's coordinating practices (Sokol, 2007), there is considerable uncertainty and angst about how global competition enforcement will function and how useful and effective it will be. Issues such as national differences in the interpretation of antitrust violations, jurisdictional boundaries in global trade, and the degree of international/regional coordination regarding mergers are likely to have a substantive role in determining the global business climate for years to come. As Hamilton and Stiegert (2000) demonstrate, trade distortions may occur through asymmetric antitrust legislation, as countries which allow highly refined vertical linkages gain comparative advantage in the production of finished goods while countries with stringent antitrust laws acquire comparative advantage in the production of raw materials. Given that downstream industries are

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typically high value-added stages of production and often associated with developed countries, the source of comparative advantage in vertically structured sectors is of a particular policy concern.

Shareholders of multinational firms either directly pressure or delegate with incentive schemes that include stock and stock option packages their desire for managers to produce high returns on share valuation. Managers, in turn, merge and spin off firm assets, make partly irreversible long-run capital decisions, align the firm with other firms and/or governments through contracts and alliances in ways that attempt to attract more investors, increase returns on invested capital (i.e. normalized profits), that when successful, lead to high price/earnings ratios. Firms regularly consider and practice legal forms of buyer and seller market power to extract market rents thereby increasing profits and profit growth. Such practices include obtaining cost advantages through innovation, erecting legal barriers to entry (i.e. branded products), or pricing above marginal costs when conditions allow for it. As well, shareholders seeking maximum returns on invested capital are also able to distort product market via delegation strategies in the form of managerial incentives.

Other forms of firm behaviour point to more problematic corporate cultures and governance. Recent Enron-like corporate accounting scandals at two global food firms (Dutch grocery chain Ahold and Italian food processor Parmalat)[2] speaks volumes about the lengths some managers might take to insure even the illusion of healthy financial statements. Moreover, the recent revelations of cartel-forming behaviour (see Connor, 2005; Bolotova, Connor and Miller, 2007; Connor and Lande, 2006) show that multinational food firms actively and successfully find illegal ways to extract actual earnings in the form of consumer and producer surplus from numerous global markets (several vitamin markets, high fructose corn syrup, leaf tobacco, lysine, citric acid to name several).

It is generally agreed that the responsibility of competition agencies and justice departments are to insure that the legal pursuit of market power is checked, that markets remain competitive, and violations of antitrust laws are prosecuted. While competition agencies and antitrust laws are generally in agreement on the illegality of cartels, enforcement represents a major issue on two fronts. First, it is difficult to police international cartels when the meetings do not take place on domestic soil. Indeed, it was not until ADM executives conspired to set prices at a meeting in Hawaii that the US Department of Justice could prosecute the case (Eichenwald, 2000). Second, cartel agreements not involving a domestic firm are difficult or impossible to prosecute. In other situations, it is difficult to determine when a practice is in violation of antitrust laws. For instance, predatory pricing is illegal because firms price below marginal costs with the intent of driving out competitors leading to long-term market power. However, intent is hard to prove. Firms may simply price lower to increase market share and utilize modern and efficient capacity, which acts to drive average costs lower. The decision by the US Supreme Court to overturn lower court rulings against Weyerhauser Lumber on predatory buying practices is a recent example of how the courts have struggled in enforcing predatory pricing behaviour (see Weyerhaeuser Co. v. Ross-Simmons Hardwood Lumber Co., No. 05-381 [U.S. February 20, 2007]). Additionally, in some agricultural industries such as the biotech-seed, marginal costs are near zero and pricing must be structured to recover decade-long investments in R&D and in breeding seeds that perform well in different growing regions and conditions. Much research has been conducted on imperfect competition and/or strategic trade in

[2] Ahold executive overstated by a half of billion dollars quantity discounts/rebates as accounts receivables from its US operations with upstream vendors (CNNmoney.com, 2003; De Jong, DeJong, Mertens and Roosenboom, 2005). Parmalat used falsified, bogus Cayman Island accounts to hide at least US$9 billion in losses (Business Week, 2004).

international agricultural markets. In this paper, I begin by first laying the groundwork for the methodologies used in imperfect competition. I then review the theoretical literature on strategic trade. This is followed with a review of the applied research in the international food markets and imperfect competition. Finally, I review the specific findings that focus on developing country markets.

2. ANALYTICAL METHODS IN TRADE AND COMPETITION

2.1 Traditional industrial organization methods

Imperfect competition, as far as this review is concerned, is defined as the ability of firms to price above marginal costs. The methods for empirically evaluating or testing for imperfect competition are usually confined to just a few possible approaches. The first approach is a qualitative market assessment followed up with reduced form analysis of aggregate pricing patterns. This approach is commonly referred to as structure conduct performance analysis (SCP). Empirical work in the SCP tradition has largely gone out of favour but remains a useful approach for conducting qualitative market studies.[3] A strict trade only application relies on analyzing pricing patterns across nations in reaction to exchange rate markets and is dubbed 'pricing-to-market' (Krugman, 1987; Knetter, 1989). Short-run price discrimination is possible when prices respond differently in markets with different currencies. The pricing-to-market approach requires only border price data, which is usually readily available in most countries. The second method, commonly dubbed the new empirical industrial organization (NEIO), is actually a set of various methodologies built to measure directly the wedge between firm or industry cost and the observed price. Bresnahan (1982) first developed the mechanics that identify market power using only aggregate market data. A variant of this is constructed on micro-principles of firm reactions to other competing firm behaviour, such as the conjectural variations approach. When firm level data is unavailable, the conjectural variations model and testing procedure take on an appearance quite similar to Bresnahan's method. Because it is hard, if not impossible to obtain detailed firm-level data for internationally traded products, the method of choice is usually a direct market analysis in the style of Bresnahan or similarly structured NEIO models incorporating aggregate data. Because market power rarely or never remains consistently at a static benchmark equilibrium such as the Bertrand pricing point, the conjectural parameter is best defined as an average of how the market or industry performs through time.[4] Some crude attempts at allowing the conjectural parameter to vary through a time series has deepened our ability to track market power changes, but the linkages to our theory remain weak or ad hoc at best.

2.2 Theory of strategic trade

Compared to the traditional industrial organization styled research, strategic trade is a very different and often misunderstood concept. Brander and Spencer (1985) were the first to show that the presence of imperfect competition presents government with an opportunity to increase domestic welfare by distorting trade. Their model was based on a stylized game theory setup in which two exporting countries, each with a single exporting firm and with no domestic consumption, market to a third country that does not produce the product. When one exporting country maintains a unilateral opportunity to offer export subsidies, it is easy to show that an optimal subsidy generates the equivalent of a Stackelberg leader-follower outcome that shifts rents from

[3] The SCP approach never completely overcome the so-called Demsetz critique, which suggests that the positive relationship between increased industry concentration and price-cost margins is not due to increased market power, but because of increased market share of large lower-cost firms.

[4] Some NEIO studies use a menu approach, which tests which benchmark equilibrium best describes the data. Unfortunately, the conjectural variation's model often emerges as the best-fitted model.

the non-subsidized firm towards the firm in the subsidized country. Much theoretical literature developed around the strategic trade policy theme.[5]

Almost immediately after Brander and Spencer's breakthrough, Eaton and Grossman (1986) pointed towards two important weaknesses of the approach. First, they showed that the correct policy mechanism hinged on the government knowing the mode of conduct: price games lead to export tariffs and quantity games lead to export subsidies. Second, because quantity setting games represent trade in strategic substitutes, a prisoner's dilemma emerges when two governments bilaterally provide export subsidies in an attempt to secure rents off the international market. As we will see, these are formidable and possibly fatal obstacles for governments that attempt to design effective and flexible rent-seeking protectionist strategies.

Two other literature strains expanded around the rent-shifting properties of the two-stage strategic trade model: strategic delegation and vertical separation. Ferstmann and Judd (1987) and Sklivas (1987) showed that profit maximizing shareholders might distort a product market by delegating a managerial incentive structure using profit sharing and revenue based salary bonuses.[6] Though nearly identical in structure to the strategic trade model, vertical separation suggests that payments systems between upstream and downstream firms generate the same outcomes that export taxes and subsidies obtain (Bonanno and Vickers, 1988; Lin 1988; Coughlin and Wernerfelt, 1989). Similarly, Bensaïd and Gary-Bobo (1991), Szymanski (1994) and Conlin and Furusawa (2000) demonstrate rent shifting properties within the context of management-union wage bargaining.

Recently, Miller and Pazgal (2005) show that, in the presence of firms using a unique delegation scheme, the government's optimal policy is always an export subsidy. They adopt Miller and Pazgal's (2001) delegation scheme in which shareholders reward managers when competitor profits rise. With respect to agriculture, this is an interesting model on several accounts. Agricultural export subsidies are far more politically feasible and common as compared to export taxes. Additionally, even if export taxes were more politically feasible, governments may not be equipped to ascertain critical information about modes of market conduct. Miller and Pazgal (2005) show this may not be necessary, because the optimal rent-shifting mechanics are diverted from the government to profit maximizing shareholders. Multinational firms are probably in a better position figure out the right managerial incentive scheme for the markets they are most familiar with. To date, no research has investigated the Miller and Pazgal (2005) notion of managerial incentives as a way to shift rents across a cross section of industries.

Despite a vibrant and advancing literature leading to a much improved understanding on how government can engage in rent-seeking activity via strategic trade properties, its many limitations have hampered any emergences as a major policy platform in virtually every industry. Brander and Spencer's work (1985) was essentially about nations being able to unilaterally distort trade and shift rent from international markets to the home

[5] Brander and Spencer (1988), Spencer and Jones (1991, 1992), Fung (1995), Ishikawa and Lee (1997), and Ishikawa and Spencer (1999), among others, consider the effect of vertical structure on strategic trade and characterize how various incentive schemes and patterns of intermediate goods exchange bear on the optimal rent-shifting policy design. Neary (1994) examines the relationship between the social cost of public funds, transnational differences in production costs, and the optimal level of a domestic export subsidy. Dixit (1988) and Qiu (1995) consider circumstances under which countervailing duties by an importer provide sufficient deterrence to curtail the rent-shifting activities of an exporting country. Goldberg (1995a, 1995b) and Karp and Perloff (1995) investigate the strategic trade implications of limited government commitment, and Bagwell and Staiger (1994), Maggi (1996) and Brainard and Martimort (1998) examine the effect of incomplete information on the optimal rent-shifting mechanism.

[6] The delegation literature has been identified with a number of business practices including merger incentives (Ziss, 2001; Gonzalez-Maestre and Lopez-Cunat, 2001; Banal-Estanol and Ottaviani, 2006), multiproduct firm incentives (Barcena-Ruiz and Espinosa, 1999; Moner-Colonques *et al.,* 2004) and relative performance measures (Fumas, 1992; Aggarwal and Samwick, 1999; Miller and Pazgal, 2001).

firm. The key ingredients for such trade distorting practices are that markets are imperfect, there exists some form of unilateral precommitment and that governments know of and are able to implement the correct policy. As we have discussed, the resulting benefits quickly breakdown when both governments in the two-player game offer export subsidies. Dixit (1984) also makes clear that the results are quite sensitive to the number of exporters. Dick (1993) shows that cross-ownership of competitor assets reduces considerably the optimal subsidy in a Brander and Spencer setting. Cross ownership of firms by multinationals is an important reality, which certainly diminishes the concept of a government helping a 'domestic' firm. Dixit and Grossman (1986) demonstrated that welfare determinations are difficult when considering the strategic trade impacts that involve upstream factor markets.

3 COMPETITION AND TRADE IN AGRICULTURE

3.1 Imperfect competition and agricultural trade

Due to high levels of concentration and the presence of import and export trading agencies, agricultural trade is commonly modelled in an oligopoly setting. The most common area of inquiry has focused on the international grain markets. McCalla (1966) and later Alouze, Watson and Sturges (1978) were the first to evaluate the international wheat market in terms of its oligopolistic characteristics.[7] Working from a traditional industrial organization vantage point, both papers were much attuned to the kinds of issues that would arise 10-20 years later in the formal strategic trade literature. For example, both studies recognized a critical role for government, state trading enterprises and the need for a grain storage mechanism as a key strategic factor to control prices. Indeed, Alouze, Watson and Sturges' (1978) result of an emerging global triopoly hinged on the Australian Government's decision to build massive grain storage facilities to operate at a time when the United States stored grain through the Commodity Credit Corporation and the Canadian Wheat Board used a centralized command system and disaggregated physical storage network to control supply. In the 1960s and 1970s wheat quality demands related reasonably well to a traditional grading system. Thus, it was easy to think in terms of a homogeneous global commodity, where without differentiation or capacity constraints, there are no incentives to play price games. The wheat market has dramatically changed from the 1960s and 1970s. Much of the recent evidence suggests that wheat characteristics are now far more identifiable and priced in differentiated product setting (Stiegert and Blanc, 1997; Parcell and Stiegert, 1998). Following Baker and Bresnahan (1985), Carter, Maclaren and Yilmaz (1999) estimated a residual wheat import demand model for Japan that incorporated product differentiation. They found support for the United States as a price leader with Australia and Canada competing in the fringe market. Other wheat market studies have focused on price discrimination and time series methods to uncover market leadership patterns. Generally, support for some form of country level leadership, particularly for Canada, emerged from these studies (see Smith, Goodwin and Holt, 1995 and Goodwin and Schroeder, 1991). Pick and Park (1991) found support for price discrimination by US wheat exporters among importing countries. Patterson and Abbott (1994) found statistical evidence of price discrimination and hence market power by US wheat exporters, although the margins are small.

The presence of two major state trading enterprises (STE) in the world wheat market has led to considerable research about their distorting impacts. Kraft, Furtan and Tyrchniewicz (1996) found that the Canadian Wheat Board generated US$19-US$34 per tonne in benefits to farmers as a result of single desk export operations. Carter, Lyons and Berwald (1998) linked bureaucratic inefficiencies within the Canadian

[7] Other early examples include Carter and Schmitz (1979), Sarris and Freebairn (1983), Karp and McCalla (1983), Paarlberg and Abbott (1986), and Kolstad and Burris (1986).

Wheat Board to US$20-US$37 per tonne in losses to Canadian barley producers. Carter and Schmitz (1979) and Love and Murniningtyas (1992) suggested that wheat importer STEs had as much or more to do with the competitive structure in world wheat markets as did exporter STEs.

Studies of market distortions and market power involving other agricultural commodities and institutions have also been brought forward. Carter and MacLaren (1997) evaluated US and Australian beef export patterns to Japan by testing six oligopoly benchmark outcomes seeking out the one best suited to the data. They identified Australia as the Stackelberg price leader. Carter (1993) found no evidence of imperfect competition in the international barley markets. Schmitz and Gray (2000) found that the Canadian Wheat Board accrued $72 million per annum in rents from distorting international barley trade. Anania, Bohman and Carter (1992) report that excess profits are absent from the international wheat market. Patterson and Abbott (1994) found that market power in international wheat markets was present, but the economic impacts were small. The Center for International Economics found no evidence of price premiums in export markets for malting barley exported by the Australian Barley Board. Deodhar and Sheldon (1997) found that international soymeal mark-ups were at competitive levels while Pick and Park (1991) obtained ambiguous results on soybean meal and oil exports when using the pricing-to-market approach.

3.2 Strategic trade in agriculture

The agricultural trade literature provides an adequate backdrop to consider the overall implications of strategic trade effects on global markets and welfare. Unfortunately, very little empirical work on strategic trade in agriculture has been conducted.[8] Following the theoretical footprint in Hamilton and Stiegert (2000), Hamilton and Stiegert (2002) and Dong, Marsh and Stiegert (2006) evaluated and tested for rent shifting possibilities in the durum wheat and malting barley trade markets respectively. Both studies centered on similar policy structures emanating from large STEs: the Canadian Wheat Board and the Australian Barley Board. The Canadian Wheat Board is the only STE operating in the world durum market, while both the Canadian Wheat Board and the Australian Barley Board compete in the global malting barley market.

The behaviour of STEs in international markets fits the above plausibility requirement for strategic trade in several ways. First, STE activities are quite transparent relative to independent operating firms and much transaction and internal payment data are public. Second, unlike the case of governments shifting rent in favour of domestic firms, which may raise strategic delegation issues and asymmetric information problems, STEs maintain legal and exclusive control over both the instruments of strategic trade and the quantity traded. In simple words, STEs represent one of the simplest and most transparent organizational forms that has the potential to distort trade. STEs are also a point of major economic and global political contention. Shortly after the Uruguay Round, the US General Accounting Office was commissioned to conduct two studies on STE behaviour (GAO, 1995, 1996). The results of these studies were, very generally, that grain STEs use many policy tools that comply with WTO law. The STE activities considered more problematic included export licenses, subsidies not tied marginally to a commodity, access to below-market borrowing rates, tax advantages, transportation subsidies and delayed producer payments. Rent-shifting and strategic trade were not on the list. However, the nature of the delayed producer payment system was such that it could act as an implicit export subsidy. Because durum wheat producers in Canada

[8] Other well-known strategic trade studies include six on the international automobile markets (Dixit, 1987; Krishna, Hogan and Swagel, 1994; Smith, 1994; Feenstra, Gagnon and Knetter, 1996; and Goldberg, 1995a), petrochemical (Bernhofen and Peng, 2000), photographic film industry (Kadiyali, 1997), airlines, (Klepper, 1994; Norman and Strandenes, 1994), and telecommunications (Kahai, Kasserman and Mayo, 1996).

and barley producers in Canada and Australia are paid an initial payment substantially below the market price, it is reasonable to consider that the STE operates much like a firm with a unilateral subsidy from the government. By setting a below-market initial procurement price for a commodity, a legally sanctioned STE could thus be able to shift rent in the export market in a manner similar to a downstream firm in a vertically structured industry which can strategically position itself through use of an upstream price restraint.[9] Moreover, in the case of STEs, the final payment in a delayed producer payment system, which is typically delivered in lump-sum fashion, provides an explicit method of transfer back to the input supplier that rationalizes the system.

By sequential design, the study carried out in Hamilton and Stiegert (2002) was much simpler compared to Dong, Marsh and Stiegert (2006). Indeed, most of the anecdotal evidence about durum markets indicated that the assumption of product homogeneity was acceptable. Further, the only STE operating in the international durum market was the Canadian Wheat Board and they usually controlled 40-60 percent of the export market. As mentioned above, malting barley is traded globally involving two STEs and there is little evidence that malting barley is a homogenous commodity. Thus the major challenges in Dong, Marsh and Stiegert (2006) was to build a model with product differentiation features and allow to the two countries the ability for pre-commitment. Immediately, one should realize that the features in the malting barley market make it more difficult to justify the use of a strategic policy tool. If malting barley can be differentiated, perhaps the governing boards should find ways to build niche markets, coordinate production along quality parameters to assure return buyers, and use the residual feed barley market to maintain these quality goals. Once properly differentiated, premiums can be extracted from the world market regardless of the prepayment system.

Both papers present similar methods to test for rent shifting effects. The principal equations describing input prices that optimize the rent-shifting mechanism were constructed from a simple isoelastic demand equation. The optimal markdown that is determined by the initial procurement price, is shown to be characterized by the level of marginal costs, the export market share and the share of the other exporters. Dong, Marsh and Stiegert (2006), developed equivalent versions of the optimal markdowns for a dual STE framework with product differentiation possibilities. Based on a bootstrapped estimation of optimal markdowns and on a signed Wilcoxen nonparametric test, Hamilton and Stiegert (2002) found that of the sample years in which a positive markdown is observed, the results show that actual markdowns were not different from optimal markdowns at the 0.05 level in 17 of 22 cases. In four of the five remaining years, the observed markdown set by the Canadian Wheat Board exceeded the level necessary to acquire the optimal rent-shifting advantage in the durum wheat market. Each of these cases corresponds with a strong leadership signal, although an excessive markdown payment is clearly not profit maximizing. Based on a bootstrapped estimation of the Bayesian system on a signed Wilcoxen nonparametric test, Dong, Marsh and Stiegert (2006) found that actual markdowns were below optimal levels and that the prepayment system could not even effectively function to shift rent in the barley market.

Jointly the results of these papers seem to confirm quite nicely the points made by Dixit (1984) and Eaton and Grossman (1986) several decades earlier. That is, the strategic trade framework does not seem to extend much past its homogeneous duopoly roots. This general finding was emerging from several calibration studies finalized in the mid-1990s and reported in Krugman and Smith (1994). In the preface, Krugman and Smith write: "The empirical implementation of the new trade theory has not been

[9] See Hamilton and Stiegert (2000) for an analysis of the antitrust implications of such vertical arrangements in international markets.

an easy matter. In spite of a growing body of evidence with such empirical work, each new application is a painful process. . . .It is also true that the research provides little support for a drastic rethinking of trade policy. Nobody has yet provided empirical evidence that would suggest large gains from protection or from export subsidy." (page 7). The fact that a strategic trade distortion was identified in the world durum market suggests that such market incentives can be factored into decisions and this should weigh into future negotiations over the rules of STE activity. However, this is a very special case of a single STE controlling 50 percent of the market and choosing its purchase price for the homogenous principle input. The fact that this could not extend into the world malting barley market casts doubt about the importance of strategic trade effects across the broad spectrum of product and certainly buttresses Krugman and Smith's aforementioned point.

Although no other direct tests are found in the literature, Reimer and Stiegert (2006) provide a discussion linking anecdotal evidence of competing grain export subsidies between the United States and the European Union to strategic concerns. Such evidence was suggested by Alston, Carter and Smith (1993) who point that export subsidies under the export enhancement program reduce the costs of price support programs such as in wheat and corn. Leathers (2001) formalized the export subsidy war between the United States and the European Union and his model supported the incentive suggested by Alston, Carter and Smith (1993).

4. STUDIES ON DEVELOPING ECONOMIES

One of the focuses of this paper is to review the literature on imperfect competition and strategic trade in agriculture in the context of developing countries. Strategic trade, in the strictest sense of the term, is about the practice of government intervention to extract rents derived from imperfect competition in tradable markets. In this strict form, there is little to report on strategic trade opportunities for developing countries. Indeed, the kinds of optimal policies in Krisna and Thursby (1992) and in Just, Schmitz and Zilberman (1979) are today far less likely to be available given rapid trends in trade liberalization and privatization of marketing boards. Another obvious reason for the limited findings is that most developing countries would be classified in the small country context and are thus, price taking importers and exporters. Firms with some form of domestic market power in a small country would not be able to project this power to the global market and trade liberalization would, in many cases, force these firms into a more competitive stance. A likely third reason has to do with the potential for downstream market power emerging from the developed world agribusiness firms. The empirical findings in McMillan, Rodrik and Welsh (2002) who examined cashew exports from Mozambique and from Wilcox and Abbott (2004) on cocoa exports from Côte d'Ivoire buttress this point. In particular, both studies show that much of the benefits from liberalized trade will tend to accrue to opportunistic and powerful multinational food firms. Sexton, Sheldon, McCorriston and Wang (2007) cited the cashew and cocoa cases to motivate their vertically aligned trade model with buyer power. In simulations, they show that even modest forms of downstream market power can have fairly large impacts on upstream welfare in developing lands. In one simulation, they show that successive oligopoly power combined with processor oligopsony power reduced producer surplus by about 49 percent. The role of multinational food firms in the developing countries' agroindustrialization was also the focus in Reardon and Barrett (2000). They discuss the depredatory impacts that large firms have had in many developing country settings. However, these studies present scant evidence in terms of nations being able to design an activist strategic trade policy.

As prerequisite to strategic trade, markets must be imperfect and this alone is a motive for reviewing the relevant literature. After a brief discussion about the role of market power in traded commodities from developing countries, I do offer some

consideration of new forms of strategic trade emerging in the new WTO trading system. Some of the earliest NEIO empirical studies focused on the US coffee roasting industry (Gallop and Roberts, 1979; Roberts, 1984). While not a developing country topic per se, downstream market power is a vitally important dimension (Sexton, Sheldon, McCorriston and Wang, 2007). Roberts (1984) rejected price taking behaviour in US coffee roasting industry and found that a duopoly with competitive fringe best supported the data. The welfare impacts were shown of course to be negative but very small compared to both Cournot and collusive outcomes. Although Gallop and Roberts (1979) do not test for a dominant firm, their findings are generally supportive of such an outcome. Empirical research measuring market power in the context of developing country trade began to emerge in the late 1980s. Karp and Perloff (1989) develop a dynamic NEIO approach to examine the structure of the rice export market. Thailand, Pakistan and China are modelled as oligopolists, and all other countries are treated as a competitive fringe. The econometric evidence confirms that this market is oligopolistic but suggests that it is closer to competition than collusion. Yumkella, Unnevehr and Garcia (1994) use a pricing-to-market approach to show that US and Thai exporters of certain varieties of rice are imperfectly competitive. Karp and Perloff (1993) study whether the two largest coffee exporters – Brazil and Colombia – are price takers, oligopolists, or in collusion. As with their rice study they employ a dynamic, quantity-setting homogeneous product model. The coffee export market is found to be oligopolistic, but markups are nonetheless small. Buschena and Perloff (1991) find that the Philippines exercise substantial market power in the coconut oil export market. In a dynamic analysis, Deodhar and Sheldon (1996) find that the German banana import market is best characterized by a Cournot-Nash equilibrium.

In the context of strategic trade in agriculture, WTO special safeguards (SSGs) may show up as a new way for governments to extract rent in developing country markets. Under the new legal framework, member countries are allowed to use a number of policy instruments to address domestic producer welfare losses linked to increases in import levels or precipitous domestic price declines. These include countervailing duties, general safeguards, and SSGs. The former two require a member country to prove the existence of injury to domestic industries and, in certain cases, require that exporting nations injured by the safeguard action are compensated. SSGs emerged as part of the unique and complex Agreement of Agriculture. Under the SSG provision, when import levels exceed a predetermined level, a member country can implement a special safeguard without proof of injury. Special safeguards do not require compensation, nor do they require consultations with relevant countries. One initial problem with the SSGs was that it was available for only those countries that agreed to the tariffication process upon completion of the Uruguay Round. About 100 of the total 150 members of WTO are developing countries. Most had gained accession to WTO well after the Uruguay Round. For these reasons, in the ongoing Doha Round of trade negotiations, which started in 2001, the developing country member contingent called for the use of special safeguards for developing countries and for the abandonment of special safeguards for the developed countries. After the unsuccessful 2003 Cancun Ministerial Conference, a group of developing countries (named the G-33) presented their proposal which highlights the concepts of the SSG. Another group of developing countries (the G-20), which includes countries such as Argentina, Brazil, China, India, Thailand, tabled a proposal in December 2005 that also included issues related to the SSGs.

At the present time, the process for defining SSGs for developing countries has yet to be finalized. However, despite the uncertainties, it appears that special safeguards are likely to remain a policy tool for WTO countries for many years hence. Under the assumption of perfect competition, the trigger mechanism seems safe from strategic manipulation by small domestic firms. However, in less competitive environments,

there exists the potential for the trigger mechanism to be endogenized in the decision process of each firm and also the government. This is likely to change the way in which both importing and domestic firms determine market shares, prices and oligopoly rent. Because the trigger mechanism causes a predictable and large price shock to the importer, the implications for strategic interaction could be quite complex. Additionally, because the SSG does not go into effect at the precise moment that imports exceed the trigger level, but it becomes operational at the end of the period in which the threshold was surpassed, there exists a storage dimension to the problem: imports may increase significantly during the trigger period and consumed in later periods. Hallaert (2005) reviews how special safeguards have been used since 1995. He reports that continuous use of special safeguard is not rare. There are cases in which the additional tariff is imposed over several years. This reality conflicts with the original intent that special safeguards be only a temporary protective measure. Hallaert argues that, to avoid the use of special safeguard as a perpetual or near perpetual protectionist device, a short and discrete time limit must be invoked before the trigger is reset. He also suggests that a requirement of a proof of injury (one simpler than that of general safeguard) is necessary to avoid frequent and continuous use of special safeguard.

Two studies have looked at SSGs under the assumption of competitive markets. Somwaru and Skully (2005) simulate agricultural trade liberalization with SSGs for seven commodities in 13 regions. They show that agricultural liberalization with special safeguards, which is allowed for developing countries, reduces the welfare gain of full liberalization, but the losses are small. Grant and Meilke (2006) simulate several policy scenarios using world wheat as a case study. They employ a partial equilibrium model for 38 major importers and exporters. Random terms are added to the wheat supply and demand equations, which allow for possible uncertainty about the safeguard trigger. The research addresses both price triggers (i.e. safeguard implemented when domestic price falls below a predetermined level) or quantity based triggers and assumes perfect competition. Special safeguards lead to increased world prices and higher domestic prices for developing countries (higher domestic production but lower domestic consumption follow), and stabilized imports into developing countries, thus transferring price risk to world markets. The global welfare effects of trade liberalization with special safeguards were similar to Somwaru and Skully's (2005) conclusion. The research to date fails to incorporate and evaluate the effect imperfect competition may have on these markets. Clearly, this in an area of fruitful research given high levels of concentration in import/export markets involving developing countries.

5. CONCLUDING THOUGHTS

This paper reviewed the literature on strategic trade as it most pertains to agriculture and developing country agricultural interests. Strategic trade is a concept born from a simple duopoly model of homogeneous goods. Realistically, however, the idea of a government mechanism capable of efficient and accurate extraction of rent from complex tradable goods markets has been shown to be difficult and perhaps even impossible. The dynamic nature of the market, the need to define precise modes of conduct, the retaliatory capability of trade competitors all stand in the way of a government's potential objective. WTO rules, at the present time, allow for various forms of strategic opportunity including tariffs, differential tax and investment policies, and R&D subsidization. However, little in the anecdotal literature suggests that governments are moving toward these strategic objectives. In practice, governments are constrained by information and political realities. Strategic trade provides a powerful pedagogical and foundational tool for analysis in imperfect markets. And this is the key contribution. No empirical findings to date offer convincing evidence that governments can or will in the future play such participatory role. The empirical results mirror the

complexities that confound the theoretical realm. In particular, the evidence suggests that strategic interventions are common in international markets, but are not consistent with the notion of an optimal strategic form of government behaviour. This is likely due to difficulties in implementing such complex and overreaching policies.

Strategic trade issues are not likely to disappear and may very well dominate much debate about more effective liberalization of agricultural trade. Special safeguards are a prime example of a policy that governments could use to distort trade along strategic lines. The good news is that a well developed and somewhat settled literature is in place to offer researchers a way to evaluate situations as they may arise and provide opportunities to suggest more effective policies. The role of strategic trade as it pertains to developing countries is not well documented. The paper by Sexton, Sheldon, McCorriston and Wang (2007), in some ways provides a launching point in the broader issue of multinational firm behaviour, government intervention, and developing country welfare gains in north-south trade. Most, but not all, developing countries have experienced considerable welfare gains as a result of freer trade. However, some of the benefits accrue to firms with market power. As globalization continues to march forward, it is important to recognize the dangers that both large firms and proactive governments present to poor populations around the world. New competition agencies and newly enacted antitrust laws are a reality in nearly every developing country in the world. These changes represent small positive steps now, but have the potential to provide tectonic adjustments to the way we check powerful nations and multinational firms. The body of strategic trade literature is part of a critical process of equipping these nascent agencies for dealing with competition issues in an increasing global marketplace.

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Foreign direct investment and agri-food value chains in developing countries: a review of the main issues

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This article provides a critical overview of the literature on foreign direct investment (FDI) in the food industry, focussing, in particular, on developing countries. Issues related to the location of affiliates are examined and arguments that FDI is fundamentally restricted to the major developed blocs are discussed taking into consideration the contributions that focus on the global dimension of current FDI. The impact of FDI inflows on competitiveness in the host countries' food sectors is examined. The evidence suggests that FDI is often associated with concentrated market, however, in some cases it may foster oligopolistic competition. FDI's relation with innovative capacity and trade also proves difficult to unravel. Technological spill-overs to the host country are possible and mainly depend on the domestic firms' ability to imitate. The effect on trade also depends on the efficiency of the agricultural and food sector of the host country. We also present discussions motivated by the novel features of current FDI flows. We focus on South-South flows and FDI in the retail sector, the participation of investment funds, the renewed dynamism of the primary processing sector, and the promotion of pro-active FDI policies in the South.

1. INTRODUCTION

After a decade of high levels of foreign direct investment (FDI) flows, the first years of the new millennium experienced a sharp decline. Tight liquidity with the halt in the stock market boom and economic or political turbulence in major recipient countries were identified as the causes of this reduction. Since then, however, there has begun what is expected to be a sustained recovery. This upturn in FDI has stimulated renewed attention on the topic, with a particular focus on its new features. Services, rather than manufacturing assumed predominance in the 1990s, a trend likely to be maintained given the extent of outsourcing in this sector, the wide-ranging privatizations and the expansion of the tourist industry (Mortimore, 2004). Discussions on policy have evolved from the need to facilitate investment through regulation to the importance of active promotion and targeting of foreign investment. On the other hand, protectionist measures have also begun to emerge. Developing countries are increasing their share of outgoing FDI and with it the importance of South-South flows (Sauvant, 2005). As globalization deepens, small and medium enterprises (SMEs) are also drawn into FDI (UNCTAD, 1998). Institutional investment funds, midway between hot money and long-term investment, have also become a relevant and novel component of FDI,

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particularly in recent energy ventures. Whereas an earlier literature focussed on the dual phenomena of foreign investment and trade within the logic of nation State economies, today the framework is rather that of global production systems, under varying forms of coordination.

The food sector has traditionally been a key component of manufacturing FDI (Wilkinson and Rocha, 2006). The need for proximity to the consumer has meant that food transnationalization has accompanied the consolidation of urban markets both in developed and developing countries. Using UNCTAD data, Senauer and Venturini (2004), have shown that food transnationals were second only to the media industry in the degree of their transnationality, defined as the ratio of foreign to total assets, sales, or employment. In line with the general shift towards services, food retail and other services have begun to be prominent objectives for FDI flows. At the same time, outsourcing for markets in developed economies, organized often by the same retail transnationals has become a key feature of global food networks, although in this case the predominant form of coordination is often contractual, rather than investment on capital assets. The transnationalization of retail has led some researchers to foresee an eventual decline in the significance of the frontiers between domestic and foreign markets, as production in both North and South is increasingly subject to the same standards and globally sourced (Reardon, Timmer and Berdegué, 2004). The upsurge in Chinese raw material import demand, on the other hand, has revitalized trade in food commodities. In this case, the rising competitiveness of the South, particularly in the light of declining subsidies in the North, is leading to a southern migration of US and European trading and primary processing capital. This has been particularly the case in the Mercosur countries that are currently major recipients of oil and grain FDI. One aspect of the South-South FDI flows noted above has been the upturn in FDI to Africa from major developing countries, especially China and India. More recently there has been a wave of investments in sugarcane, particularly in Brazil which is paralleled by increased investment in palm oil in Asia, both for the expanding biofuels market. All three sectors of the downstream food industry, therefore, primary processing, manufacturing, retail and food services are involved in current FDI flows.

Gopinath (2000) has drawn attention to the importance of food FDI within total manufacturing and its wide diffusion across countries based on Dunning's (1992) paradigm that identifies flows with ownership, location and internalization advantages (abbreviated as OLI). Food industry FDI can also be studied within the four objectives elaborated by Behrman (1972) namely, market exploitation, resource access, efficiency gains and the search for strategic assets. In this review, we discuss each of these and we also pay particular attention to the role of research and development (hereinafter R&D). FDI outflows to R&D and technical innovation relate to Behrman's search for strategic assets, an issue that has not been discussed extensively in the food industry literature.

In analysing welfare effects, Gopinath (2000) reviews Bhagwati's (1952) influential 'immiserizing growth' thesis and refers to the threat of FDI been motivated by the static advantages of cheap labour or weak regulation. This has become a key issue in recent years, as the fragmentation of global production systems has led to out-sourcing based on the search for savings in labour costs, or raw material intensive activities (Gereffi, 1994). Strategies of upgrading within the framework of global value chains have now been widely adopted in developing countries to counter the effect of immiserizing growth. For example, non-traditional food exports have become a key component of these upgrading efforts.

Markusen (1984) has focussed on the trade-off between increased efficiency and increased monopoly power. We review this literature exploring the relationship between FDI and market power, including the formation of global cartels as one of its manifestations. New growth theories, for their part, focusing on positive returns

to knowledge and technology, have emphasized the importance of the institutional environment and the potential for dynamic interaction between FDI and the host economy in promoting growth through non-traditional exports, rather than import substitution (Gwynne, 2006).

The paper is organized as follows. Section 2 discusses some of the locational issues that relate to food industry FDI trends. Arguments that FDI flows are fundamentally restricted to the major developed country blocs are of particular relevance here, as we focus our discussion on developing countries. We also discuss the relationship between FDI and competitiveness, examining both the evidence that FDI is attracted to concentrated markets and the impact of investment on competitiveness. In section 3 we discuss the relationship between FDI and technical innovation, while in section 4 we review the evidence on impacts on the host country trade. In section 5 we discuss the novel features of current FDI flows, such as global production systems, South-South FDI, the participation of investment funds, the renewed dynamism of the primary processing sector and the promotion of pro-active FDI policies in the South. Lack of systematic research implies that a number of these issues can only be considered anecdotally. Our conclusions are presented in section 6.

2. MULTINATIONAL ENTERPRISES, FDI AND COMPETITIVENESS

Multinational enterprises (MNEs), it has been argued, rarely become truly global firms but rather expand within their own region, an option facilitated by common institutions, cultural proximity and other factors. Given that most of these enterprises are based in major developed countries, such as the United States, the European Union Member States and Japan, a group that is often referred to as the Triad, investment flows could be expected to remain within these countries instead of contributing to the globalization of these firms (Rugman, 2005). In addition to the reasons proposed by Rugman (2005), another explanation for MNEs preferring to invest in the Triad would be the high average income of these countries. According to Ayadi *et al.* (2004), around 83 percent of the 7 697 affiliates pertaining to the world's largest 100 MNEs are located in countries with high and medium-high per capita annual income of more than US$2 936. Approximately 73 percent of these affiliates are located in high income countries where per capita annual income amounts to more than US$9 076.[2] Ayadi *et al.* (2004) considered, however, that high GDP per capita alone is not sufficient to attract agri-food FDI and point to other key factors, especially the presence of metropolises in the host-country, a characteristic that implies new urban life styles and particular food consumption patterns.

Tozanli (1998) claims that there exists a trend towards a worldwide uniformity of urban consumer behaviour, which is equally valid for developing countries (DCs), thus explaining the expansion of agri-food MNEs in the emerging markets of Far East Asia and Latin America. Tozanli (2005) challenges the Triad thesis and argues that in response to the stagnation of food demand in the developed countries the world's largest food and drink MNEs are now turning to emerging economies with dynamic demographic trends and increasing consumer power. Ayadi *et al.* (2004) studied the restructuring operations of the world's largest 100 MNEs over 1998-2003 and found that companies that tended to invest in emerging markets tended to disinvest in the Triad over the same period. Senauer and Venturini (2004) argue that food and drink transnational enterprises are typically present in a very large number of countries, since they depend on their ability to respond to rapidly changing consumer trends that

[2] The country classification was taken from the World Bank. There are, however, several developing countries in both groups. In the high revenue group, we can mention Bahrain, Hong Kong Special Administrative Region, Republic of Korea, Singapore and Taiwan Province of China and, in the medium-high revenues group, Argentina, Chile, Costa Rica, Mexico, Venezuela, Malaysia, Botswana and Saudi Arabia.

are also heavily influenced by local customs and culture. Indeed, companies such as Unilever, Nestlé and PepsiCo are present in approximately 120-150 countries.

A more targeted focus is presented by Caves (1996) who, after reviewing the empirical literature, concludes that MNEs, in both developed and developing countries are likely to be found in non competitive markets as they are especially well placed to overcome the high entry barriers prevalent in some foreign country markets, on the basis of their advantages in terms of scale, advertising outlays and R&D. Analysing data on FDI in ten Latin American food and drink industries, Arroyo *et al*. (1985) found that while the average share of MNEs in national production was less than 30 percent in most countries, their share of production in specific food industry sectors, such as pre-prepared food, instant coffee, confectionary, dairy products, beer and soft drinks, was often more than 80 percent. These specific sectors, the authors noted, were the most dynamic and concentrated in each national food and drink industry. According to more recent studies, MNEs are likely to have a strong impact in markets for branded, differentiated foodstuffs, where advertisement activities are significant. Bolling *et al.* (not dated), studied a panel of 43 food processing industries in China and concluded that US FDI was most likely to occur when the market was concentrated among a few firms as in the beer, vegetable oil and wet corn milling sectors. Their findings are supported for all MNEs, irrespective of the parent country, that are found in China by Wei and Cacho (2001).

A different issue is whether the entry of MNEs induces an increase in market concentration in the host country. The entry method used by a foreign company may have different implications on competitiveness. Greenfield investment, some authors claim, may increase the level of competition as opposed to entry through the acquisition of a domestic firm (Caves, 1996). Nevertheless, the predominant method of entry practiced by food MNEs all over the world has been that of mergers and acquisitions which may raise the level of industrial concentration in DCs (Farina and Viegas, 2005; Tozanli, 2005). Some greenfield investment is, however, also taking place in a number of dynamic DCs' food markets where new investment in ports, transport and storage facilities results in fast market growth. Gutman and Bisang (2006) have identified such a process in the Argentine soybean sector, where FDI flows coincide with greater participation of domestic firms. The significant presence of greenfield investments in the biofuel sector in Brazil is also associated with fast market growth. In some fast growth markets, therefore, increased rivalry among incumbents and new foreign entrants may stimulate competition. According to Ietto-Gillies (2005), MNEs may respond with new investments to the initial investment of rival firms in the host country. Tozanli (1998, 2005) using a Lorentz curve to measure concentration among the world's 100 largest food and beverages MNEs concludes that oligopolistic competition has actually been fostered by processes of capital concentration within the multinational food industry. Regional foreign and domestic agri-food investors have also demonstrated a dynamic response to the presence of FDI. The case of China, studied by Wei and Cacho (2001), is particularly instructive. A flood of MNEs entered the food market in the 1990s and quickly dominated the high-income consumer segment. Regional players, however, such as President from Taiwan Province of China, Charoen Pokphand from Thailand, Sinar Mas from Indonesia and Kerry from Malaysia were able to benefit from their knowledge of the market, positioning themselves in the middle-income consumer segment that is crucial for market expansion. Unable to compete in this segment, a number of transnationals, such as Danone and Carlsberg withdrew, selling their investments to the regional competitors. Nevertheless, competition was strengthened as domestic firms learned from foreign investors, setting new quality standards and developing reputable competitive brands. Wei and Cacho (2001) conclude that the policy of attracting FDI in China has resulted in the emergence of many strong domestic firms.

Competition between domestic and foreign firms may take a number of forms. Meyer and Tran (2006), observing that emerging economies often include very diverse groups of customers in terms of income and regional tastes, indicate that MNEs might implement multi-tier strategies combining both mass and premium market segments. In their study case of Carlsberg, a Danish beverage MNE, they point to the dual market strategy of the firm in Viet Nam and China and argue that in DCs the segmentation of markets could determine large margin differences between global and local brands. In the mass market segment, foreign entrants may compete with local firms that often produce at very low cost and where customers' loyalty to brands may create barriers to entry. However, this dual market strategy could position the MNE for future developments, when conditions in the host-country change. Therefore, some MNEs could choose to operate, contrary to conventional wisdom, in nearly competitive markets in developing countries, at least as an entry strategy.

The presence of MNEs may also result in a decrease in competitiveness with negative effects for consumers and domestic firms. Rugman (1975) points out that collusion between multinational firms gives rise to monopoly advantages, while Connor (1997, 2003), stresses that a number of international food and feed ingredient cartels were discovered during the 1996-2002 period, though illegal price-fixing had existed, in some cases, since the 1980s. Such cartels had a negative impact on developing countries, as, in addition to charging higher prices to their consumers of which approximately 46 percent were in Asia and Latin America, they adversely affected the prospects of some competitive smaller exporters based in countries such as China, Turkey and Indonesia. The existence of these cartels show that the Chicago school of international organization, as well as the FDI theory prediction that collusion is implausible mainly due to high costs of managing a multinational cartel was erroneous (see, for instance, Caves, 1996).

Rugman (1975) argues that MNEs may integrate vertically in the host country in order to gain monopoly advantages. Early foreign investors in Latin American food production often integrated vertically, controlling vast areas of land and exporting goods such as sugar, bananas or meat to the US and European markets (Oman *et al*., 1989). Multinational ownership of land, however, lost importance everywhere as from the 1980s.[3] For food MNEs in DCs, including foreign retailers, contract farming with local producers has become an important means of procurement for high quality, low priced agricultural goods, creating new supply chain structures mainly in export orientated sectors. In this form of vertical integration, MNEs focus on providing technology, organizational methods, supervision and finance to producers (Oman *et al.,* 1989). A typical example of contract farming relates to the rise of horticulture exports from Kenya to British supermarkets studied by Dolan *et al*. (2000). More generally, contract farming has now become the dominant form of securing inputs for many food processing activities, whether MNE or domestic, as the need for specific quality, product mix and efficient logistics have resulted in a contraction or even elimination of the open market for many products (Eaton and Shepherd, 2001). Nevertheless, direct involvement in agricultural production may still occur in the case of radically new products, or where agricultural conditions are exceptionally favourable but existing farming practices inadequate.[4] Vertical integration by means of contract farming has important implications for producers upstream depending on the form of their relationship with the MNE. To the extent that growers receive technical

[3] According to AGRODATA, the percentage of agricultural affiliates on the total number of affiliates of the world's 100 largest MNEs fluctuated between only 3.7 percent and 4.2 percent in 1996-2000. As reported in section 5, however, biofuels are now initiating a return to agricultural investments.

[4] There is now a huge literature on this issue. See: Birthal, *et al*. (2005), Humphrey and Memedovic (2006), Eaton and Shepherd (2001). In Latin American studies this tendency was already detected by the late 1970s (Rama and Vigorito 1979).

assistance and/or inputs, contracts will often specify sales conditions. A typical example consists of poultry production where producers must deliver the poultry to the input supplier. Dixon (2002) provides a description of this relationship in Australia, which applies also to other leading poultry producing countries, such as Brazil. Other forms of relationship request producers to meet specific quality standards, rather than providing them with inputs or technical assistance. In this case, the required investment costs often 'lock' the producer into the specific product market. The transaction cost approach, with its notion of idiosyncratic assets, has been widely used to explain this phenomenon (Farina and Reardon, 2001).

While integrating vertically, sometimes MNEs form conglomerates which develop a variety of activities such as the supply of technology to local agricultural producers, the processing of agricultural goods, the organization of transport and the exportation of the product. This strategy allows firms a substantial control of agricultural exports in some DCs. The global value chain literature has focused on shifts from market to vertical coordination that are often driven by the retail sector and result in buyer driven supply chains (Humphrey, 2005). This shift does not represent a typical case of monopsony, as the specific characteristics for the product and the process requirements effectively create a new product to the specification of the buyer. The economic power implications are no less real, however, and producers have initially no alternative marketing options. A number of authors have identified a shift by global retail sectors to a system of category management, where the responsibility for organizing production is outsourced to what is called a 'first tier supplier' in DCs. To the extent that the new production conditions become diffused and consolidated through standards, it is possible that market options increase, for example in terms of contractual arrangements. Dolan *et al.* (2001) describe these developments in the context of the Kenyan horticulture sector, where the first tier supplier's options increase with time. Nevertheless, they find that small farmers have difficulties in complying with the new quality standards.

Reardon *et al.* (2004) focus on the development of contractual arrangements between retail MNEs that operate in both the parent and the host country and their suppliers in DCs.[5] They argue that contracts are designed to overcome the limitations of traditional agricultural markets, such as poor post-harvest control and insufficient technical assistance. Contracts, they note, benefit local producers as they sometimes include direct or indirect support to local farmers who wish to invest in equipment or improve their workforce's skills and the quality of their inputs. In general, supermarkets stimulate the production of better quality food since they enforce public or private standards. Nevertheless, the implementation of such practices necessitates labelling and new packaging forms that require substantial capital investment which, some authors observe, is essentially made by suppliers (Coe and Hess, 2005). After analysing the situation in East Asia, Coe and Hess (2005) conclude that there has been a polarization of the supply system in the host country, since some smaller supplier that are unable to invest heavily, are excluded from the possibilities offered by foreign retailers, such as increased sales and access to new markets.

In general, in the DCs' food industries, FDI often seems to be associated to market imperfections (Rugman, 1975; Caves, 1996). In exceptionally dynamic markets, however, the entry of numerous smaller foreign investors and oligopolistic rivalry among the world's largest food firms could affect the structure of food markets and intensify competition among firms, thus resulting in a decrease in consumer prices for some processed foodstuffs. This situation is more likely to occur in the largest and relatively more affluent countries of the developing world. Research by Farina and

[5] Investment by the European retail sector began in the 1970s, increasing significantly as from the 1990s. The US retailer Wal-Mart assumed a global FDI strategy only in the first years of the new millennium. Initially focused on the middle and upper class areas of large cities, modern retail sector investment has since expanded to smaller cities and less affluent areas.

Viegas on Brazil concluded that the more recent entry of retail FDI has introduced a novel vertical downward pressure on food industry prices (2005).

3. FDI AND INNOVATION IN DEVELOPING COUNTRIES

Technical innovation in the food industry is strongly related to FDI flows. Among the world's largest food firms, ability to innovate is a good predictor of a firm's decision to become international, as well as, at a later stage, its good performance (Rama, 1998; Wendt and Pedersen, 2006). Technology may provide a key monopoly advantage which firms can exploit in foreign markets (Caves, 1996). Though comprehensive data are not available, the technological impact of MNEs is likely to be particularly strong in DCs, as innovation in food tends to be quite weak in these countries and food industry affiliates are, in general, more innovative than domestic food firms (see, for instance, Costa and Robles Reis de Queiroz, 2002; Siriwongwilaichat and Winger, 2004).[6] Internationalization of R&D has become increasingly common during the last decades, although it is mostly an intra-Triad process (OECD, 2005; UNCTAD, 2005). Investment in R&D by food MNEs, however, is relatively better diffused worldwide. Patent analysis shows that food MNEs tend to internationalize their R&D activities to a greater extent than MNEs in other industries, probably owing to the need to adapt foodstuffs to local tastes (Cantwell and Janne, 2000).

According to Reddy (2005), since the 1990s, MNEs have also expanded their activities in technical innovation in DCs, by recruiting skilled scientists in order to reduce R&D costs. These innovation affiliates perform a variety of basic, as well as advanced R&D activities, such as research in seed biotechnology. Filippaios *et al.* (2007) report on affiliates with R&D and technology transfer capacity owned by major food and drink MNEs in developing countries. They found that DCs accounted for 14 percent of such affiliates in 2000 with the most important recipients being China and India.[7] UNCTAD (2005) also point out that countries that are major recipients of US manufacturing FDI, such as Brazil and Mexico, are also important hosts of US R&D investment. The internationalization of R&D has stimulated a strong debate during the last decades. There has been concern that foreign firms could siphon off a host country's accumulated knowledge (Meyer-Krahmer and Reger, 1999), liquidate its independent science and technology base (Dyker, 2001), access publicly funded R&D (Mowery, 2001) and bring in the wrong technology, thus fostering a cumulative decline of the sector (Tolentino, 1993). There has also been concern that foreign firms would not conduct research in host countries, thus investing in low value-added activities (Dunning, 1994).

After reviewing the literature, OECD (2005) concludes that current trends in R&D related investment may result in a potential for loss of domestic innovative capacity, or 'hollowing out', in the host country. Nevertheless, the internationalization of R&D may also result in benefits to the host country through technology transfers. Reddy (2005) points out, however, that in the context of DCs, resources, such as research skills, are often underutilized. Tapping into scientific and technical resources at the local level, therefore, will not necessarily prejudice domestic firms. Another review of the empirical literature concludes that host countries obtain the maximum benefits from the internationalization of R&D only when, in addition to performing R&D *in situ*, the affiliates import foreign technology, purchase their inputs in the host country, relate directly to domestic suppliers and enjoy product and technological autonomy *vis-à-vis* the parent (Rama, 2007). A key condition, however, is that domestic firms are endowed with enough R&D capacity so that are able to imitate the affiliates' activities

[6] A study calculates that Latin America and East Asia, for instance, contributed together only 0.77 percent of the food patents granted by USPTO during the period 1969-1994 (Christensen et al., 1996).

[7] This suggest a stable relationship, since previous analysis of a similar sample had calculated that DCs amounted to 13 percent of these specific affiliates in 1988 (Rama, 1996).

in innovation, otherwise spillovers of knowledge will not necessarily have a positive impact in the host country (Maskus, 2003). In addition, a competitive environment in the industry will encourage technology transfers from the parent firm to the affiliates (Blomström *et al.*, 1994).

Such ideal conditions for technology transfers are not always met in the food industries of DCs. As stressed in the previous section, food MNEs often appear to operate in non competitive markets, which could discourage the parents' transfers of frontier technologies to their affiliates. Second, food processing affiliates often import agricultural commodities from the parent country, or other developed countries, a practice limiting these companies' purchases from the local suppliers and, therefore, the scope of potential technology transfers to agriculture (Rama, 1985). Vertical integration by means of contracting producers in DCs in order to source high quality agricultural products has important implications in terms of technology. In this case, empirical research suggests that technology is transferred to medium and large suppliers in DCs. Oman *et al.* (1989) report on Nestlé supplying new inputs and technical advice to local milk producers in Mexico and Brazil. They also point out that firms such as Ralston Purina and Anderson Clayton provided improved varieties to Mexican producers which led to significant productivity gains. Echanove-Huacuja (2003) also reports similar technology transfers to fruit and vegetable growers in Mexico.

Nevertheless, certain aspects of the technological strategy of food MNEs could further restrict the potential for technology transfers to DCs, even in the largest countries. In Brazil, for instance, food and beverage affiliates are characterized by limited R&D investment and by limited acquisitions of domestic capital goods (Costa and Robles Reis de Queiroz, 2002; Franco and Quadros, 2003). Even in São Paulo, the most developed Brazilian region, Franco (2004) finds that food and beverage affiliates have adopted a technological strategy based on importing equipment in order to quickly acquire gains in productivity, to the detriment of developing their own local technical innovation capacity. These affiliates are technologically linked with domestic firms only through the intensive use of engineering and technical assistance services. This practice is not unique. A study on the Mexican dairy industry, reports that most affiliates do not perform R&D in Mexico and cover their technological needs by using patents and technical assistance provided by the parent company (del Valle Rivera, 2000). Other aspects of the technological strategy of food and beverage affiliates could, by contrast, encourage technology transfers from the MNEs to DCs. Though many authors have traditionally argued that affiliates in such countries tend to undertake only adaptive innovation, recent studies have begun to challenge this view, at least for large DCs such as Brazil and India, where some foreign laboratories perform basic research, as well as other sophisticated activities in this technological field (Reddy, 1993; Rama, 1996; Franco, 1998; Filippaios *et al.,* 2007). This, however, requires the ability of domestic firms to learn that is often hindered by insufficient human and financial resources (see, for instance, Cabral, 1999; Bisang *et al.,* 2006).

4. FDI AND IMPLICATIONS FOR INTERNATIONAL TRADE

Ayadi *et al.* (2004) observed that, between 1990- 2000, the rate of growth of agri-food FDI surpassed that of agri-food international trade. The authors attributed this trend to two main reasons. First, firms prefer to invest in other countries, as this enables them to achieve greater control of markets for branded products at less cost. Second, host countries are eager to attract investment as a means of inducing the modernization of domestic industries. The function of FDI as a strategy to penetrate foreign markets was noted earlier by Goldsmith and Sporleder (1998) who estimated an econometric model using data from a panel of 646 food and beverage firms worldwide for the period 1987-1992. Their results indicated that firms which produce highly differentiated products are more likely to invest in foreign countries, rather than export their products,

when other variables, such as the size and origin of the company, are also controlled. Goldsmith and Sporleder (1998) based on the transaction cost theory argue that firms, such as producers of differentiated foodstuffs and beverages, which enjoy specific assets may be vulnerable to rent extraction by unscrupulous bilateral trading partners, hence, the preference for FDI.

A concern voiced in the 1980s was that food affiliates located in DCs would rely heavily on agricultural imports and, hence, contribute to a permanent disequilibrium in these countries' balance of payments. More recent studies, however, suggest a more complex relationship between food FDI and trade with food industry affiliates' effects on trade differing from one host country to the other. In some cases, foreign investment can be a substitute of the home country exports of agricultural products and semi-processed inputs, while in other cases FDI can complement exports. Ietto-Gilleiss (2005) argues that trade and FDI should not be analyzed only as alternative source of supplies for markets, but should be considered within three different strategic frameworks related to (i) resource-based production aimed at obtaining raw materials; (ii) local market oriented strategies; and, (iii) integrated international production involving vertical coordination. For example, Sanderson's (1986) argument that US investors in Central America and Mexico's cattle and meat industry aimed at globalizing the production of a "world steer" would be an example of this third strategy on integrated international production.

A study of US outward food FDI in 23 countries during the 1990s suggests that the effects of MNEs on the agricultural and processed-foods imports of host DCs depend on many factors (Barkley, 2005). In the case of South America, FDI and trade were found to be substitutes, as increases in food industry FDI tended to induce a reduction in the host countries' imports of agricultural goods and semi-processed foodstuffs, as food MNEs, have been able to stimulate local production. By contrast, in countries such as Republic of Korea, Philippines and Mexico and in some developed countries, Barkley (2005) detects complementarities between FDI and trade. In these cases, the higher the US food industry investments, the higher are the host countries' imports of agri-food products. Another case study in Argentina, also suggests that FDI can also lead to an increase in the exports of semi-processed foods by the host country, building on the country's competitiveness in agricultural commodities (Gutman *et al.*, 2006). These results suggest that when a country is not competitive in the production of agricultural commodities that are processed by food MNEs, the entry of these firms may not stimulate local agri-food production.

Host country governments are eager to attract agri-food FDI on the basis that the entry of foreign MNEs will facilitate the access to foreign markets (Ayadi *et al*., 2004). These expectations, however, are not always met since the MNEs are often more interested in the domestic markets of the DCs, than in exporting processed food from such regions, as suggested by Rama (1992). A study on North American integration in agriculture concluded that 96 percent of the sales of the Mexican affiliates of US processed food companies were domestic, while the remainder was evenly divided between exports to the United States and exports to the rest of the world (Doan *et al.,* not dated). Although the level of protection of agri-food markets in developed countries may support such a strategy adopted by the affiliate in the host country, it is probably only part of the explanation. For example, large Japanese food processors and agribusiness, primarily aim at supplying the home market with agricultural goods and fish produced by their foreign affiliates especially in Asia, but also from countries such as Brazil (Tozanli, 2005). US fruits and vegetable firms in Latin America also aim primarily at securing year-round supply for the US market, rather than targeting the host country market. Doan *et al.* (not dated) argue that the existence of two different types of investors, namely, market servers and exporters, makes the relationship between trade and investment more complex than was previously thought.

5. NEW FORMS OF FDI AND SOUTH-SOUTH FLOWS

In the current upturn of FDI, inflows to developing countries have increased notably, benefiting all regions especially Africa and the least developed countries, which experienced record foreign investment levels in 2005. Total inflows to developing economies in 2003-2005 represented 35.9 percent of global inflows, as compared to a share of 21.7 percent in 1998-2000. There has also been a significant increase in the outflow of FDI from developing countries, representing 12.3 percent of total outflows in 2003-2005, amounting to US$117 billion in 2005 (UNCTAD, 2005). UNCTAD (2005) stresses that this trend can be understood within the general FDI theory. More globalized markets have meant that FDI is currently occurring at an earlier phase of development, as compared to the past experience. The bulk of these outflows originate from Brazil, Russian Federation, India and China and is resource-based, mainly directed at energy and minerals (Sauvant, 2005). However, in the case of China, FDI is also directed at agricultural raw materials. In addition, for Brazil, South-South agribusiness trade has become more important than exports to the North and FDI is now a key component of competitive strategies in sectors such as meat, grains and drinks. Regional food and drinks FDI is particularly relevant in the South as in the case of the Mercosur, with similar tendencies evident also in Southern Africa where retail has moved into neighbouring countries. The strength of South agri-food firms begins to make itself felt also in the emergence of South FDI that is directed at developed countries. South African Breweries have incorporated the US company, Miller, while Brazil's AMBEV begun its expansion into Europe and the United States before being incorporated, although with a high level of operational autonomy, into the Belgian, Interbrew. Brazil's meat company Friboi acquired Swift in the United States in 2007 to become the world's largest beef supplier. Perhaps the most significant inroads into the North have been made by Mexican food and drink firms in the United States. As part of its strategic goal of ensuring raw material and energy supplies, China is currently involved in investments in Africa and Latin America for the supply of agricultural commodities.

UNCTAD (2005) noted a marked increase in FDI directed to the primary sector, an important component of which is renewable energy. While in the future the prime target may be forestry, investment in the short to medium term is directed to grains and sugarcane for ethanol, as well as to oilseeds for biodiesel. Here, food and non-food markets become linked, and FDI is aimed at the incorporation of agricultural assets in an energy supply chain. This partial reversal of the tendency to disinvest in primary production occurs due to strong technological indivisibilities. For example, in the case of ethanol production from sugarcane, sugarcane must be processed within twenty four hours after harvesting, as the sugar content declines quickly. For North FDI, this is most evident in the wave of acquisitions of sugarcane plantations and factories in Brazil and the Caribbean, while for South FDI the target has been plantations and facilities for the production of vegetable and biodiesel. This tendency is accompanied by a parallel movement for leading agricultural enterprises to launch their firms on the stock market. A peculiar feature of these acquisitions, which was also identified by UNCTAD (2005) and analyzed by Passow and Runnbeck (2006), has been the participation of investment funds. In the Brazilian case for example, we find among leading investors in the sugar/ethanol sector many financial firms in addition to traditional sugar and ethanol commodity trader interests.[8]

[8] Companies led by George Soros, Vinod Khosla, James Wolfensohn, Bill Gates, Merrill Lynch, Stark and Och-Zitt Management are involved. This would seem to be in line with the "financeirization" approach developed by Gibbon and Ponte (2005) and Palpacuer *et al.* (2005) where the pressure for short-term shareholder value accelerates the drive to efficiency-based global restructuring.

6. CONCLUSIONS

In this paper, we have explored the literature on the trends and the implications of food industry FDI in the context of developing countries. While FDI has traditionally been concentrated in the Triad countries, there is now a greater participation of developing countries as their weight in the global economy increases. This is particularly the case with the food and drinks sector which is polarised between raw material and location rigidities, on the one hand, and the need for proximity to final consumers on the other. While this shift is intelligible within the terms of FDI theory, it would seem that globalization and liberalization are promoting a precocious expansion of developing country FDI.

Inflowing FDI is attracted by the existence of non competitive markets for highly differentiated products, almost exclusively taking the form of mergers and acquisitions. Greenfield investment is limited to new market segments. There is evidence also that FDI can induce further concentration, even leading to collusion. Nevertheless, in dynamic markets, new investments can stimulate competition and the growth of new market opportunities. The food and drinks sector is paradoxical in that low levels of R&D co-exist with high rates of product innovation. In fact, the sector's innovative capacity has traditionally been underestimated and its leading firms have a disproportionately high percentage of food technology patents when compared with their market share. There is a strong relation between the innovative capacity of MNEs in their home country and FDI. As yet no consensus exists in the literature with regard to whether FDI's impact on the host country's innovation may be positive, or negative. Some surveys suggest that the effects may be negative, inhibiting host country innovation and drawing only on engineering and technical assistance services. Other studies suggest that basic food research in large developing countries is increasing pointing to the need for capacity building in this area.

The FDI implications for trade also depend on a number of factors. Firms that produce highly differentiated products, have the tendency to locate in the country they are interested in, rather than choosing to export their products. There is much debate in the literature on the impact of the sourcing practices of the incoming firms. These seem to depend, to an important degree, on the efficiency of the potential suppliers in the host country. Governments have often encouraged FDI in the hope that this would stimulate export capacity, although in many cases incoming firms are looking primarily to the host country market.

A new feature of FDI in the food industry sector has been the rapid transnationalization of the food retail sector. During the early 1990s, food chains were characterized by the presence of transnationals in food manufacturing and the persistence of traditional distribution and marketing systems. Since that time, the retail sector has changed significantly, first in Latin America, the most urbanised of developing regions, and more recently in Asia and Africa. The research suggests that modern retail is no longer restricted to middle class metropolitan markets, but it is rapidly redefining the dynamics of distribution systems in DCs and is extending its activities into the mass of the population as urbanization increases. The trend in modern retail and the related quality and logistic requirements lead to formalization of the relationship along the supply chains through contractual arrangements, thus questioning the viability of traditional producers and suppliers.

New trends in agri-food industry FDI include the increasing importance of South-South flows with its consequences for development strategies and the initiation of South-North flows as rapid growth in the larger developing countries begins to spawn competitive global firms. Attention is also drawn to new forms of FDI which include institutional investment funds and a renewed interest in primary assets as the shift to renewable energy strategies conflates food and non-food markets.

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Technical regulations and standards for food exports: trust and the credence goods problem

Nadia Cuffaro and Pascal Liu[1]

Credence goods, such as organic and fair-trade foods, gain importance in food trade as consumers increasingly demand product attributes that depend on the production process but cannot be verified even after consumption. The effectiveness of the regulatory system governing the labelling of credence goods and its perception by consumers are critical to the development of their markets. The model shows that low effectiveness of regulation and prejudice may cause a failure in the market for high quality goods and a decrease in exports. Countries with a low level of development may remain trapped in the production of low quality goods. For a developing country exporter, obtaining certification against a standard that is accepted in its export market may be a solution to the national prejudice problem. However, the outcome will depend on the extent to which consumers trust the standard and its monitoring system, and on the balance between the costs and benefits of certification. In the long run, pursuing the international harmonization of standards and monitoring systems may be a better strategy.

1. INTRODUCTION

Trust or credence goods have the common characteristic that consumers cannot evaluate some or all of their attributes either by inspection or after the experience of consumption (Darby and Karni, 1973). Therefore, standards and consumer trust are crucial for the development of their markets. Credence goods are especially relevant in the food sector. Products that are labelled as environmentally friendly or free from Genetically Modified Organisms (GMO) and food that originates from a particular place or a particular social group are all credence goods.

Credence goods gain importance in food trade as consumers increasingly demand product attributes that depend on the production process but cannot be verified even after consumption. An increasing number of consumers demand assurances that their foods have been produced and traded in a way that is not harmful to their health and that of farmers, respects the environment, ensures a fair return to small-scale farmers and addresses various other ethical and cultural concerns. In response, farmers and processors have differentiated their products on the basis of the production process (for example by reducing or even banning the use of agrochemicals). This is a relatively recent trend, which differs from the traditional product differentiation strategy that aims at improving the physical characteristics of the goods. By adopting voluntary standards that relate to the production process (e.g. environmental and social standards), producers may be able to obtain price premiums and secure buyers (Byers and Liu, 2007).

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In particular, organic and fair-trade products are, from an economic standpoint, interesting examples of credence goods. They inherently may not be different from their conventional counterpart, making it impossible for consumers to know whether the claims are true, even after consumption. Yet, market operators may have an incentive to cheat, as these products are highly demanded by the market and tend to fetch higher prices. Hence, trust in the standards and the regulations that govern the use of claims and labels is a critical issue for these goods.

This paper argues that the market for credence goods depends on how much consumers "trust" regulation, i.e. to what extent they believe in product labels claiming that the product meets a specific standard (e.g. "high quality"). Expected quality is a function of consumers' beliefs about the effectiveness of regulation and therefore such beliefs are crucial for the industry involved, as illustrated by the impact of the decrease in consumers' confidence during several major food safety crises during the last decade. Such crises include the BSE crisis in the United Kingdom first and then in the whole European Union, microbiological contamination such as that in berries in the United States and Canada, and avian flu in Asia.

In this paper, we use the term "effectiveness of regulation" to capture three components of regulation:

(i) the scope of regulation, that is the extent to which standards meet consumers' demand for product quality and safety;
(ii) the quality and relevance of the standards in terms of meeting the defined objectives; and,
(iii) the efficacy of the monitoring system in ensuring that producers actually meet the standard.

The latter two characteristics also indicate to what extent consumers can trust regulation as reflected by the probability that, for example, a product labelled "environmentally friendly" was actually produced in a way that is environmentally sustainable.

The likely impact of the effectiveness of regulation on high quality credence goods for a developing country which is an exporter, or a potential exporter, has been relatively neglected in the literature so far. We present a model that addresses this issue in the context of bilateral trade. We illustrate the discussion with two examples of credence goods: organic and fair-trade products.

There are two development dimensions of the problem, as represented in the paper. First, regulation may often be less effective in developing countries. Second, foreign consumers may partly base their expectations about product quality on the level of development of the producing country as a proxy for the effectiveness of its regulations, i.e. on general notions about the relationship between regulation on quality and income level. Hence developing country exporters may suffer from a specific "trust" problem regarding the effectiveness of internal regulation, which may hamper high quality exports.

The policy implications are that the effectiveness of regulation is crucial to avoid failures in the market for high quality products. In the short run, developing country exporters may find a solution in certification schemes operated by international institutions including non-governmental organizations (NGOs). These schemes may play a useful role in overcoming the national stereotype problem, as trust will be based on the reputation of the certifying institution and the perceptions consumers have about its incentives and effectiveness in monitoring compliance with the standard. However, few organizations are totally immune from potential conflicts of interests. In addition, private standards and certification schemes entail costs and, in some cases, those may offset the benefits of certification. The paper concludes that pursuing the international harmonization of standards is a better long-term strategy for developing countries than seeking bilateral mutual recognition or requesting special and differential treatment in the form of an authorization to use "lower" standards.

The paper is organized as follows. Section 2 focuses on the characteristics of credence goods and section 3 examines the economic significance of specific credence goods, namely organic and fair-trade foods. Section 4 presents a brief review of the literature on the economic modelling of the problem. Section 5 presents a model for an exporting developing country that faces a trust problem and discusses the implications for trade. Possible solutions to the trust problem and their limitations are discussed in section 6. Section 7 concludes the paper.

2. CREDENCE GOODS AND CONSUMER PERCEPTIONS

The information environment for different product attributes may be search, experience, or credence in nature. The consumer can learn about the quality level prior to purchase (search), after purchase and use (experience), or not at all (credence). Trust or credence goods have the common characteristic that consumers cannot evaluate some or all of their attributes either by inspection or after the experience of consumption (Darby and Karni, 1973). Credence attributes can obviously be of a very different nature, but there are two major classes that have received increasing attention.

First, in the context of food, there are attributes that have health consequences, especially when the level of assurance demanded by consumers is higher than the assurance provided by existing and well established regulations. These attributes are based on objective and scientific assessment of risk as for example a lower level of chemical residues on fruits and vegetables or drug residues in meat. Consumers in this case generally perceive direct personal benefits. An additional dimension of this problem is the possibility that consumers' perceptions on food and health issues differ between countries as reflected by the US-EU disputes about GMOs, or growth enhancing hormones used in animal production.

Second, consumers demand or are willing to pay for attributes that are of 'altruistic' nature and are related to their concern for weaker social groups, the environment, animal welfare or other ethical issues. These attributes derive from the production process and may include fairness of distribution, the environmental impacts of production, the use of child labour, animal welfare standards applied and other.

Organic and fair-trade foods can both be considered as credence goods. Organic agriculture is a holistic production method which relies on the use of local natural resources and the management of the ecosystem rather than external agricultural inputs such as mineral fertilizers and agrochemicals. Organic agriculture therefore rejects synthetic chemicals and genetically modified inputs. (Liu *et al.*, 2007). According to the NGOs that promote it, fair-trade can be defined as a trading partnership that aims at greater equity in international trade by offering better trading conditions to developing country producers, securing their rights and improving trade rules and practices. Fair trade organizations work with marginalized producers and workers to increase their security and economic self-sufficiency and to empower them in their own organizations. Usually fair-trade standards guarantee farmers a minimum price and a price premium on product sales. They promote long-term trade relationships and the provision of credit or advance payments to farmers.

As these organic and fair-trade standards relate to the process of production or/and trade and not to the product itself, organic or fair-trade food may not be different from its conventional counterpart. This makes it impossible for consumers to know whether the claims are true, even after consumption of the product. The characteristics that consumers seek in these products are credence attributes. Surveys consistently show that consumers who choose to purchase organic products do so for two main reasons. First, they believe these products are healthier and, second, they view organic agriculture as an environment-friendly production method. Both the supposed health and environmental characteristics of organic foods are credence attributes: consumers cannot verify before or after consumption of the foods whether these attributes were

truly present. Similarly, the characteristic of social equity sought by buyers of fair-trade products is a credence attribute.

Consumers' perception of quality is influenced by the product's intrinsic attributes, as well as by extrinsic indicators and cues provided by the seller of the product. Extrinsic indicators such as certification and labelling, and cues that include brand name and packaging, convey search information to the consumer since they are available prior to purchase. However, attributes can switch between the categories of search, experience, and credence. For example, a regulation such as mandatory labelling can change an *a priori* credence characteristic such as uses of GMOs, into a search characteristic (Caswell, 1988; Grolleau and Caswell, 2005). This trend has been observed in the organic agriculture sector. The governments of most developed countries and a growing number of developing countries have adopted mandatory standards and regulations governing the production, marketing and labelling of organic products. In the European Union, the organic sector has been governed by Regulation EEC 2092/91 since the early 1990s, in the United States the National Organic Program rules have applied since 2002 and in Japan the JAS Organic regulations have been implemented since 2001. Usually the government does not monitor directly the compliance with the standard. Rather, it authorizes independent certification bodies to carry out this activity. In contrast, the fair-trade system is not regulated by governments. There is a variety of fair-trade standards developed by a number of NGOs. In the agricultural sector, the most widespread system is that of the Fairtrade Labelling Organizations International (FLO), an international NGO based in Germany. FLO is a coalition of 20 national fair-trade NGOs representing 21 countries (most of them are developed countries). Fair-trade certification is carried out by FLO-Cert, a not-for-profit NGO established by FLO.

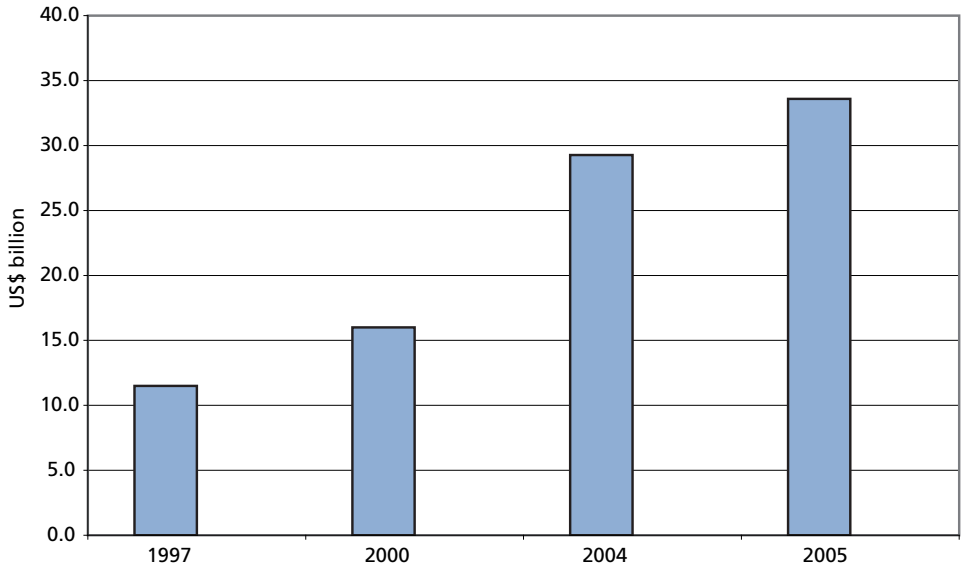
The role of regulation and standards in the credence goods market depends also on how much consumers trust regulation, i.e. to what extent consumers believe that a product marked "high quality" is actually a high quality good. For example, in many countries firms apply to independent labelling agencies for a license to use a particular label stating that their product is environmentally friendly, socially responsible or safe. These labelling programmes are often applied to products where consumers would generally be individually unable to determine the implementation of standards in the production process.[2] As the firm's compliance is gauged by random monitoring, certification must be viewed as noisy (Engel, 1998; Mason, 2006).

3. THE ECONOMIC SIGNIFICANCE OF CREDENCE GOODS

Credence attributes may add considerable value to goods. In the agricultural sector, organic and fair-trade products are of particular interest to developing countries where they may help to generate employment, boost export earnings, support small producers, improve food security and resilience to climate change, preserve environmental quality and diversify the local economy. Perhaps most importantly, adopting these standards is a strategy for producers and exporters to add value to their products and increase the economic viability of small-scale agriculture. Rising demand for certified products creates new market segments where producers may be able to demand price premiums and secure buyers. Based on estimates collected from various studies and industry sources, global retail sales of organic foods were estimated at some US$34 billion in 2005 (Byers and Liu, 2007). They have increased by over 200 percent in less than a decade, from approximately US$11 billion in 1997 (Figure 1). Although growth slowed slightly in the early 2000s, it has remained robust (43 percent between 2002 and 2005).

[2] In the area of environmentally friendly products important examples are German "Blue Angel", Japanese "Eco-Mark", Swedish "Environmental Choice" and "Nordic Swan".

FIGURE 1
Global retail sales of certified organic foods 1997-2005



Source: FAO estimates based on industry sources

TABLE 1
Sales of organic foods by region

Region/country	Sales in 2005 (US$ billion)	Market share (%)
Europe	16.2	48
North America	14.9	44
Japan, Australia and New Zealand	1.6	5
Developing countries	1	3
World total	**33.7**	**100**

Source: estimates calculated by the authors based on industry data

The organic agriculture industry of developing countries relies heavily on the markets of developed countries. Although, they are estimated to account for over 30 percent of the land certified as organic worldwide (Willer and Yussefi, 2007), developing countries represent only 3 percent of retail sales of certified organic foods (Table 1). Europe and North America alone are estimated to account for some 90 percent of sales.

As far as fair trade foods are concerned, according to FLO, global sales exceeded US$2.1 billion in 2006, all of which were exported from developing to developed countries. This represented an increase of 41 percent over their level of 2005 and further growth is forecast for 2007. Tropical products such as tea, cocoa, coffee and bananas enjoyed the fastest growth rates, with sales expanding on average by 40 percent annually over the period 1997-2007 (FLO, 2007). At the end of 2006, 569 producer organizations in 59 developing countries in Africa, Asia, the Caribbean and Latin America were certified by the FLO, while about 1.4 million of farmers and farm workers benefited from fair-trade (FLO, 2007). Exports of fair-trade coffee alone earned 241 producer organizations the sum of US$41 million.

At the country level, the gains from exports of credence goods can be substantial. For example, Peru earned over US$26 million with organic banana exports in 2006. During the same year, Latin America shipped close to 2 million metric tonnes of Rainforest Alliance certified bananas for an estimated value of US$520 million.

4. MODELLING CREDENCE GOODS

Credence goods present a difficult challenge in modelling. There is now a relatively large literature on credence goods in agriculture with implications for trade.[3] Models such those by Bureau *et al.* (1998) and Anania and Nisticò (2005) focus on interesting features of the relationship between trade and regulation on credence goods' quality.

Bureau *et al.* (1998) focus on the credence attributes of food products and on the possibility that, although imported goods are safe according to scientific standards, consumers either still see them as inferior to domestically produced goods or think that they may be unsafe. They highlight that differences in consumers' perception of quality in different countries may result in potential losses from trade liberalization among countries with different regulation on quality, thus challenging the economic rationale for trade liberalization and international agreements on the basis of *Codex Alimentarius*. Bureau *et al.* (1998) build on the EU-US trade dispute on hormone-treated beef, a credence good for which consumers are imperfectly informed. They show that with no trade between two countries only not treated meat is offered in the country in which hormone prohibition is enforced by internal regulation. When trade is liberalized with the country where regulation allows treated meat, consumers in the importing country expect, on average, lower quality. If trade liberalization involves a large decrease in the quality expected by consumers and an analogous contraction in demand, and if the difference in production costs of imported products relative to domestic production is small, trade liberalization may result in welfare losses for the domestic country. Differences in consumers' perception about food quality are indeed empirically relevant. For instance Lusk *et al.* (2006), in a large-scale cross-Atlantic study to analyse consumer demand for genetically modified food, found that the median level of compensation demanded by English and French consumers to consume genetically modified food was more than twice that in any of the selected United States locations. In general, modelling imperfect information problems may lead to challenging traditional conclusions about the effects of trade liberalization, making the case for "consumer-based protectionism" (Hobbs and Kerr, 2006). From the point of view of developing countries, this represents a strong argument in favour of concentrating efforts towards improving the effectiveness of internal regulation and pursuing the multilateral harmonization of standards.[4]

Anania and Nisticò (2004) stress the consequences of weak regulation on quality and the possible interest of low quality producers in exploiting weak regulation, i.e. a regulation that will allow some of them to label their products as being of high quality[5]. The issue of trust in regulation for credence goods is empirically relevant. For instance Mason (2006) notes, in the context of ecolabelling, that the certifying party cannot be certain that the firm always uses an environmentally friendly technique, nor that the monitoring scheme is able to perfectly detect any violations. Even if the certifying process is perfectly able to evaluate a product's compliance with the standard, standards may not be perfectly correlated with environmental friendliness.[6]

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[3] Including Anania and Nisticò (2004), Auriol and Schilizzi (2003), Bureau, Marette and Schiavina (1998), Caswell and Mojduszka (1996), Crespi and Marette (2001), Giannakas (2002), Giannakas and Fulton (2002), McCluskey (2000), Zago and Pick (2004).

[4] Also, with conversion costs, countries - especially the largest ones - have an incentive to form standardization unions that imply trade diversion. Finally there is a cost of multiplicity, linked also increasingly to standards established by private organizations based in the developed countries with strong impact on consumer's beliefs (Cuffaro, 2007).

[5] The authors use as an example of weak regulation of this type that accorded by the European Union with the introduction of "Protected Designation of Origin" (PDO) and "Protected Geographic Indication" (PGI) denominations, with a product list where appear products easily recognized by consumers, which in most cases were already protected by national regulations and products that are not as well recognized and often were nor previously protected.

[6] In the Mason (2005) model of ecolabelling, the certifying test is subject to two types of errors: there are some green sellers that would fail the test and some brown sellers that would pass the test.

Furthermore, certifiers have mixed incentives, such as the incentive to maximise the number of certified clients and the incentive to maintain their reputation. In other words, third party verification does not automatically guarantee impartiality or absence of conflicts of interest. Evidence of opportunistic behaviour in the certification systems in the European Union is reported in Jahn *et al.* (2005). In their model, Anania and Nisticò (2004) consider high and low quality goods producers, with a measure of the effectiveness of regulation being reflected by the percentage of producers who sell their products according to their actual quality. As the effectiveness of regulation declines, an increasing number of low quality producers offer their products in the high quality market, while the demand for the high quality good contracts. If consumers' trust in regulation is low, there may be no market for the high quality good.

5. CREDENCE GOODS, REPUTATION AND EXPORTS

The likely impact of the effectiveness of regulation on high quality credence goods for a developing country which is an exporter, or a potential exporter, has been so far relatively neglected in the literature. Our model focuses on such an impact in the context of bilateral trade.

The hypotheses introduced here are three. First, expected quality is a function of consumers' beliefs about the effectiveness of regulation. Second, domestic and foreign consumers may hold different beliefs. Domestic consumers base their expectations on a measure of the effectiveness of regulation. Foreign consumers base their expectations on the percentage of exports from the country which failed border quality inspection, but are also influenced by a country of origin stereotype. Their trust in the regulation of product quality increases with the level of development of the exporting country. Finally, consumers know the minimum price below which goods can only be of low quality.

The second assumption is based on the idea that since foreign consumers cannot observe regulation as closely as domestic consumers, they may partly base their expectations about product quality on the level of development as a proxy for the effectiveness of regulation, i.e. on the general notions about the relationship between regulation on quality and income level. What foreign consumers may observe about the effectiveness of regulation in the exporting country is a very loose indicator of such effectiveness. For example Jaffee and Henson (2004) report that over a typical three year period the US Food and Drug Administration (FDA) undertakes inspections of all domestic firms that produce low-acid canned foods, yet the same inspections are undertaken on just 3 percent of foreign facilities exporting such products to the United States. Even after substantially increasing resources for the inspection of food imports, the FDA still inspects only 1 to 2 percent of the more than 6 million consignments of food and cosmetic products imported each year. Regulatory oversight for certain products and markets is more stringent on domestic, rather than imported supplies (World Bank, 2005).

A 'level of development' effect on trust is not unfounded on theoretical as well as empirical grounds. There is empirical evidence both on the lower effectiveness of regulation in developing countries and on a level of development factor in consumers' beliefs about quality. Stephenson (1997) provides a description of the situation at the beginning of the 1990s, showing that the number of national standards in developing countries, including large Latin American countries, for which data were available, was at least ten times lower than the corresponding number in the United States and also the proportion of mandatory standards was comparatively low. Furthermore most countries had not established national accreditation programmes for laboratories that perform product testing.

As for consumers, in a review of country-of-origin effects on product evaluation, Bilkey and Nes (1982) point out that several studies found a hierarchy of biases,

including a seemingly positive relationship between product evaluation and degree of economic development. Han and Terpstra (1988) show specifically that products with a country-of-origin label from a developing country are rated inferior to those with an industrial country-of-origin label and Head (1993) reports that a 'Made in Germany' label evokes the concepts of reliability, precision and punctuality. There appears to be also a specific negative prejudice against exports from former centrally planned countries, based on the notion of the generally low quality of production under central planning.

There is empirical evidence of a 'level of development' factor in the market for organic foods. In a study of markets for organic fruit and vegetables in 13 developed countries, Liu *et al.* (2001) found that in virtually all markets consumers have a clear distrust of the authenticity of certified organic imports, especially if these come from developing countries. Consumers in several European countries were said to strongly prefer domestic organic products (preferably bought directly at the farm) and only appreciate imports during off-season periods or for products which cannot be grown domestically. When imports are necessary, fresh produce originating from European countries is favoured. In another study, Liu (2003) found that EU importers prefer to source organic citrus fruits from Spain or Italy rather than from developing countries. Beside criteria such as costs and distance, the respondents indicated that they had more trust in the integrity of European organic citrus. Also, consumers in Japan and the United States have a strong preference for locally grown organic produce. While other factors such as the willingness to support domestic farmers also play a role in this preference, an important reason mentioned is the lack of trust in the authenticity of imported organic foods. Overall, EU importers will tend to source products from EU countries or the United States rather than from developing countries. When supply cannot be found in developed countries, importers will turn to those developing countries where they believe organic standards are more strictly enforced. In general, they will avoid to source from developing countries where governance and regulation enforcement are weak. Therefore, if consumers cannot detect quality and producers cannot credibly signal it, trust in domestic and foreign regulation is the problem to be addressed.

More generally, trust requires the presumption that national standards and regulations are merely different means of implementing equivalent regulatory goals and that national institutions do enforce the standards. Such trust is unlikely to emerge among countries with vastly different levels of development (Baldwin, 2000; OECD, 2001).

We adhere to Bureau *et al.* (1998) and model demand as follows:

$$D(P) = M\left(1 - \frac{P}{E(k)}\right) \tag{1}$$

where M denotes the population and P is product price. Quality k can take values k_H and k_L that reflect high and low quality respectively. However consumers cannot possibly know quality k even after consumption and thus base their decision on expected quality $E(k)$. Under a number of assumptions common in the literature (Bureau *et al.*, 1988; Cuffaro, 2007) the term in the bracket reflects the density of population that will consume a unit of a good that is characterized by a specific level of expected quality $E(k)$. As in Anania and Nisticó (2004) markets are competitive and there are N producers of the same size in the market of which n_L are low quality and n_H are high quality.

The marginal cost function of each of the L producers is:

$$c_L = \alpha_L + \beta_L q_L \tag{2}$$

where c_L and q_L denote the low quality producers' marginal cost and quantity produced. The aggregate inverse supply function of the high quality producers is:

$$P_H = \alpha_H + \beta_H Q_H \tag{3}$$

where P_H and Q_H denote the price and quantity of high quality product, while the intercept α_H can be thought of as the minimum price of the high quality product. Some low quality producers choose to sell on the high quality market, depending on individual attitude toward risk and the probability λ of being caught cheating, a fraction $(1-\lambda)$of them succeeds and each produces a quantity such that marginal cost is equal to expected marginal revenue $P_H(1-\lambda)$. Given this the aggregate supply in the high quality market is as follows:

$$S(P) = \mu \frac{(P_H - \alpha_H)}{\beta_H} + \left[n_{LC} \frac{(1-\lambda)P_H - \alpha_L}{\beta_L} \right] \tag{4}$$

The first term in the right hand side of equation (4) reflects the supply from high quality producers and the second term that from n_{LC} low quality producers that cheat. The parameter μ equals one if the price P_H in the market is higher than α_H, the minimum price of the high quality product and zero otherwise, indicating that in the event that $P_H < \alpha_H$ there will be no high quality supply.

Domestic consumers are aware of the measure of the effectiveness of regulation λ and expect high quality with a probability g increasing in λ. Thus, expected quality becomes $g(\lambda)k_H + [1-g(\lambda)]k_L$ and abiding by the general functional form of equation (1) domestic demand can be specified as follows:

$$D^D = M^D \left[1 - \frac{P}{g(\lambda)k_H + (1-g(\lambda))k_L} \right] \tag{5}$$

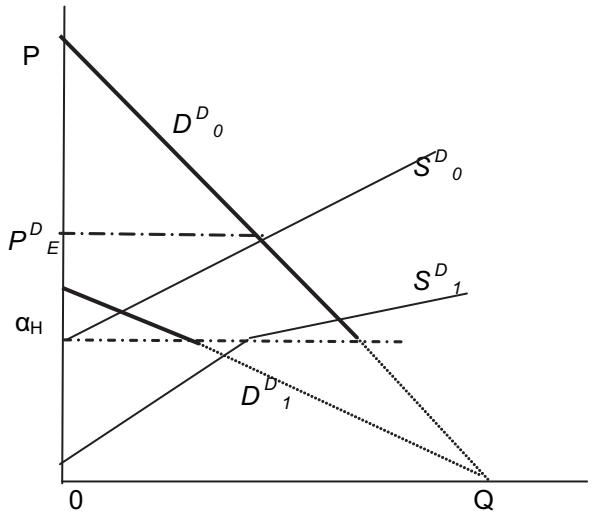
where M^D denotes the population. Consumers in the importing country form expectations on quality on the basis of two variables, the percentage of importers who failed border quality inspection σ and an indicator of the economic distance of the exporting country from developed countries in terms of per capita income y_r. They form expectations on quality in line with probability $f(\sigma, y_r)$ that is decreasing in σ and y_r. Thus the expected quality becomes $g(\sigma, y_r)k_1 + (1-g(\sigma, y_r))k_2$. and import demand can be expressed as follows:

$$D^I = M^I \left[1 - \frac{P}{f(\sigma, y_r)k_1 + (1-f(\sigma, y_r))k_2} \right] \tag{6}$$

where M^I denotes the population in the importing country.

Figure 2 shows the domestic market before trade. With $\lambda = 1$ and $P_H > \alpha_H$ only high quality producers participate in the market and the supply function is S_0^D, while there is no supply below α_H, the minimum price of high quality product. The demand function is D_0^D, while it is important to note that for prices below α_H, there is no demand as consumers expect low quality. Therefore the only relevant section of the demand curve is above this minimum high quality price with the equilibrium price being P_E^D. If $\lambda < 1$, the supply function shifts to S_1^D. For prices below α_H, S_1^D represents quantities supplied by cheaters (low quality producers who offer their product on the high quality market), while for prices above α_H, S_1^D is the sum of product offer by cheaters and high quality producers. As consumers are aware that $\lambda < 1$, the demand curve rotates towards D_1^D and the equilibrium price decreases.

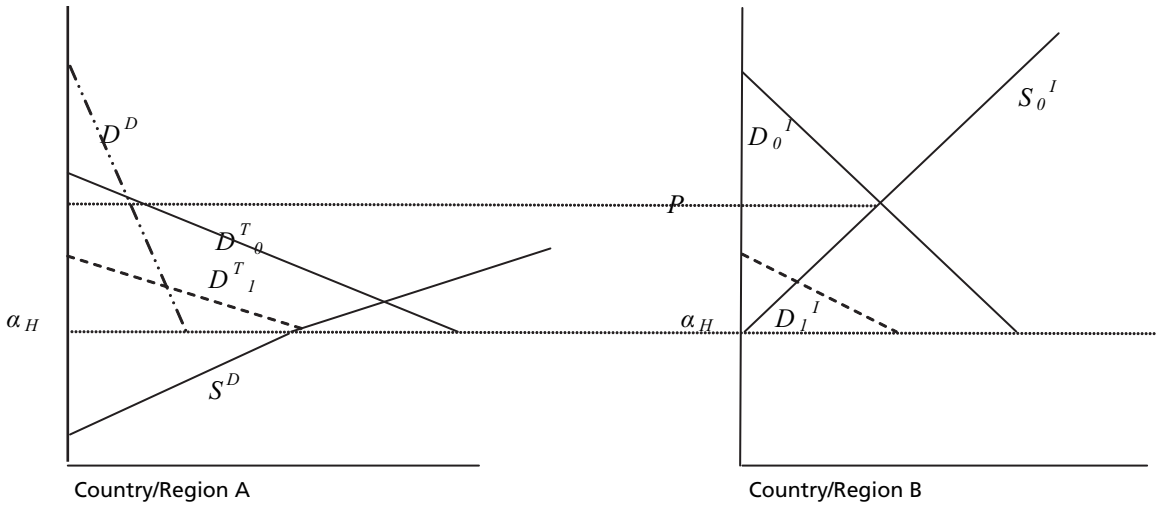
FIGURE 2
Domestic market



Relatively low values of λ may result in significant rotation in the demand schedule, as shown in Figure 2, and in a missing market for the high quality good.

Figure 3 shows the trade relationship between two countries or regions, with region A being the exporting region and region B being the importing region. As portrayed in the figure, the conditions of supply in region B are such that there are no cheaters. Moreover, the vertical intercept of the import demand schedule in region B, D^I_0, is initially the same as that of the demand schedule of the exporting region A, D^D, as it is assumed that domestic and foreign consumers have the same expectations about quality across regions. In panel (a) of Figure 3, the demand schedule D^T_0 represents total demand for the domestically consumed and exported good. Export supply is equal to import demand at price *P*. For prices lower than *P*, import demand exceeds export supply and region A exports to region B. Decreasing quality of exports or a shock, such as a food safety event in the region A will bring about an increase in σ and will also

FIGURE 3
Trade of credence goods



hint on an unfavourable level of development stereotype y_r, resulting in the import demand schedule in region B rotating from D_0^I to D_1^I. Similarly the total demand schedule will rotate from D_0^T to D_1^T, decreasing export price and quantity. It is also possible that a strong perception of low quality formed though the developing country stereotype, could result in a wide rotation in total demand and no exports, creating for the market a trap of low development and no high quality. Besides, a change in λ or σ may cause a sudden and more than proportional drop in consumers' confidence, depending on the nature of the problem, causing severe damage to the sector involved, as illustrated by several major food safety crises during the last decades.

In the food crises the adverse effects on health and on consumers' confidence were often amplified by a combination of poor communication about risks, mismanagement of crisis responses on the part of governments and private companies and by the media. Each new event, at least in the European Union, accelerated consumers' reactions, including an intensified search for alternative sources of information, usually from consumer and environmental groups, and for alternative foods (World Bank, 2005). An illustration of the impact on a small exporter is given by the cyclospora crisis and the change in the US import demand for raspberry from Guatemala to Mexico, a case in which the industry never recovered.[7] A similar sequence is quoted in Chisik (1996) for Colombia's garment industry[8]. The World Bank (2005) remarks that international buyers and consumers are likely to be more tolerant and patient with core and long-standing suppliers that have established a national image in which they have confidence, and conversely, that small countries and niche products are probably far more vulnerable to loss of markets and reputation in the face of food safety problems.

There are several important implications of the trust and stereotype problem as represented here. First, low effectiveness of regulation may cause a failure in the market for high quality, i.e. low quality goods may drive high quality goods out of the market. Second, there may be a trap of low level of development and failure in high quality exports. Third, it is unlikely that in the presence of large income gaps, consumers would recognize the equivalence of different country standards. Instead, they are more likely to believe that other standards may be associated with low quality. The pursuit of "mutual recognition" of standards between two trading countries may be a good approach for an experience good, where consumers may verify quality when the good is allowed into the export market, but less so for a credence good. Mutual recognition requires considerable mutual trust, since it involves the presumption that national standards and regulations are merely different means of implementing equivalent regulatory goals and that national institutions do enforce the standards. Such trust is unlikely to emerge among countries with vastly different levels of development (Baldwin, 2000; OECD, 2001).

Therefore, in the long run, pursuing the international harmonization of standards is a better strategy for developing countries aiming at export markets. In the agricultural

[7] In the late 1980s, several firms exported raspberries from Guatemala to the United States. Cases of food-borne illness associated with the parasite Cyclospora in the United States and Canada led to a US import ban on Guatemalan raspberries in 1997. In spite of a successful collaborative effort between United States and Canada and Guatemala to solve the problem, in 2000 two further Cyclospora outbreaks, which were traced back to a single Guatemalan farm, led to a drop of consumers' confidence, several US supermarkets sought alternative sources of supply and a number of leading firms in the industry shifted their operations to Mexico. The Guatemalan raspberry industry never recovered (World Bank, 2005).

[8] Chisik (1996) develops a model where the country stereotype can determine the number of high quality firms. The stereotype is self-fulfilling. The author uses Colombia's garment industry as an example of a self-fulfilling unfavourable quality reputation in international trade. Although expanding at a rapid rate throughout the early 1970s, Colombia's deteriorating reputation became a determining factor in the contraction of this industry, essentially because of a single garment firm that took a large contract beyond its capability. High-quality importers became wary of Colombian-sewn garments. With the payoff to high-quality production reduced, Colombian garment firms then concentrated on low-quality markets.

sector, several intergovernmental bodies work towards the international harmonization of standards. These include the Codex Alimentarius Commission, created by FAO and the World Health Organization (WHO) to develop food standards, guidelines and related texts such as codes of practices under the joint FAO/WHO Food Standards Programme; the Commission on Phytosanitary Measures (CPM) which adopts international standards for phytosanitary measures and governs the International Plant Protection Convention (IPPC) and the World Organisation for Animal Health (OIE), which develops health standards for international trade in animals and animal products. In the specific case of organic agriculture, the Codex Alimentarius Commission has produced *Guidelines for the Production, Processing, Labelling and Marketing of Organically Produced Foods*. In contrast, strategies aiming at obtaining Special and Differential Treatment in the form of less stringent standards applied to goods imported from developing countries are likely to be counterproductive and lead to the exclusion from high-value export markets in the long run. Finally, independent certifying organizations can play an important and positive role.

6. INDEPENDENT CERTIFICATION ORGANIZATIONS: A SOLUTION TO THE PROBLEM OF TRUST?

In countries where the effectiveness of regulation is perceived as low, or the developing country stereotype influences the perception of consumers in the importing markets, the use of external monitoring organizations may be a solution for establishing the trust in the quality of exported products. In the agriculture export sector, the use of foreign control firms is common. Multinational certification companies, such as Bureau Veritas Quality International or Société Générale de Surveillance, perform thousands of quality controls of agricultural goods for export worldwide every year. Similarly, the use of foreign certification bodies is widespread for organic foods. One reason is that few developing countries have domestic organic certification bodies. Yet, the main cause is that consumers in importing countries are more likely to trust an organic product that bears the label of their own country's certification bodies. This is because they tend to trust the quality of the work of the latter in general. Also, they believe that these will be less vulnerable to possible pressures and conflicts of interest than the certification bodies of the producing country.

Nevertheless, it should be noted that even a foreign certification body is not immune from possible conflicts of interests. If the certifier is a for-profit company, it may have an interest in not interpreting the standard in too strict a manner, lest some clients leave for competitors who have a more flexible interpretation. Also, withdrawing certification in case of non-compliance means losing a customer. Even when the certifier is a not-for-profit non-governmental organization, conflicts of interests are still possible. First, if the certifying NGO has set the standard itself, it may be tempted to interpret it flexibly so as to promote its adoption by a large number of producers. Therefore, ideally, the organization that has set the standard should not carry out the certification operations itself. Rather, it should authorize competent independent certification bodies to do this work after checking their capabilities. Second, a certifying NGO, in a similar fashion as for-profit certifiers, may have an incentive to be flexible to avoid losing "clients" if it faces fierce competition from other certifiers. The possible problems generated by competition for clients to certify do not exist in the case of fair-trade foods, since only one organization can certify to FLO standards: FLO-Cert. However, FLO-Cert is registered in Germany under a company status and must be self-financing. The costs of its inspections and certifications activities must be covered by the fees it charges to the companies it certifies. This could be considered as a potential source of conflict of interests.

The above reasons may partly explain why many developed country consumers tend to have more trust in domestically-produced organic foods than imported ones, even when the latter are certified by domestic certification bodies (Liu *et al.*, 2001).

TABLE 2
Different types of voluntary standards and certification programmes

	Good practices Food safety	Environmental Ethical
Examples	GlobalGAP, BRC, SQF	Organic agriculture, fair-trade
Type	Business to business	Business to consumer
Usually set by	Corporate buyers (retailers, processors)	NGOs (sometimes producer group)
Freedom of choice	Limited (often demanded by client)	High
Benefits for producer	Helps maintain market access	May add value, raise sales
Price premium	Usually no	Usually yes
Cost borne by	Producer sometimes with exporter	Consumer sometimes with producer

Finally, it should be noted that while the intervention of a foreign certification body can provide some solutions to the trust problem in developing countries, the costs may be high. When no recognized local inspectors are available, the travel costs and fees of the foreign inspectors may account for a substantial share of the revenues generated by the export of certified foods. There is empirical evidence that some developing country producers stopped seeking certification and sold their products as conventional, as the price premium received was not sufficient to cover these costs. For these reasons, some developing countries exporting substantial quantities of organic products have developed national certification systems and regulations and sought to have them recognized as equivalent to those of their main import markets. For example, Argentina and Costa Rica have managed to be registered on the Article 11 list of countries recognized by the European Union as having equivalent organic certification systems. In these cases, costs are much reduced since the inspection and monitoring activities are performed by domestic organizations. In contrast, a study on the impacts of EU organic certification legislation on Chilean organic exports by Garcia Martinez and Bañados (2004) found that the lack of an equivalent system forces Chilean organic exports to enter the European Union through the 'back door', that is, through special import permits, with the resulting increase in transaction costs as products accepted in one EU country may not be accepted in another.

Standards may be set by governments or by the industry itself, i.e., producers, buyers, or retailers. The recent developments in global markets have led to a significant privatization of standards especially in the case of developing countries where the effectiveness of public standards was generally considered as low. Such privatization has occurred in two distinct ways. On the one hand, large agribusiness firms, mostly supermarkets and large processors and especially multinationals, created private standards generally meeting or exceeding the stringency of public standards and ensured their implementation through vertical coordination (Reardon *et al*., 2001).[9] On the other hand, not-for-profit NGOs have provided standards as well as the monitoring and enforcing mechanism for many credence products with ethical attributes, in a fast growing market segment of products originating in developing countries to overcome the trust problem. The two categories of private standards are illustrated in Table 2.

While the adoption of private standards may grant export opportunities to farmers, they can also be considered barriers to entry for those who cannot apply them either because they are too costly or because of the lack of knowledge about their requirements. Corporate standards that aim at ensuring that suppliers use good production practices for food safety are especially controversial for several reasons. Although in theory they are voluntary in nature, they tend to be imposed by corporate buyers on their suppliers as a prerequisite for doing business. Hence,

[9] These served several purposes: they are strategic tools for product differentiation and market penetration; reduce coordination costs of sourcing from diverse locations and of operating in diverse markets, limit exposure to penalties from public regulations.

they are increasingly viewed as de facto mandatory. Furthermore, they tend to be more stringent than the technical regulations of governments. Complying with new standards usually entails additional costs for suppliers. Investments are often necessary to upgrade the production facility. Obtaining and maintaining certification is costly, as suppliers have to pay registration and inspection fees. Although certification benefits the entire food chain, the costs of food safety certification are almost always entirely borne by suppliers without compensation in the form of higher farm-gate price. Small farmers may not be able to afford such costs and run the risk of being excluded from value-added market segments. In fact, developing countries increasingly regard private standards as non-tariff barriers to trade and the issue has been raised several times at the SPS Committee of the WTO.

In the synthesis report of the World Bank's research programme on *International Agro-Food Standards*, Jaffee and Henson (2005a) examine the challenges and opportunities for developing country exports raised by food safety and agricultural health standards. They analyse the costs and benefits of compliance and non-compliance, and look into the distributional effects of standards. The implications for technical assistance are presented. In another report, the same authors argue that rising standards serve to accentuate underlying supply chain strengths and weaknesses (Jaffee and Henson, 2005b). Thus, they impact differently on the competitive position of individual countries and distinct market participants. Some countries and industries are even using high quality and safety standards to successfully position themselves in competitive global markets.

There have been a large number of case studies on the impacts of standards on specific developing countries. UNCTAD's Consultative Task Force on Environmental Requirements and Market Access for Developing Countries prepared several country case studies on the developmental and market access impact of private voluntary standards. The studies found that good agricultural practices (GAP) standards are particularly challenging for small farmers in developing countries. Although there may be potential benefits (such as maintaining market access and a possible reduction in input costs), achieving compliance is often costly. Also, from the viewpoint of an exporting country, the relevance of a specific standard depends to a large extent on the targeted market. OECD has undertaken case studies on Peru, Chile, Ghana and South Africa. The studies found that private standards tend to raise costs for exporters and lower them for importers. For producers, finding the resources for the necessary investments to meet the standards and to cover certification costs is a major challenge, as most business-to-business schemes do not result in a price premium. Most studies emphasized the following success factors in the adoption of food safety and GAP standards:

– good infrastructure and the availability of services;
– accumulated social, physical and financial capital;
– strong producer and exporter associations, with representations in the import market; and,
– public private partnerships, in particular for research and development.

Wilson and Abiola (2003) discuss the specific capacity constraints, opportunities and institutional reforms needed for successful market access in five African countries. They set trade facilitation measures and standards (both voluntary and mandatory technical standards) within a broader developmental context. In a case study on Morocco, Aloui and Kenny (2004) analyse the costs of compliance to SPS standards. The study focuses on tomato and citrus exports. The authors find that at the farm level, compliance costs with the EUREPGAP standard account for 8 percent of the total farm-gate costs with small farms requiring a longer implementation time. For citrus growers, the requirement of mobile sanitation facilities will result in higher costs. At the packing house level, the use of HACCP is fairly new but has already been integrated in several

management strategies. The authors state that many managers have noted benefits from ISO 9001 implementation such as better worker performance, greater efficiency, less rejects and easy tracing of the source of problems. The residue testing required by the British Retail Consortium (BRC) can not be done in the government laboratory and samples must be sent to Europe. The authors conclude that differences among standards are the most serious problem.

Jaffee and Masakure (2005) study the strategic use of private standards to enhance international competitiveness in Kenya's vegetable export industry. They observe that leading Kenyan fresh produce suppliers have re-positioned themselves at the high end segments of the market – those most demanding in terms of quality assurance and food safety systems. Factors having influenced this positioning include: relatively high freight costs and low labour costs, the emergence of more effective competition in mainstream product lines, and strong relationships with selected retail chains.

In addition to case studies from the perspective of exporting countries, a number of researchers have carried out buyers' surveys. For example, Lamb *et al.* (2004) look into SPS and other standards for shrimp and fresh produce in the United States market. The paper provides an overview of applicable standards and main SPS issues encountered, including the history of contaminations and entry refusals and analyses how suppliers adapt their strategies according to the buyers' perception and the cost of non-compliance (including refused shipments at the port). Willems *et al.* (2004) carried out a survey of European Union buyers to capture changing European public and private food safety and quality requirement. They find that transnational companies guarantee quality and safety under a private label in a vertically integrated chain. In collaborative chains, buyers support suppliers to implement standards. In transaction-oriented chains with intermediaries, suppliers are not regularly informed about standards and run the risk of non-compliance. The survey finds that the reasons for changing suppliers include food safety, volume and reliability of supply, price, quality and packaging, social and ethical issues and political conditions.

Large-scale retail chains impose their standards in their outlets located in developing countries also. Berdegué *et al.* (2005) researched Central American supermarkets' private standards of quality and safety in the procurement of fresh fruits and vegetables. Their paper summarizes the results of studies in Costa Rica, Guatemala, El Salvador, Honduras and Nicaragua from 2002 to 2004. They found that also in Central America leading supermarket chains are imposing private standards while cutting costs through organizational change. The authors argue that the implementation of these private standards is positive for consumers but poses challenges to producers.

7. CONCLUSIONS

There are several policy implications of the literature discussed in this paper and specifically of our hypothesis on the mechanism of trust in regulation from the point of view of a potential exporter.

First, the "effectiveness" of regulation is crucial to avoid failures in the market for high quality products. Low effectiveness of regulation may cause a failure in the market for high quality, i.e. low quality goods may drive high quality goods out of the market. In addition, countries with a low level of development may remain trapped in the production of low quality goods and fail to develop their exports of higher quality products. Therefore, strategies to increase the objective measure of the effectiveness of regulation, such as improving legislation and monitoring, should improve export prospects. An important challenge is to increase the supply and quality of public standards and their associated monitoring mechanism to the benefit of domestic agribusiness firms and farms in developing countries.

Second, it is unlikely that in the presence of large income gaps, consumers would recognize the equivalence of different country standards. Instead, they are more

likely to believe that other standards may be associated with low quality. The pursuit of "mutual recognition" of standards between two trading countries may be a good approach for an experience good, where consumers may verify quality when the good is allowed into the export market, but less so for a credence good. Mutual recognition requires considerable mutual trust, since it involves the presumption that national standards and regulations are merely different means of implementing equivalent regulatory goals and that national institutions do enforce the standards. Such trust is unlikely to emerge between countries with vastly different levels of development.

Third, for a developing country exporter, a possible solution may be to obtain certification by an international institution that is trusted by customers in its export market. This approach may help overcome prejudice that foreign consumers may have with respect to the effectiveness of regulation in the exporting country. However, the outcome will depend on the extent to which consumers trust the certification scheme, i.e., the standard and its monitoring system. Also, any decision to seek certification against a private standard should be based on a comprehensive costs-benefits analysis, as in some cases the costs of complying with the standard and proving compliance may exceed its potential benefits. Finally, while voluntary certification may offer some advantages in the short term, pursuing the international harmonization of standards and monitoring systems is a better strategy in the long run for developing countries aiming at export markets.

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The Brazilian orange juice chain

Marcos Fava Neves [1]

The Brazilian orange juice chain is unique in terms of world wide leadership, specific assets, coordination forms and contractual arrangements that have evolved over the last 40 years. This paper examines this value chain from the consumer to the producer focusing on consumer preferences, the production and processing structure and contractual arrangements. In the long run, consumption of orange juice is expected to grow especially in developing countries. In Brazil, many factors have contributed to high concentration in the orange juice industry including the need to reduce production costs and improve logistics. Contractual arrangements with fruit growers vary in terms of time and prices paid and depend mainly on considerations on risk, farm location and fruit quality. Increasing production costs may result in further consolidation in the orange production sector, while the emergence of growers' groups is expected to increase the bargaining power of primary producers.

1. INTRODUCTION

The orange juice supply chain is one of Brazil's most competitive food chains. The country dominates the world market of the major traded product, the frozen concentrated orange juice (FCOJ), with a share of more than 80 percent in total world trade. Brazil produces 40 percent of the world's orange juice, while it accounts for a third of the world's orange production (USDA, 2006). The industry generates approximately US$4 billion per year and maintains more than 400 000 direct and indirect jobs (ABECITRUS, 2006). Low production costs, efficiency, innovation in research, technology and logistics are the pillars of this leadership. Most of the FCOJ exports, originate from the State of São Paulo, where some producing regions currently show faster growth rates when compared to the Brazilian average.

In 2006, a decline in the world supply of oranges that was caused by climatic factors in Florida, the major competitor to Brazil, as well as an outbreak of diseases resulted in an increase of about 65 percent in the price of FCOJ with the value of Brazilian orange juice exports reaching almost US$2 billion (SECEX/MDIC, 2006). Several changes are taking place affecting the orange juice sector and bringing forward a number of questions: what are the major impacts of globalization on the Brazilian orange juice sector? how do concentration and changing consumer preferences affect this food chain?

The major objective of this paper is to provide a focus on the Brazilian orange juice value chain. An analysis of the chain from the consumer to the producer is provided, including a discussion on grower and processor production patterns and concentration, contractual arrangements, consumer preferences, distribution channels and outlets. The orange juice production link of the chain is analysed in terms of the number of companies and the nature of competitiveness. Finally, an agenda for enhancing Brazilian orange juice chain's competitiveness and leadership is provided.

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The chain is analysed according to the traditional agribusiness systems approach (Zylbersztajn and Farina, 1998) starting with the final consumer and moving upstream to the primary producer. The paper is organized as follows. Section 2 focuses on fruit juice consumption patterns in the world and in Brazil and section 3 discusses the juice distribution channels and the bottling industry. Section 4 focuses specifically on the orange juice processing industry in terms of market structure and governance issues. The primary orange production sector is discussed in section 5, while an analysis of prices paid to the fruit growers in Brazil, as compared to international FCOJ prices is provided in section 6. Section 7 concludes the paper and provides prescriptions for increasing the efficiency of the chain.

2. CONSUMPTION

At global level, juices, nectars and mixed beverages (still drinks) make up of approximately 15 percent of the global consumption of beverages, while in Central and South America their share is about 7 percent of the total. The growth in juice consumption, in global terms, is estimated at around 10 percent per year. Relatively low growth rates characterize markets in the European Union, the United States (US) and Canada, whilst in Middle East, Asia, Eastern Europe and Latin America juice markets experience fast growth. The average annual juice consumption in China is less than 1 kg per person, whilst in Japan it amounts to 18 kg and in the US and Germany to 45 kg per person, as compared to a world average of 7 kg per person. In developing countries, most of the oranges are consumed as homemade juice, a characteristic that is expected to change, as income growth and improvements in infrastructure and distribution will result in increased packed juice consumption. There is potential for beverage consumption growth in Latin America, where it is estimated that the annual total consumption may reach 216 billion litres, or 388 litres per person, including water. This represents an opportunity for increases in the consumption of juices over the amount of soft drinks consumed, since the share of juices, nectars and still drinks amounts to 7 percent of total consumption.

International trends indicate the emergence of new markets and faster growth in the market of organic products and products with socio-environmental and geographic appeal. Consumers tend to associate juice with the benefit of consuming *in natura* fruit. Specialists on juice markets believe that markets will experience a rather steady growth in the following years, making fruit production and processing into juice and nectars an attractive market.

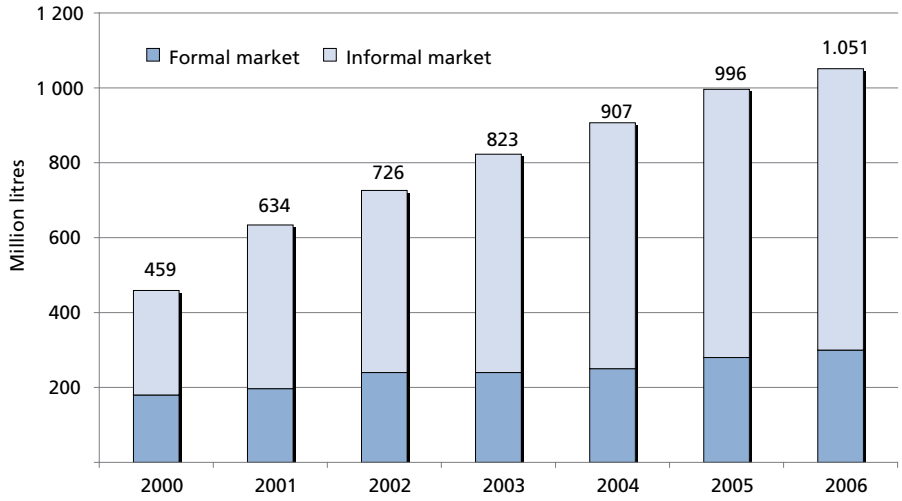
In Brazil, carbonate drinks represent around 55 percent of total beverages consumption, however the growth in the consumption of all beverages has been significant at an average annual rate of 15 percent per year during the period 2000-2006. Such a sustained increase has been realized mostly in the informal markets in which nectars are diluted to produce juices in the foodservice sector, or for home consumption (Figure 1). In parallel, the Brazilian domestic market of packed juices is developing and, as concerns about health are prevalent, it is likely to expand further. There are growth opportunities for health related products that can provide consumers with new experiences. There has been a steady increase in the consumption of beverages that

TABLE 1
Beverage consumption: world and Central and South America, billion litres

	World	Central and South America
Soft drinks	471.5	77.4
Juice and nectars	37.2	2.0
Still drinks (mixtures)	33.4	3.3
Share of juices, nectars and still drinks	15%	7%

Source: Reinhardt (2007)

FIGURE 1
Evolution of juices, nectars and soft drinks consumption in Brazil



Source: Franklin (2007)

contain a mixture of juices in their composition and there is also room for increased consumption of juices diluted in convenient and cheap packages for middle and lower income classes.

Since several juice companies, such as Del Vale and Tropicana, have entered the Brazilian market to compete with domestic firms there has been an increase in the variety of juices that are processed from fruits, other than orange. In 2000, the share of orange juice in total packed juice consumption was by far the largest, amounting to around 60 percent. However, in 2006, orange juice consumption decreased significantly and its share declined to 13 percent of total consumption, falling to the third position after the grape juice (25 percent) and peach juice (16 percent). This decrease in consumption of orange juice was not the result of a change in preferences but that in relative juice prices. An important factor that contributed to the growth in consumption of other juices was an increase in the price of orange juice due to reduced production in Florida. As orange juice prices surged from an average of US$900 for the past decade to US$2 100 per tonne of final beverage, bottlers focused on other juices and mixtures. Prices declined slightly during the second half of 2007, however they remain high relative to the historical price patterns.

3. DISTRIBUTION AND THE BOTTLING INDUSTRY

There are two major distribution channels for juice, the retailing sector and the foodservice sector. Retailing is responsible for a large proportion of juice consumption, amounting approximately to 70-80 percent. Food retailers that sell juice are quite diverse, ranging from large supermarkets and discounters to convenience stores, specialty stores and street vendors.

Retailers offer several general services to consumers such as spatial convenience, wide range of products, smaller lot sizes, assortment breadth, and shorter delivery time. More services can be provided, making the variation in the price of juices quite large. For example, freshly squeezed juice is sold by retailers at high prices. Usually, retailers perform all the distribution functions including product ownership, stocks, negotiation, finance, promotion to final consumers and market research.

The foodservice sector consists of several types of firms, such as fast-food chains, caterers and restaurants. In Western Europe, foodservice accounts to approximately

30 percent of total food and beverage expenditure, a share that is significantly lower than that in the United States, where about 50 percent of total food and beverage expenditure is allocated to the foodservice sector. In a manner similar to retailers, foodservice firms perform several marketing channel functions. However, their needs are also different as far as packaging, quality, taste, brands and delivery are concerned.

The bottling industry has different characteristics depending on the country being analysed. For example, it is highly concentrated in the United States with the three biggest bottlers accounting for 50 percent of the sector. Large companies such as Coca Cola, with the brand Minute Maid, and Pepsi, with the brand Tropicana have strong links with Brazilian juice producers. Coca Cola is a global partner of Brazilian FCOJ producer Cutrale, and Pepsi has established strong commercial relations with another Brazilian producer Citrosuco. The ownership of both companies' orange juice facilities in Florida was transferred to their corresponding Brazilian partners in the 1990s. Together with other private labels, the four major brands account for more than 80 percent of the US market. In Europe, although Coca Cola and Pepsi are growing, there is a large number of bottlers operating, rendering the sector one of the most fragmented ones in the beverage market characterized by low margins and general excess capacity of around 30 percent (Flussiges Obst, 2007).

Technological and capital entry barriers are not so high mainly due to the relatively low investment level in packing lines. These physical assets of the juice bottling industry are not specific, as they can be used for bottling other beverages and can also be removed with relatively low reallocation costs.[2] Some location specificity exists, mainly related to juice transport costs and the need for quality water supply. Time specificity also exists due to the frequency of delivery desired by supermarkets and fast-food chains and the product shelf life. However, one of the most important specificities in bottling is related to technology and the monitoring process of high quality ingredients that result in uniform flavour throughout the year. Research for new product development and brands also require specific human assets, while license and distribution agreements, also common in the juice industry, require specific investment relationships.

The FCOJ needs of the beverage industry depend on their market positioning in terms of quality, pricing strategy and brands. The Brazilian FCOJ that is destined for export is transported from Santos in Brazil in bulk systems with dedicated vessels and port facilities. Nearly 70 percent of the total volume exported from Brazil arrives in Europe.[3] Due to delivery times, the seasonal nature of supply and the inventory costs for refrigerated products, the logistical process is very important. Coordination of the chain is central with blending and product differentiation through adding frozen cells and other attributes increasing the need for concerted effort. Strong coordination efforts are required for high quality products, where bottling companies often monitor the fruit production and crushing.

Prices paid by bottlers have been quite variable during the last decade, ranging from US$900 per tonne to more than US$2 000 per tonne, thus resulting in increased uncertainty. Bottlers also face the concentration in the FCOJ industry in Brazil and have to deal with fewer suppliers that are able to circumvent bottling by means of direct relationships with retailers. However, the major trend is that juice companies are becoming part of bigger multinational beverage companies through a series of several mergers and acquisitions. In addition, bottlers have to face the growth in private labels and develop alternative and diversified channels, building alliances with other beverages suppliers, improving logistics and developing niche markets through

[2] The major package suppliers to the industry are Combiblock and Tetrapak.

[3] In Europe, the main ports to which the Brazilian FCOJ arrives are Rotterdam and Amsterdam accounting for 22 percent of total exports to Europe, Antwerp and Gent accounting for 42 percent and Hamburg.

innovation. Product innovation is also central in bottlers' agenda. There are many opportunities for novel products, such as new juices that can be characterized by social and environmental responsibility which can enter the fair trade or the organic markets, as well as new mixes and carbonated beverages.

4. THE ORANGE JUICE INDUSTRY

4.1 Production and exports

There are several orange juice producing countries with Brazil and the United States being the two major producers accounting for 39 percent and 16 percent of the world production in 2006 respectively. In these two countries, two regions or states account for most of the production: São Paulo in Brazil and Florida in the United States. Other countries are also relatively important in terms of orange juice production. China accounts for 10 percent of world production, Mexico and Spain for 8 and 6 percent respectively, while Italy's share in world production amounts to 5 percent (Table 2).

Although Brazilian exports to countries in Eastern Europe, Middle East and Asia have been growing at a fast rate, the impact of hurricanes in Florida in the 2006/07 marketing year had a significant impact on the structure of trade flows (see Table 3). As the North American bottling industry increased its demand for imports of Brazilian FCOJ, international prices increased to historical levels. A relatively high level of exports, in conjunction with high world prices resulted in the Brazilian orange juice export revenue for the season 2006/07 increasing by 65 percent to over US$2 billion from US$1.2 billion in the previous season (Abecitrus, August 2007).

4.2 Market structure of exporting firms

Although the Brazilian FCOJ industry can trace its origins to the 1940s, investment in processing and new facilities took place since the 1970s and intensified with the entry of several firms in the Brazilian market. During this period from the 1970s up to the beginning of 1990s, there were points where up to 15 or 20 firms operated in the production of orange juice. An important price regulator for the sector was Coopercitrus, the largest cooperative of orange farmers which also used to own a processing plant, Frutesp.

TABLE 2
World: orange juice production, consumption and trade (tonnes)

Year	Production	Imports	Exports	Consumption	Ending Stocks
2002/03	2 244 435	556 456	1 561 631	1 426 416	624 555
2003/04	2 719 010	548 915	1 692 154	1 450 386	749 940
2004/05	2 231 865	658 703	1 685 935	1 437 049	517 524
2005/06	2 217 904	601 806	1 527 030	1 346 093	463 338
2006/07	2 177 900	614 475	1 521 235	1 397 957	336 521

Source: USDA (2007)

TABLE 3
Brazil: exports of concentrated orange juice, 2000/01 to 2006/07

Year	EU		NAFTA		Asia		Mercosur		Others		Total	
	million tonnes	%	million tonnes	%	million tonnes	%	million tonnes	%	million tonnes	%	million tonnes	%
2000/01	791.2	70.4	208.2	18.5	92.0	8.2	4.0	0.4	28.1	2.5	1 123.5	100.0
2001/02	762.4	71.3	131.1	12.3	124.5	11.7	2.0	0.2	49.3	4.6	1 069.3	100.0
2002/03	867.2	67.5	231.3	18.0	126.2	9.8	0.7	0.1	59.5	4.6	1 284.9	100.0
2003/04	969.3	71.8	165.8	12.3	148.3	11.0	2.8	0.1	64.1	4.8	1 350.3	100.0
2004/05	978.9	69.4	212.7	15.1	148.8	10.5	1.9	0.1	68.9	4.9	1 411.2	100.0
2005/06	872.8	65.0	174.1	13.0	172.3	12.8	1.1	0.1	121.5	9.1	1 341.8	100.0
2006/07	895.4	64.3	247.3	17.7	135.6	9.7	2.6	0.2	113.0	8.1	1 393.9	100.0

Source: Abecitrus, August 2007

It the beginning of the 1990s, the intensification in the competition with other juices, increased retailer concentration, the emergence of private labels and other structural changes affected the profitability of the industry and highlighted the need to reduce production and transaction costs, improve logistics, secure a smooth fruit supply and deal with increasing demands of all kinds of certification. The FCOJ industry went through a consolidation process with several acquisitions, resulting, in 2006, in a structure that is characterized by four large firms that engage in the production and export of orange juice, namely Cutrale, Citrosuco, Citrovita and Dreyfus. Cutrale and Citrosuco, both Brazilian owned companies, dominate also around 40 percent of Florida's FCOJ production. Dreyfus is a firm with French origin and entered the market through the acquisition of Frutesp. Although, the technology of the juice extraction process is standard, orange juice production is an industry with huge entry barriers. These barriers relate mainly to securing fruit supply, acquiring the necessary capital and specific bulk transport systems and the relationship with concentrated buyers.

Table 4 presents FCOJ exports by each firm in Brazil for the period 2000 to 2003. Since 2004, there is no published data on the amount exported by each firm, while the composition of the industry has also changed with the acquisition of Gargill Juice by Citrosuco and Cutrale.

Nevertheless, according to information collected through interviews, Cutrale and Citrosuco exported 36 percent and 30 percent of the total respectively, while the shares of Citrovita and Dreyfus amounted to 12 percent each. Consequently, in terms of exports the industry is characterized by a four-firm concentration ratio of over 90 percent with large firms that exploit economies of scale to reduce costs and coordinate effectively the input buying and processed product sale processes. The importance of scale is also evident by the exit of Cargill from the industry, a firm that was responsible for over 10 percent of total exports in 2002 and 2003. Nevertheless, such a high concentration can also give rise to market power that can be exerted upstream, as producers consist of a large and relatively uncoordinated group with weak associations or cooperatives and low bargaining power. Currently, the industry is being investigated by the Economic Defence Council, the antitrust institute of Brazil, for illegal fruit buying practices in the past, following complaints by a number of small producer associations.

Oligopsonistic behaviour possibilities aside, profitability in the FCOJ industry depends highly on the raw input buying strategies as a sufficient volume of fruit needs to be purchased. The industry faces FCOJ prices that are determined by market forces in commodity exchanges and as there are no brands, no differentiation is possible except for that due to quality. Vertical integration through ownership of orchards appears to be a good strategy for firms, where land prices are not high. Contracts with producers are also prominent and create partnerships between the industry and the fruit

TABLE 4
Brazil: citric exports by main processing firms, million US$ fob

	2000		2001		2002		2003	
	US$	%	US$	%	US$	%	US$	%
Cutrale	321 783	28.63	348 765	35.84	315 741	27.03	424 101	30.96
Citrosuco	243 025	21.62	222 299	22.84	261 132	22.35	331 646	24.21
Citrovita	74 135	6.6	68 428	7.03	98 816	8.46	163 852	11.96
Cargill Juice	37 642	3.35	-	-	156 558	13.4	151 815	11.08
Coimbra Dreyfus	98 576	8.77	94 186	9.68	82 605	7.07	108 531	7.92
Montecitrus	86 554	7.7	66 776	6.86	67 011	5.74	73 121	5.34
Others	262 386	23.34	-	-	186 437	15.96	116 834	8.53
Total	1 124 100	100	973 1	100	1 168 300	100	1 369 900	100

Source: MDIC/SECEX (2004) and interviews.

producers that sometimes can last for the whole life cycle of the orchard. Spot markets also exist providing the opportunity to producers to sell their fruit without entering into a long term contract. On average, about 20 percent of the orange harvest is sold for *in natura* consumption and 80 percent for processing into juice by the industry. Several governance forms and contractual arrangements emerge and are described below. Table 5 presents a description of coordination forms with the percentage of fruit transacted under each transaction agreement.

Spot market

In this form, fruit producers and industry make the transactions without any kind of contract, shortly before the harvest. This type of transaction gives rise to inefficient supply chain governance for the industry. First, it does not ensure that the processing plant will acquire adequate fruit supplies. Second, there are high asset specificities that relate particularly to location and delivery. Industrial units must be near the farms in order to reduce transport costs and transport time, as the fruit must be processed quickly soon after harvesting in order to achieve high quality. The uncertainty that is inherent in this type of transaction makes buying fruit in the spot market an unattractive option for the industry. It is estimated that about 5 to 10 percent of the total fruit production that is supplied to the industry is sold in the spot market.

Contracts

The use of written contractual arrangements between the industry and the producers is the prevalent transaction method in the orange juice supply chain. There is a large number of different contract formats including fixed prices, payments with a fixed and a variable component, minimum prices with indices based on variation of the international price, special partnerships with farm input companies, pre-payments for part of the fruit production, financing on the basis of anticipated purchase of fruit, and other forms.

Contracts allow both the industry and the fruit producers to specialize in their core competence, guaranteeing the supply of, and the demand for raw material. The first written contracts provided for fixed prices per box of oranges (each box weighs 40.8 kg). From 1986 and up to 1993, contracts provided varying prices per box according to the New York Commodity Exchange FCOJ price, while each firm had its own specific contract format and policy. In 1993, the Brazilian Orange Juice Industry Association (ABECITRUS) proposed the use of a uniform contract for all producers and firms, however, its use was prohibited by the Economic Defence Council. Currently, contracts are arranged individually between each firm and the fruit producers and stipulate quantity and quality levels, location, frequency and fixed or variable prices, or a combination of both.

At present, groups or "pools" of fruit growers emerge in order to perform joint negotiations with FCOJ firms and to achieve better prices and conditions, as well as better coordination in all activities. These contracts vary depending on the nature of relationship between the industry and the producers' pool. Again, distance, quality and volume are stipulated, in addition to the nature of transaction in the face of problematic events. From a theoretical point of view and taking into consideration the asset specificity, transaction costs, specialization and core competence of both parties, this may be the most efficient governance structure for this type of transaction in the chain.

Competition between processing firms for the raw material appears to be intense in spite of the location and time specificities involved in the transaction. Although transportation of oranges over a range of 200 km will have a negative impact on the prices received due to high transport costs and the decrease in fruit quality, plant facilities are characterized by a dense geographic concentration in the region of São

Paulo. This allows farmers to negotiate the contract terms with at least two processing firms. Although in their majority, growers prefer fixed, or variable price contracts, often they change buyer at the end of a contract, if conditions provided by another firm are more attractive to them. One of the four processing firms interviewed indicated that only about 20 percent of their fruit suppliers have a relatively long standing business relationship for more than six years with them. Approximately 50 percent of their current contracts are with growers that have only one or two year relationship with the firm, suggesting that growers have a choice on which firm they prefer to supply.

Toll processing

In the orange juice supply chain, toll processing has taken place since the 1980s. This contractual arrangement allows producers to rent the idle capacity of the industry and go further downstream the chain by adding value to their product. Toll processing involves fruit producers selling FCOJ to the beverage industry, or distributors, instead of selling the raw material to the processing industry. In this manner, producers engage in the international market and take over risks that are related to volatile juice prices (Neves, 1995).

Apart from improving the relationship of producers with the industry, the main advantages to the fruit growers that are involved in toll processing are related to their advance further down the chain, incorporating margins, reducing their dependence upon the industry, acquiring knowledge about the processing activity and gaining some experience in the international market. To the processing firms, the main advantages include higher supply warranties and a reduction of their idle capacity. Often the firm that lets its idle capacity to producers also acts as the agent for the sale of the juice, as entering the international market and negotiating a price consists of a high transaction cost activity for fruit growers. In this relationship, the juice extraction rate is improved, as the cost of processing a box of oranges, which normally amounts to US$1.00, depends upon efficiency. The more juice production, the higher the price per box paid to the industry. There are some risks for the producers related to monitoring the processing of fruits, as for this type of contract producers have to face the costs maintaining sufficient technical staff during processing.

Vertical integration

The degree of vertical integration varies between the FCOJ firms. Some industrial units are integrated to a large extent, owning the supply chain upstream to fruit production in order to secure adequate fruit supply. However, the majority of the firms are characterized by a vertical integration of a lesser degree, owning about 15 to 20 percent of the chain, or even lower, as for instance in the case of Dreyfus. There are many advantages in vertical integration, such as the reduction in the risk related to the supply of raw material and to the fulfilment of the contract conditions by the growers. There are also increases in the economies of combined operations, as better control of the farms results in stable relationships and information flow that facilitate the decision making process, inventory management and industry planning. In particular, vertical integration in the FCOJ supply chain is made possible, as orange production in Brazil has proved to be an attractive investment. Moreover, a higher degree of integration enhances the negotiation power in the chain and stimulates other fruit producers to follow the practices of the industry and invest in orange production.

The main disadvantages of vertical integration in the chain are related to high immobility of resources in land and buildings and higher risks faced by the industry in agricultural production. Integration may also entail increased costs of monitoring a principal-agent relationship between the industry and farm managers. Other negative aspects of vertical integration may include loss of specialization and diseconomies from unbalanced stages between the fruit production and industry.

TABLE 5
Contractual arrangements and coordination in the orange juice chain in Brazil

	Coordination types	Percentage participation of orange production	Characteristics of the relationship
+ (greater) Control (minor) / Supply risk	Vertical integration	18 to 22%	Refers to the companies' own orchards, with full ownership of assets, that is, the processing industry owns the production areas.
	Leasing	1 to 2%	Long lasting contracts (15 to 20 years), the industry rents the land at a previously established amount, unchanged throughout the 20 years, and carries out its activities.
	Integral partnership	1 to 2%	Long last contracts, the industry invests and operates in the area and the products are used as payment for the use of the area. The industry guarantees the purchasing of the fruit at market price. The landowners' risks are natural (productivity) and economic (fruit price).
	Supported partnership	0.5%	Long lasting contracts, inputs are supplied by the industry, the landowners operate the farms closely supported by the industry. The price of the fruit involves fixed and variable rates according to the price of juice in overseas markets, especially the European market.
	Toll processing	7%	Processing by renting the industrial unit, that is, the producer rents the capacity (partial/total) of a factory, process their own fruit and trades the products.
	Contract flex	20 to 25%	Supply contracts based on set amount and variable part according to the price of juice in overseas market. These contracts last 2 to 5 years.
	Fixed contract	35 to 40%	Supply contracts based on set price for a period between 2 and 5 years. Industry bargaining power here has value, capturing margins
	Crop contract	5 to 10%	Contract valid for a crop, usually with set price.
	Spot market	5 to 10%	The fruit is sold in market transactions; spot, in period close to the harvest.

Source: Elaborated by the author based on interviews.

5. ORANGE PRODUCTION

Orange is one of the most produced fruits in the world. Brazil represented almost 30 percent of the world orange production in 2005 (see Table 6). In 2007, it is estimated that the about 800 000 hectares will be harvested, with 566 000 hectares been in the State of São Paulo (71 percent of orange area). The value of the orange production in Brazil amounted to US$2.3 billion in 2005/06 and US$3.2 billion in 2006/07. The State of São Paulo has, on average, 150 to 160 million trees, producing up to 350-400 million boxes of 40.8 kg each.

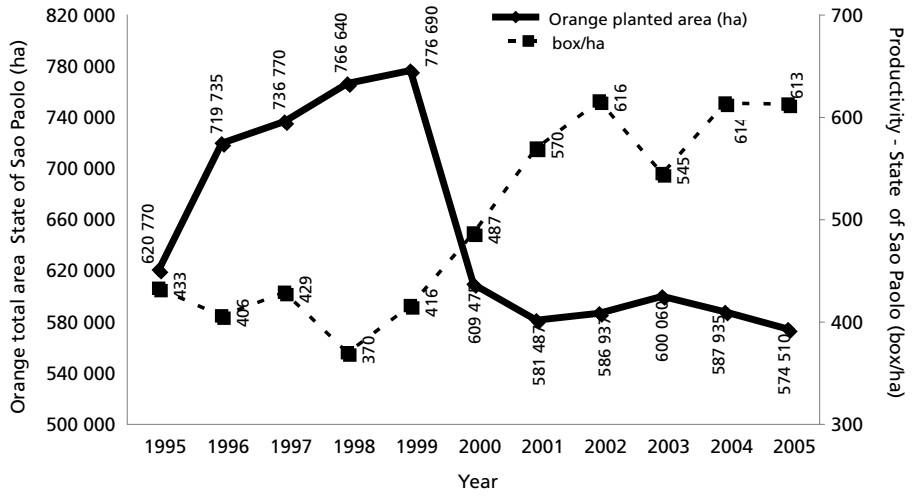
In Brazil, since the year 2000, the total area under orange trees has remained stable. Nevertheless, productivity in terms of box of oranges per hectare increased by

TABLE 6
World production of oranges

	2001		2002		2003		2004		2005	
	million tonnes	%	million tonnes	%	million tonnes	%	million tonnes	%	million tonnes	%
Brazil	16.98	28.06	18.53	29.73	16.92	27.87	18.31	28.51	17.86	29.70
USA	11.08	18.31	11.22	18.00	10.47	17.24	11.67	18.17	8.39	13.95
Mexico	4.03	6.66	4.02	6.45	3.84	6.32	3.97	6.18	4.11	6.83
India	2.86	4.73	3.12	5.01	3.07	5.06	3.1	4.83	3.1	5.15
China	1.48	2.45	1.64	2.63	2.01	3.31	2.31	3.60	2.41	4.01
Spain	2.89	4.78	2.69	4.32	3.05	5.02	2.76	4.30	2.29	3.81
Others	21.19	35.02	21.11	33.87	21.36	35.18	22.1	34.41	21.98	36.00
Total	60.51	100	62.33	100	60.72	100	64.22	100	60.14	100

Source: FAO, 2007

FIGURE 2
Evolution of area under oranges and yield per hectare in the State of São Paulo



Source: Instituto Brasileiro de Geografia e Estatística, 2006

21 percent in the last 6 years (see Figure 2). These increases in productivity were made possible by the establishment of research centres that aim at developing production systems and genetic material, such as the Apta Citros Center and the Estação Citriculture Experimental Site in Bebedouro.

The orchards in São Paulo show varying levels of tree density. Through the interview process, three different orchard farm system segments were identified depending on the productivity per hectare and the average density for the orchards (Table 7). It is important to note the most productive farm system (Farm System III) is identified by a tree density that is twice as high as that of the less productive farm system (Farm System I). Although, a number of studies stress the downsides of greater tree density, which include limited plant growth and decreased average fruit weight, it appears that denser planting produces more fruit per unit of area which may outweigh these drawbacks.

Orange producers are subject to intense pressure regarding labour and environmental laws, as well as increasing costs due to higher disease rates that require frequent applications of agricultural chemicals. On average, the share of crop protection in total costs amounts to approximately 28 percent with fertilizers accounting for 14 percent. Harvesting and the transport of fruits, as well as management costs amount to 23 and 13 percent of total costs respectively while other energy costs account for 4 percent of the total.

Efforts to minimise production costs have led to changes in the structure of the orange production sector with the number of farms having decreased from 28 000

TABLE 7
Orange farm systems in São Paulo

Characteristics	Farm System I	Farm System II	Farm System III
Productivity (box/ha)	488	690	990
Productivity (box/tree)	1.8	2	2.2
Density of Plantation (trees/ha)	271	345	450
Participation in total orange area	40-45%	30-35%	20-25%
Participation in total orange production	30-35%	30-35%	30-35%

Source: elaborated by the author from interviews

TABLE 8
Structure of orange farms in São Paulo

Number of trees	2001		2006	
	% Producers	% Trees	% Producers	% Trees
> 400.000 trees	0.2	13.3	0.4	25.5
200 to 399 thousand trees	0.3	10.1	0.5	6.0
100 to 199 thousand trees	1.1	12.7	1.3	11.7
50 to 99 thousand trees	2.6	14.9	2.8	13.9
30 to 49 thousand trees	3.5	11.3	3.5	9.3
10 to 29 thousand trees	14.9	20.0	15.2	17.6
< 10 thousand trees	77.5	17.9	76.3	16.1
Total	100.0	100.0	100.0	100.0

Source: Author's estimates

to around 10 000 in the last two decades. There is also evidence of an increase in the orchards with more than 400 000 trees which by 2006 accounted for 25 percent of total orange trees in Brazil (see Table 8). Nevertheless, the majority of orchards in Brazil have less than 10 000 trees. Scale and density have important implications on productivity with some orchards having a yield of 1 600 boxes of oranges per hectare, while other more traditional and old farmers produce only 400 boxes per hectare. Given these differences in productivity, it is possible that consolidation in the orchards will continue. Nevertheless, it is a fact that the industry needs more technological advances, principally in the area of plant genetics. For a decade, tree productivity has remained constant. As land prices increased considerably in the state of São Paulo, the sector faces increased costs and improved tree productivity, as well as increases in the intensity of land use are fundamental factors in order to maintain the profitability of the sector.

The major threats in orange production are related to diseases, competition for land and coordination. Orange trees are susceptible to a number of diseases. However, citrus greening, or huanglongbing (HLB) presents a major threat. The disease is caused by bacteria and is transmitted by an insect called *Diaphorina Citri*. HLB affects all varieties and has caused severe damages in China and South Africa and it is also present in more than 120 locations in Brazil. HLB can cause irreversible damage to plants, threatening the quality and quantity of oranges and has the potential of completely rendering an orchard unproductive. Therefore, it is vital to establish strict rules and incentives in the phytosanitary area and to improve the inspection capacity.

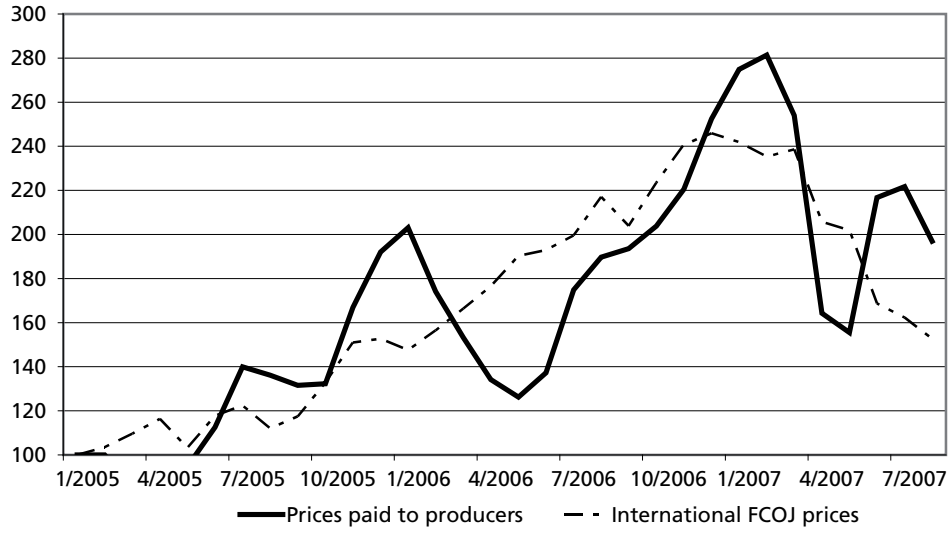
The increased intensity in the competition for land also presents a problem for the orange production sector. The production of sugarcane is located in the state of São Paulo, the same area in which most of the orange production takes place. Increased oil prices have triggered increases in the production of ethanol, resulting in sugarcane area expanding at the expense of orange trees. Estimates suggest that sugarcane has captured around 50 000 to 100 000 hectares from citrus production during the last five years. Nevertheless, the orange juice price surge in 2007 has hindered this development at least for now, with sugarcane expanding in other areas of the country.

Finally, farmers are not well coordinated. There is only one association, ASSOCITRUS, in which some 10 percent of orange growers belong. There is also one large citrus cooperative, Coopercitrus which is only involved in the collective purchase of farm inputs and not in fruit market transactions. There is room for the emergence of more groups of orange farmers that perform market transactions collectively, as such pools can coordinate purchases and sales at better conditions that on average correspond to lower input prices by 10 percent and higher orange prices by 10 to 20 percent.

6. THE TRANSMISSION OF PRICE SIGNALS ALONG THE CHAIN

In 2006, the average price of a box of oranges in the Brazilian market rose by 68 percent, when measured in US dollars, as compared to the previous year, reaching US$ 6.64 in

FIGURE 3
Spot market prices for oranges and international prices for frozen concentrated orange juice
January 2005=100



Source: Center for Advanced Studies on Applied Economics, 2007

December 2006 and hitting a record level of US$7.4 in February 2007. Figure 3 shows the relationship between prices paid to producers for a box of oranges in the spot market in Brazil and the international FCOJ prices between 2005 and 2007. It appears that, seasonality apart, spot market fruit prices follow closely those of the international FCOJ market. Between January 2005 and January 2006, fruit prices increased by an average 8.8 percent per month, while the average monthly increase in FCOJ prices was 7.6 percent.

Nevertheless, for the majority of growers who are tied in contracts with the industry, spot market prices are not entirely relevant. There is a large variation in the price per box of oranges paid by the FCOJ firms to contracted producers. There are contracts where prices can be 200 percent higher than the average price paid by the firm in a particular year, while for other contracts prices can be 50 percent lower than the average price. This difference in the prices paid to growers arises as prices depend on several factors, but most importantly on the timing of the transaction, the market trends, juice stocks, the size and location of the grower, the quality of fruit, and other reasons.

The following equation reflects the impact of these factors:

Prices paid to farmers = f (farmers component, industry component, time),

where:

- Farmers component = (volume, type of orange, location, quality, ability to negotiate, risk)
- Industry component = (amount of fruit needed, idle capacity, intensity of competition for fruit, history of relationship with farmer)
- Time = (expected Florida production, expected São Paulo production, stocks, juice demand)

Thus, the form of individual contracts determines the transmission of price signals from the international FCOJ market to the producer level in terms of extent, as well

as in terms of timing. In this respect, the orange market is different than the grains and sugar markets where shocks in international prices may be fully transmitted upstream the chain. When the prices of juice increase, farmers that had agreed on part of the price been fixed and part of the price been based on international prices, receive higher prices, however, not to the extent of the juice price increase in the international market. Growers with fixed price contracts do not benefit from an increase in the international FCOJ price, with the industry capturing the difference in the value between the price paid to these producers and the spot fruit market. Recently, a renegotiation process, initiated by farmers' federations and the processing industry resulted in an increase in the price per box paid that was thought of as insufficient by a proportion of growers. Moreover, other producers who had fixed price contracts with FCOJ firms that were expiring at the time of the orange juice prices surge, enjoyed relatively strong negotiating power and agreed on better prices as firms were eager to ensure adequate supply of fruit. Therefore, the extent to which price changes in the international FCOJ market are transmitted to fruit prices in Brazil depends on the price flexibility provided by the contractual arrangement, but also on the negotiation power of the producers.

It is important to note that 35-45 percent of the growers prefer fixed price contracts for three to four years. Such a strategy depends on the grower's cost structure, his/her expectations on international prices and the extent to which he/she is risk averse, as with fixed price contracts the risk that is related to international price uncertainty is borne by the processing firm. After analyzing the cost structure and the market, a farmer may consider that a fixed price for three to four years will be enough and bring him/her adequate income. Contracts that stipulate a price with a fixed, as well as a variable component present higher transaction costs for growers, since they involve increased risk and monitoring international prices. Although preferred by a significant share of producers, fixed price contracts have recently led to discontent mainly due to the marked increase in the incidence of diseases that resulted to an increase in the use of chemicals in production costs. Another factor that had a significant impact on growers' profitability, irrespective of the form of contract, is related to the strengthening of the Brazilian currency, Reais as compared to the US dollar. The appreciation of Reais from US$3.30 in 2004 to US$1.90 in 2007 had a significant impact on the profitability of orange production, as orange prices are set by referring to the international market, whilst production costs are determined in Reais.

7. CONCLUDING THOUGHTS: A FUTURE AGENDA FOR THE INDUSTRY

On the basis of the above analysis, an agenda for the future of the orange juice chain in Brazil is composed by means of the GESis method (Neves, 2007). The agenda puts forward a number of actions in six dimensions, namely i) coordination and contracts; ii) orange and juice production; iii) innovation in research and development; iv) advertising and communication; v) collective and institutional actions; and, vi) distribution channels and logistics. Table 9 provides a summary of the proposed actions in each dimension.

The Brazilian orange juice chain is unique in terms of world-wide leadership, specific assets, sophisticated coordination forms, and contractual arrangements that have evolved over the last 40 years. The potential of the Brazilian citrus chain, mostly in orange, is high. Orange juice production has always been characterized by a supply chain of exemplary success in terms of efficiency and evolution. The current problem in Brazilian orange juice chain is one of organizational nature. It is in this area that there is a need to innovate and change well established paradigms. A number of points that compose a future agenda for the orange juice chain focus on the creation of a vertical organization which would centralize all the coordination efforts. This organization is expected to have private sector orientated professional management and modern administration systems. There are similar organizations in agribusiness in

TABLE 9
Brazilian orange juice 2015 agenda

Coordination Agenda

- ✓ Unify horizontal organizations. Each part would have a sectoral organization, with compulsory participation, which would represent it in the vertical organization (consisting of producers, industries and facilitators (logistic, concessionaires, packing and input suppliers). This vertical organization could be managed by the private sector, with compulsory financing involving the whole chain and resources from the government coming from taxes retrieval; Representatives from state and federal government offices would be invited
- ✓ Fundecitrus, as well as other research organizations, would meet in a research/sanitary defence branch of this vertical organization, so that they can join efforts in research, defence, budget and financial assistance.
- ✓ Provide alternative models for contracts and arbitrage between producers and industries. This would be the contract branch of the vertical organization
- ✓ Elaborate and disseminate systematized data

Contracts Agenda

- ✓ The main idea is to elaborate a standard model for long term contracts between industries and producers with transparent criteria, such as: product cost and quality indexes, by-products generated, international prices, agricultural and industrial performance and coefficient, etc. The remuneration system would be strongly based on a transparent cost index and/or in some way proportional to the final juice price in international markets (average of prices paid by the FCOJ in the main market packing houses)
- ✓ It would be equally created a system for payment of bonuses (additional or price discount) in the form of private incentive to the production quality systems. Criteria, as payment for soluble solids and fruit quality and defectiveness, would be developed and applied in a clear and transparent way. This is not new, since the sugar cane chain in Brazil is organized this way

Production Agenda

- ✓ Plant and renew orchards using the latest technology to reduce costs
- ✓ Develop customized financing lines by public banks in order to revitalize the citriculture
- ✓ Improve quality control system, which includes certification, tracking, standardizing and food safety, contemplating aspects related to the LMR (Maximum Residue Allowance)
- ✓ Regional diversification: expansion to new areas and new states (Petrolina-Juazeiro Center), with high technology and social inclusion
- ✓ Care for the environmental sustainability and certifications (organic and conformity stamps, among others)

Innovation, Research and Development

- ✓ Re-structure organizations that provide extension activities
- ✓ Opportunities to set up national and international innovation and research networks;
- ✓ Invest in researches concerning the plant's most resilient variety to plagues and diseases, and varieties which can be harvested all year long
- ✓ Develop juices for lower income classes, which attend demands of flavour, convenience to compete with soft drinks
- ✓ Develop juice production processes that makes the industrialized juice flavour more alike to the home made one
- ✓ Develop new products, adding to orange juice products
- ✓ Develop attractive packing and cheaper alternatives of packing
- ✓ Develop appliances that make in natura consumption easier, such as modern peelers and squeezers, as electric coffee machines
- ✓ Launching popular, light and functional juices
- ✓ Premium products
- ✓ New products based on orange (ice cream and dried-like snacks)

Advertising Communication Agenda

- ✓ Carry out a wide-range advertising plan using strategies aiming at motivating consumption and the creation of high quality standards, providing support to Brazilian orange
- ✓ Explore and better advertise the characteristics of each type of orange and juice
- ✓ Elucidate the differences between juices, refreshments, nectars and mixed beverages
- ✓ Motivate consumption in schools and among children, create a mascot (character)
- ✓ Develop campaigns aiming at informing how the products benefit health
- ✓ Link the orange image to the state economy, showing how orange contributes to collecting and development.
- ✓ Regional labels and geographic identification
- ✓ Family integrating activity

Institutional and Collective Action Agenda

- ✓ Strengthen political relations between government and professionals in the sector. Lobby for simplification and, if possible, tax reduction
- ✓ Create an association for fresh fruit exporters, contributing to an increase in Brazilian exportations and overcoming some difficulties
- ✓ Establish regional and bilateral agreements with other countries, providing better commercial conditions and, consequently, higher competitiveness for the Brazilian orange

Distribution Channels Agenda

- ✓ Develop new distribution channels for fruits in natura and juices
- ✓ Develop a market of companies that provide collective meals and foodservice
- ✓ Internationally distribution through major retail networks, which are also development channels, placing the products directly into these networks brands
- ✓ Development in new and promising markets, such as East Europe and Asia
- ✓ Redeem the table orange, due to the health appeal
- ✓ Set up juice houses, consumer laboratories

other countries which can be analysed in order to identify their advantages and pitfalls. As the current market conditions are favourable and business climate is better a strong coordinated effort is necessary.

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