

# **PART 1**

## **CONCEPTUAL ISSUES OF MARKET STRUCTURE IN AGRICULTURAL COMMODITY VALUE CHAINS**

# Market Control and Competition Issues along the Commodity Value Chain

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## ABSTRACT

This paper examines from the viewpoint of microeconomic theory and, in particular, from that of the modern theory of industrial organization, issues that arise when agricultural and food markets deviate substantially from the perfectly competitive model. We review some important ways in which terms of trade, profits, and the allocation of resources are affected when markets are monopolistic or oligopolistic at various stages of the vertically related commodity value chain. We also discuss the role of contracts between upstream and downstream producers and how contracts affect the firms' incentives for investment, innovation, and pricing decisions. Finally, we refer to possible issues raised for vertical markets in the context of competition policy.

Keywords: Vertical markets, contracts, value chains, market concentration, oligopoly markets, competition policy.

## INTRODUCTION

The importance of agricultural and food markets for consumers, producers, national economies and international trade has always been and is expected to be extremely high. Taking a historic perspective, such markets have been generally viewed as working in a way that can be approximated by the textbook "perfectly competitive" model, or simply by "demand and supply". Among the more pronounced related features are product homogeneity, small scale, relatively low entry barriers and (most importantly) a large number of buyers and sellers. While there may be market uncertainty (manifested either through demand or supply shocks), this doesn't generally upset the validity of the general model adapted: the appropriate general theoretical vehicle for analyzing such markets and for discussing policy issues has been traditionally the perfectly competitive economic model. In such a setting, one looks first for an equilibrium in the market and the associated prices and quantities. Even in such a (perfectly) competitive framework, of course, important policy issues may arise.<sup>5</sup> From these, I would like to single out two that are the most important, in my opinion: (a) the insurance policies against aggregate or local market fluctuations that may adversely affect the prices, volumes and producers' incomes and (b) the incentives for innovation (or the lack of such sufficient incentives), in particular for the adoption of new technologies under uncertainty and/or with network effects. Both of these issues are particularly important in agricultural and food markets and also quite interesting in theory, independently of whether the market structure is nearly perfectly competitive or not.

While the competitive framework has to be taken as a starting point, gradually over the last decades (and more recently at an accelerating rate) the structure of agricultural and food markets appears to be changing in fundamental ways. The main way in which such markets are changing is by the emergence of significantly increased concentration at one or more stages of the value chain: where we may have used to have a very large number of buyers and/or sellers that each operated as small price takers, we now may have large buyers and sellers, each with significant market power. We are also

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<sup>5</sup> See e.g. Johnson, ed. (1981) for articles on the important policy issues for food and agricultural markets in the 1980s.

starting to see product differentiation emerging as an important strategy and, for some products, even a significant number of “brand” names that become strong in the market.<sup>6</sup>

In particular, there is evidence of significantly increased concentration at the distribution and retail stage (see e.g. Clarke *et al.*, 2002, for an analysis and further references), increased concentration in the production stage, as well as also in the middle stage (transportation). Once it is recognized that it may be now “large” players that compete in the market, the issue of strategic behavior and, in particular, the emergence of product differentiation and of the formation of vertically linked chains comes to the centre of the discussion.

It is crucial to start our analysis of at hand by the observing that in markets organized as oligopolies, above normal profits can be sustained on average, while there is also a possibility of some insurance against low prices. But “moving out of commodity markets” raises a number of additional issues. If such a transition takes place, is it driven by demand (consumers are willing to pay enough for different varieties or higher qualities) or supply (the need of sellers to strategically position/differentiate themselves) or both? How should production and trade be vertically organized? At which stage of the vertical chain high rents tend to be realized? Do such strategies offer some insurance against risks or these risks become more threatening? What are the implications for policy design?

More specifically, changes like the ones mentioned above, in my view, imply (at least) four sets of issues that become important both for policy makers and also for the firms’ strategies:

- How does the treatment of important more “traditional” themes (like the ones mentioned above: insurance from fluctuations and innovation incentives) get modified when there is a concentrated market structure?
- How do the market conduct and performance get modified when certain stages of the market (production, retail, transportation or intermediation) are oligopolistic, especially taking into account the vertical structure of the value chain? Does increased concentration upstream (large producers) or in the middle stage (large intermediaries) have different implications from increased concentration downstream (large retailing sellers)? Can the final consumer benefit from such developments?
- What is the role of product differentiation, and how the goal of moving away from undifferentiated “commodity” markets towards differentiated products of higher value is related to increased concentration and oligopoly pricing?
- To what extent the presence of market power raises issues of competition (antitrust) policy and in particular such issues related to merger control (horizontal or vertical), cartel-like behavior and “collusive practices”, and “abuse of dominance” by dominant firms.

This paper focuses on the basic theory for the issues mentioned above, and on some of the main implications related to the introduction of market power in value chains in agricultural and food markets. The important issue of general interest here for agricultural products can, more broadly, be described as the (partial) transition from “demand and supply” commodities markets to markets where products are differentiated and supplied through distinct vertical chains. Research in this area is gradually attracting significant and increasingly strong interest. This paper will hopefully provide a useful link with some of the important ideas developed in the context of the industrial organization literature and can be useful when applied appropriately in agricultural and food markets. Since the number of the various issues involved is quite large, this presentation here will be necessarily brief and selective.

The structure of the remainder of the paper is as follows. Section 2 reviews some of the important recent trends from the viewpoint of the implied changes in the (vertical) structure and concentration of the market chain. Section 3 presents the basic externality (double marginalization) in vertically related chains when linear contracts are used and discusses possible solutions. Section 4 is an introduction to

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<sup>6</sup> See Sarris and Hallam (2006) for a recent overview of the important issues and trends in agricultural markets and trade. Also McCorrison *et al.* (2004) and Reardon & Timmer (2005) for related discussions.

strategic pricing issues when there are multiple oligopolistic competitors at the upstream or downstream stage of a chain. The issue of quality provision is also discussed. Section 5 considers the important issue of investments that are specific to a particular value chain and the implied incentives for contracting and exclusive versus multiple sourcing. Section 6 turns to dynamics and in particular examines the role of learning effects. Section 7 reviews the main competition (antitrust) issues that may emerge as important in the near future in these markets. Section 8 discusses that, given various forms of policy interventions is the norm rather than the exception in agricultural and food markets, increased concentration at some stage of the vertical chain may affect policies and the economic results for buyers and sellers via its direct or indirect influence on policy. Section 9 concludes.

## REVIEW OF SOME MARKET TRENDS AND SOME OF THE IMPLIED ISSUES

In the agricultural and food economics literature it is important to understand the vertical structure of the supplier-retailer relation. We need to distinguish between upstream firms, i.e. the producers or suppliers and the downstream firms, i.e. the processors or manufacturers or retailers. The market structure organized along these two main stages is very important for the analysis of the food chain. Each stage may be characterized by imperfect competition (low number of firms upstream and downstream). For example, in many developing countries the decrease observed for the purchasing prices that receive the upstream suppliers is often not proportional to the reduction of the final prices set by the supermarkets. This phenomenon can be contributed to the oligopolistic nature of the downstream level of the market, the profits at which generally tend to increase. It should also be noticed here that many upstream suppliers of raw materials or unprocessed food commodities are exporters that reside in developing countries, while the downstream firms are importers in developed countries. Hence, the tariff system (tariff escalation) and other international trade barriers are really important for the formation and development of the food chains.

### *The main market trends downstream*

Market structure in the agricultural and food sectors has changed fundamentally and rapidly since the 1950s both in the developed and developing countries (in the latter countries usually with a delay of three decades or more). Before this transformation period, the norm in most cases tended to be the existence of informal and traditional domestic food markets with many small producers in the production segment and direct sale or local brokers for the rural market or traditional wholesale to the urban market in the wholesale segment. Also, at the retail stage the main form of market organization were small shops or central markets. After this traditional phase, a new phase emerged with “modernized” domestic food markets with significant concentration in the wholesale sector. This phase has been characterized by some researchers and policy makers as the “supermarket revolution”. Initially, this change referred mainly to the processed food sector, due to the non-perishable character of these products, but gradually it has become relevant also to the fresh fruit and vegetables sectors of the market.<sup>7</sup>

This transformation occurred in three main waves at different times and places, with the first wave in much of South America, East Asia besides China and Northern-Central Europe. The second wave occurred in much of Central America and Mexico, Southeast Asia, Southern-Central Europe and South Africa, and the third wave in South Asia, China, Eastern Europe and parts of Africa. This transformation was, of course, not always with uniform characteristics, but dependent on the specific socioeconomic and structural characteristics of each region.<sup>8</sup>

Today, taking an average concentration in the areas mentioned above, the three or four top supermarkets in each country tend to possess a share of 50 percent in many national food retail systems. This share differs, of course, across countries. The main reason for this supermarket revolution is the increased demand for supermarket services. The demand-side incentives were primarily related to the urbanization and the consequent entry of women in the workforce outside the

<sup>7</sup> See e.g. McCorrison (2006) for an analysis.

<sup>8</sup> For evidence and analysis from different regions see e.g. Balsevich *et al.* (2003), Berdegue *et al.* (2005), Boselie *et al.* (2003), Hu *et al.* (2004), Neven & Reardon (2004), Reardon *et al.* (2003).

home. This has increased the opportunity cost of women's time (and more generally the household's time) and their incentive to seek shopping convenience and processed food to save cooking time at home. Second, the operation of large supermarkets, often in combination with large-scale food manufacturers, reduced the prices of processed products and offered greater variety than traditional retailers could offer, due to economies of scale in procurement and improved inventory management. Recent improvements in marketing research, on the one hand, and in information technology, on the other hand, have also improved the efficiency of large retail units.

On the demand capacity-side, several reinforcing factors in play were the real per capita income growth in many countries of most of the above mentioned regions since the 1990s, as well as the rapid growth in the 1980s in ownership of refrigerators that meant an increased ability to shift from daily to weekly or even less frequently shopping. Increased access to cars and public transportation reinforced this trend.

The growing supply of supermarket services was driven by several factors. One important factor was the increased level of Foreign Direct Investment (FDI) mainly by chains from developed countries that were seeking new markets to supply their products due to saturation and intense competition in their home markets. A second crucial supply-side factor was the revolution in retail procurement logistics technology and inventory management. The use of the Internet and computers for inventory control improved the supplier-retailer coordination and minimized the inventories on-hand. Finally, the gradual liberalization of the tariff system in many countries and generally the significant reduction of trade barriers helped to the creation of a better supplier-retail system.

All the above factors in combination led to an increased concentration at the downstream level of the food supply chain with main features the centralized procurement system, the consolidation of distribution, the increase, in general, in food quality and safety due to implementation of private and public standards, the "most preferred" supplier, economies of scale in transportation, storage and finance, the increase of barriers to entry for the competitors and the ability to demand lower merchandise prices or greater provision of services from their suppliers. These and other improvements in organization and institutions "drove costs out of the system".<sup>9</sup>

### ***Implications for market competition upstream***

The need to supply large volumes according to strict delivery schedules and to consistently meet high enough quality standards means that the preferred suppliers of supermarkets will naturally tend to be primarily large growers. Small producers will be at a disadvantage because of small financial base, lower expertise and relatively weaker abilities and incentives to maintain consistent and high enough quality. Hence, the consequences of the above described concentration trends in the retail stage developments for the smallholders are not always positive. The inability to exploit positive economies of scale and the need for certification that face the smallholders do not help them remain as significant players in the vertical supply food chain. On the other hand, the ability to provide the care required for high quality and possibly even production at a lower cost (sometimes due to the "family" labor supply) can be the comparative advantages of the small growers. As a result, if smallholders are to continue playing collectively an important role in the market should meet the new challenges via appropriate coordinated actions and, when needed, the support of the governments or local agencies (for reasons of technological and institutional innovations).<sup>10</sup>

<sup>9</sup> In a study of the European food retailing sector, Clarke *et al.* (2002) examine the welfare effects of the observed significantly increased buyer power. They explain that the final evaluation depends on a number of trade-offs including one between increased buyer power and increased retailing power (large supermarkets obtain better terms of trade from their suppliers but may not have an incentive to pass these savings to the final consumers) and one between the short-term benefits of lower prices and the long-term effect on increased concentration. They also discuss important similarities as well as differences among the countries studied. Dobson and Waterson (1997), also, analyze the issue of the increased (countervailing) buyer power.

<sup>10</sup> For analysis of the implications for producers see e.g. Cacho (2003), Crespi & Gao (2005), Dries *et al.* (2004), Key & Warning (2002), and Reardon *et al.* (2003).

### ***Contracts***

Economists generally distinguish three broad methods for organizing the transfer of commodities from farms (upstream stage) to the next stages of food production: a) spot markets where the price of the commodities is set at the time of sale based on the current market demand and supply, b) vertical integration which combines the farm and downstream users of a commodity under some single ownership, and c) contracts i.e. formal agreements between the suppliers and the retailers.

Spot markets represent the dominant traditional method for organizing the transfer of agricultural and food commodities for a long time. Economic theory and business practice alike indicate that when markets have perfectly competitive features, the “free market” price (generated by the demand and supply mechanism) has strong and desirable efficiency properties, at least when the market is viewed from a static perspective. In particular, the market price tends to reflect the true economic cost and value of each commodity and its relative scarcity. Still, when the market is viewed dynamically, competitive spot prices may have problematic properties and adverse implications – this issue is particularly relevant for the allocation of risks and the investment incentives in new technology. At the same time, as already discussed above, the observed increased concentration downstream has had as a direct implication a fundamental change in the way that producers and retailers transact and determine the terms of trade; in particular, more and more transactions from the farm to the retail level are organized through agricultural specific contracts. The gradual liberalization of agricultural markets and the removal of trade barriers worldwide have accelerated the formation of such “vertical” agricultural contracts. These contracts usually specify the quantity to be delivered, the time of delivery, the buying price (before harvest begins), the quality of the product and/or the type of variety or seed to be used. Depending on the type of the contract (for example, if it is production or marketing contract) the contractor can provide the grower inputs, labor for harvesting or technical advice and support. Moreover the duration of such contracts often tends not to be too long, a few months or near to one year, while the suppliers that agree to formal contracts are large growers. While in some cases the length of the contracts is increased, this has not been the norm.

The advantages of the farming contracts are that the farmers know that they have an assured buyer for their production, the provision of inputs, “security” about the prices, the quality control and the cash in advance. All these factors lead to the reduction of the risk for the farmers. On the other hand, the farmers often get a lower price due to the high bargaining power of the downstream firms than what they may obtain in a free (spot) market. Thus, producers may face a trade-off between risk and return. Another disadvantage is that farmers lose their autonomy and having full control of their operation – as a result, in some cases they may find it more profitable to work for themselves and arrange their business dealings independently. Moreover, contracts serve as incentives to the suppliers to stay in a transaction relationship with the same buyer and over time make investments in assets (such as equipment and learning) that are specific to the particular retailer. Such specific investments can lower significantly the cost of production and increase the attractiveness of the farmer’s product to the buyer, but they also reduce the flexibility of the growers.<sup>11</sup>

An alternative to shorter or longer term contracting is for the firms to follow vertical integration strategies, though mergers, acquisitions or simply by expanding their business along the value chain. By following such strategies, a firm can integrate backwards, typically with a large retailer moving back towards the distribution, transportation and even the production stage. Or producers (once they each reach a critical size or in some collaboration among them) can integrate forward by moving into the distribution stage and even all the way to the stage of sales to the final consumers. Vertical integration can be full (in the sense that it covers all the stages along the value chain) or partial. Compared to contracting, integration may allow firms to solve problems due to high transaction costs, by internalizing risk-related and other incentives. However, vertical integration is associated with a loss of flexibility and also – if it proceeds beyond a certain level – with high internal transaction and administrative costs as a result of a larger combined size of the firms and of operating in multiple markets.

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<sup>11</sup> See Eaton and Shepherd (2001) for details on contract farming with emphasis on the institutional environment and the responses of the farmers to changes in this environment. See also MacDonald and Korb (2006).

It is obvious that due to the growing use of vertical contracts in the concentrated food chain, it is necessary to analyze the role that they play for the level and division of the profits in the vertical chain and the formation of the final price that pay the consumers. It is important to also identify the policy implications for the government and, in particular, for competition policy.

### THE BASIC VERTICAL EXTERNALITY AND SOLUTIONS

It is sometimes informally suggested that a larger number of stages in the vertical chain, essentially a larger number of intermediaries leads to higher final product prices. To understand this argument, which is indeed correct but only under certain conditions, let us consider a simple vertical market structure or value chain with one upstream firm (U) and one downstream firm (D), like that shown in Figure 1. Note that here we assume, for simplicity, that there are one only two stages. Firm U's product is sold to firm D, which in turn sells to the final consumers (possibly after some packaging or other processing). Thus, in this simple example, with only two stages, the upstream firm may be a producer and the downstream a retailer.

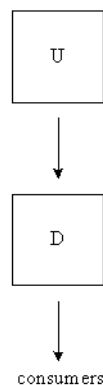


Figure 1: Value chain with one upstream and one downstream firm

The main *double marginalization* argument can be understood as follows. Demand in the final market is taken as given (and can be formally represented by any strictly decreasing function of the final price). Suppose that pricing can be only “linear”, that is, we have a constant per unit pricing. The U firm sets a price  $P_w$  (the wholesale linear price) and then the D firm makes its purchasing decisions from the U firm and decides the price that it sets for the final consumers,  $P_R$  (retail price). Each firm is independent from the other, in the sense that it seeks to maximize its own profit. The fundamental result that one obtains in the equilibrium of this model, a relatively well-known result since Spengler (1950), is that this process of double marginalization leads to prices for the final consumers that *exceed* the prices they would face under a vertically integrated (VI) monopoly. Since the monopoly profit is by definition the maximum possible in a market, we also find that, under vertical separation, the aggregate profits (for D and for U) will be *below* the profits for the VI case. So, vertical separation with linear pricing tends to hurt both the consumers and each of the two firms, while integration seems to benefit them. The underlying reasoning is that the firms fail to internalize the vertical externality that exists in their pricing (in particular that the U firm ignores part of the effect that an increase in its own price will have on the final price).

The following remarks are important in order to understand how this fundamental vertical externality works in value chains:

- From the above discussion, it follows that one “solution” to the double marginalization problem is vertical integration. This would take the market structure to a simple monopoly that covers both stages of the market.

- However, this problem can also be solved if different pricing schemes can be used (instead of linear pricing), like two-part tariff arrangements. Under such an arrangement, if the marginal price is set at the competitive level (cost) and the fixed fee is set to be equal to the total monopoly profit (or just below that, so that it is not rejected) then we can recover exactly the monopoly solution (without having formally a vertical integration arrangement).
- If there are additional stages in the vertical market (that is, not only two stages as assumed above, but more), the problem under linear pricing becomes even worse. In fact, the more stages there are, the more severe the “multiple marginalization” problem becomes and the higher the final prices for the consumers will be. One interpretation of this result is that a larger number of “intermediaries” would imply a higher final price.
- The picture changes if we allow the D firm to have the price setting (or bargaining) power against both the final consumers and also the U firm. In such a setting, only one profit margin can be applied and there is no additional distortion.

### EQUILIBRIUM PRICING INCENTIVES WITH STRATEGIC PRICING

Based on the insights from the above discussion about double marginalization, one can proceed to an analysis of pricing in more complicated vertical structures. One of the important cases in practice is when, in addition to the basic vertical externality discussed above, we also have a horizontal externality that takes the form of “interbrand” oligopolistic competition. This may correspond to the case of one producer that deals with two (or more) retailers. In such cases, there is market power not only in the vertical sense but also in the horizontal: not only strategic interaction between producers and retailers matters, but also among retailers. Let us discuss a case like that of Figure 2 with one firm upstream and two downstream. The U firm should then understand that given the oligopolistic competition downstream (more precisely, here, duopolistic), prices in the final market tend to be too low relative to what the U firm would like to have seen (that is, the monopoly price). A two part tariff instrument would be sufficient so that the U firm can make competition in the D market soften and prices to rise to the monopoly level, and then capture the total monopoly profit via a fixed fee. The reason that two instruments would be required here is because one instrument is needed to control the horizontal externality (competition between the D firms) and the second instrument could then transfer the profit (or part of it) upstream. In this case, the U wholesale price (as part of the two part tariff) has to be higher than cost, exactly to make the two D firms behave more passively against each other.

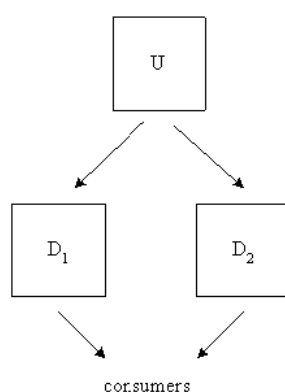


Figure 2: One upstream firm and downstream duopoly

The situation described just above would not be very different if, instead of having only two D firms, we had several firms (see Figure 3). Again, the marginal price charged downstream (for buying one additional unit) can make them passive enough against each other and then the fee can transfer the profit upstream. This is the case in reality when we have one large producer (or one large wholesaler) and many small retailers.



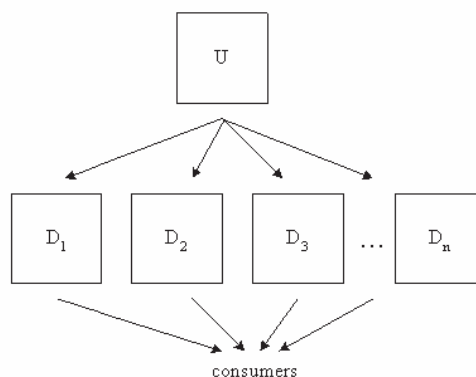


Figure 3: One upstream firm and downstream oligopoly

Of course, the picture will be very different when there is both interbrand and intrabrand competition at the same time. Suppose, for example, that there are two upstream firms, one trading exclusively with  $n$  downstream firms and the other with  $m$  downstream firms (the assumption of exclusive dealing for each upstream-downstream pair is maintained here to keep the analysis simple but is not without restriction). In this case, the dominant effect may be that each vertical chain may like its own retailers to have more aggressive marginal incentives in the market *vis-à-vis* rival retailers (see e.g. Vickers, 1985, Fershtman and Judd, 1987). Then the equilibrium wholesale prices will tend to depend on the number of retailers that each upstream firm is associated with (see Saggi and Vettas, 2002). Of course, what is also important for the exact results is the form of downstream competition, e.g. whether that is in quantities or in prices. With quantity competition (Cournot) assumed downstream, each chain would like to assist its own downstream firms to commit to more aggressive behavior and to seek a larger market share. With price competition (Bertrand) assumed downstream, if each chain encourages its own downstream firms to have more passive behavior the outcome may be higher profits and desirable for all parties.

Also important is the strategic case when there are two upstream firms (say two producers) that may have to go through a single downstream firm (say a retailer or a wholesale firm). In such a case, the D firm is a “bottleneck” and typically can use its bargaining power to obtain high profits (each of the U firms has no outside option in the bargaining, while the D firm can play one D firm’s incentives against the other). The exact details depend on how bargaining takes place – in general such situations are mentioned in the literature as “common agency” (see Figure 4).<sup>12</sup>

<sup>12</sup> See Rey and Tirole (2004) and Rey and Verge (2005).

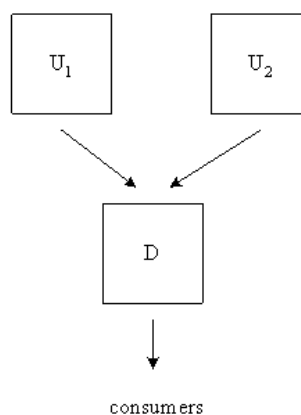


Figure 4: Upstream duopoly and downstream monopoly

Of course, cases of vertically related markets can be quite complex even with only a small number of firms. See e.g. Figure 5, where there are two large upstream and two large downstream firms. How is trade going to take place? What are the prices for the final consumers? The answers will depend on a number of factors including: is the product a homogeneous commodity or is it differentiated – and what are the bargaining powers of each party and the outside options? As can be seen in Figure 5, one of the chains can be exclusive and the other may allow trade of both products.<sup>13</sup>

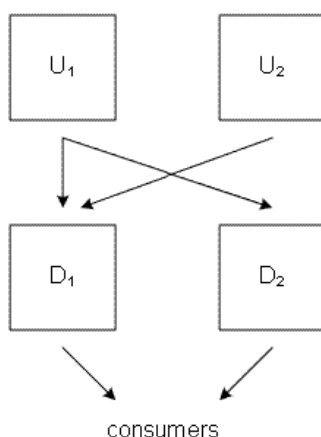


Figure 5: Upstream and downstream duopoly

In addition to prices, the horizontal and vertical features of the market structure also affect another important dimension, this of quality provision. This dimension of the product may be viewed by the final consumers as equally important or even (especially for certain food products) more important than the prices. It is therefore important to examine what are the incentives that the market structure and the associated contracts give to the various parties for providing the appropriate product quality. Quality for the final consumer typically depends on actions taken by all involved parties along the value chain.<sup>14</sup> For example, for most food products, the quality of the product when it leaves the farm is often not less important than the way it is treated during the transportation and distribution stages. In that sense, decisions by the various parties that may affect the product quality should be viewed as complementary. Assuring a particular quality typically requires the collaboration of these various

<sup>13</sup> On the incentives for forming exclusive relationships with large buyers, see e.g. Innes and Sexton (1994). Another interesting issue here is the endogenous formation of *stable* trading structures in bilateral oligopoly markets; see e.g. Bloch and Ghosal (1997).

<sup>14</sup> See Fafchamps *et al.* (2006) for a study of quality control in India.

parties. If this collaboration cannot be assured, then product quality will be below the optimal one not only from the view point of the final consumers but also of the entire supply chain. For instance, suppose that there is one upstream producer that attempts to establish a reputation for his product (possibly using a specific brand name) as having high and/or consistent quality. Suppose that to reach the final consumer, the producer supplies various retailers (who in turn sell to the final consumers, possibly in markets that communicate only through information exchange and reputation building). If assuring a specific product quality is costly but also important, and if quality depends on actions by all parties (from the producer until the final buyer), the incentives for the final retailers to provide high quality may be weaker than optimal. The reason is because of “spillovers” or informational externalities: a retailer that does not assure high enough quality standards (e.g. in how a particular food product is stored or presented to the buyers) hurts not only his own sales but also the reputation of the product and, thus, the profitability of the other retailers as well. As this cost is not fully internalized by each independent retailer the market will tend to provide sub-optimal quality.<sup>15</sup> It follows that appropriate measures will have to be taken to solve the problem, like specifying particular details in contracts when this is possible, profit sharing schemes along the chain so that the relevant incentives are aligned, exclusive dealing, or vertical integration solutions.<sup>16</sup>

### **INVESTMENT INCENTIVES AND SPECIFIC ASSETS, EXCLUSIVE CONTRACTING AND DUAL SOURCING.**

When analyzing vertically linked markets (or “value chains”) the exact form that vertical organization takes is critical, as one moves from the producers-farmers to the distributors and retailers. As discussed in previous Sections, such vertical structures may vary greatly between the two extreme structures, that of full vertical integration (the formation of a single firm that covers all vertically linked stages and internalizes the corresponding vertical transactions) and that where all trade takes place through the markets. Many intermediate forms exist involving longer or shorter contracts and exclusive or not exclusive dealing. To understand the market forces that may push the organization towards one or the other extreme, the fundamental guiding conditions have to be traced back to the celebrated work of Coase (1937): the boundaries of the firm, he explained, depend mainly on the nature of transaction costs. To the extent that markets exist and operate efficiently, internalizing the corresponding transactions only increases the overall cost for the parties involved. So if there are competitive markets that one can rely upon either upstream or downstream there are little or no benefits from a vertical integration decision. This tends to be the case when the products are homogenous and there are a large number of (potential) buyers and sellers. If, for instance, there are many possible producers able to provide the desired quality and quantity at the desired time, then a retailer would not wish to integrate backwards – supply is assured and competition would drive the supply price close to cost. Similarly, if there are many possible retailers able to absorb the desired quality and quantity at the desired time and offer access to the final consumers, then a producer would not need to integrate forward: demand is assured and competition between retailers would drive the purchasing price close to what final demand would dictate. Uncertainty in the market would be representing only aggregate (demand or supply) shocks, not firm specific or idiosyncratic shocks. There is no efficiency or risk-reduction rationale for an integration strategy, while there is also no incentive for incorporating profits, as these are kept roughly at the normal level. Contrary to such cases, if there are products that are differentiated and specialized and / or the number of buyers and sellers is small, there may be both a transaction cost rationale and a profit rationale for a vertical integration decision.

Of particular importance when evaluating the relevant transaction costs is the issue of specific assets and investments (see e.g. Grossman and Hart, 1983). To the extent that the supply of products or their retail processing requires investments that are specific to the particular pair of transacting buyer and

<sup>15</sup> See e.g. Blair and Kaserman (1994) for a related simple model of quality incentives and Blair and Lafontaine (2005) for a general analysis and possible solutions to the problem.

<sup>16</sup> Vertical integration typically will not be a feasible solution in the case the downstream stage firms are multi-product, like in the case of food retailers (supermarkets) that carry different categories and varieties of products.

seller, there may be a dynamic rationale for vertical integration as market forces and contracts may not be sufficient for the investments needed. This is of course a more general issue that emerges in many markets, but also one that is also particularly relevant for food and agricultural markets. Supermarkets and other large retailers would tend to prefer having quality and quantity assurance and/or to achieve product homogeneity within each type and variety of product (because consumers dislike quality variance, prefer returning to the same retailer for their purchases once they have been satisfied, and certainly dislike not finding an item when they are looking for it, due to a possible shortage). As a result, they would need to give incentives to the producers that they transact with (directly or through intermediaries). The reason is that assuring a quality and quantity level for the product would typically require significant investments that become sunk once undertaken and, in particular, because they can involve specific assets (that is they do not have value, or only have a small value for other buyers). That is, the particular quality or characteristics of the product that one retailer may require may not be similar to the one that another may require. If this is so, and as a result the markets become very “thin”, the farmers may require assurances that the strong buyers will not behave opportunistically and would not “hold them up” after they have first committed themselves by making specific choices and/or investments. In other words, given that a specific investment is required to take place before supply is provided and given that exactly by its specific nature this investment would be losing much of its value outside the particular transaction, the party that has invested may find itself in a weak bargaining position (since there is no significant outside option available) and as a result the other party may extract a large part of the trade surplus. Anticipating in a rational manner this behavior, parties that consider undertaking such specific investments may simply not invest at all or invest at an inefficient level.

As a solution to the problem associated to specific investments, it appears that agreeing on contracts that are long and broad enough to cover for the risks involved may be needed for the transaction and for the market to operate effectively. The design of such contracts, however, presents two difficult and crucial choices. If these contracts tend to be short-term, they may not protect the parties from opportunistic behavior and may be too weak for giving incentives to make initial specific investments (there may be the fear that after the contract expires one of the parties will hold up the other). On the other hand, long-term contracts may open up the possibility that after the contract has been signed, one of the parties may not have enough incentives to spend enough effort for producing a good enough product or timely delivery, especially if it is costly or impossible to write complete enough contracts and these have to be incomplete. This is an important “moral hazard” problem associated with longer contracts. It follows that, as a result of the above-described problems, the appropriate contracts and organizational form would have to balance the incentives for specific investments and the incentives for effort for quality assurance during the entire contract horizon for all the parties involved.

The picture in agricultural markets in practice currently appears to be pointing in the direction of vertical chains that allow intermediate degrees of flexibility, through medium-run contractual arrangements. What is the key issue here? If retailers wish to provide to their customers products that meet certain quality standards or are differentiated in certain dimensions, then they need to form links with producers that will produce such products in a consistent and reliable manner. The more formal these links and the longer their horizon are, the lower the chance that appropriate products will not be available, but the higher the management cost, as well as the risk in case of a negative shock. At the same time, it is also observed quite often that it is the buyers that typically undertake to finance, at least at a significant part, the specific investments required by the producers. This is primarily for two reasons. First, buyers tend to be larger firms and financially stronger than producers and more able to absorb risks. Second, being in closer contact with the final consumers, they have a clearer idea about the qualities, features and quantities of the product that the market requires than the producers have.

The other side of the same coin is how many producers a distributor/retailer should be linked to (see the related literature on split awards and dual sourcing, e.g. Anton and Yao, 1987, Demski *et al.*, 1987, and Riordan and Sappington, 1987). Given that enough assurances and incentives have to be given for a producer to make the necessary investments to supply products that meet the predetermined criteria (otherwise, a “hold-up” risk exists), reliance on a small number of producers (only one producer in the

limit) minimizes the cost of these incentives. On the other hand, reliance on a single or a small number of producers would tend to reverse the hold-up risk (so that now it is the retailers that become exposed to that) and only provide low marginal incentives to the producers. The arrangements that currently seem to be more frequent in practice are ones of intermediate levels of dependence, with each retailer being linked to a small but not too small number of producers. It would be interesting to study the details of these relations and to explore how they are expected to evolve in the future.

## **DYNAMIC EFFECTS AND LEARNING**

Much of the literature on vertical contracts has focused on static models that do not take dynamic interactions into account. One important way to introduce dynamic interactions in the vertical environment is to examine vertical contracting with learning-by-doing technologies at the production stage (see Kourandi and Vettas, 2006). The basic idea is that over time the (generalized) unit cost of production may decrease as the producer gains more experience, that is, may be a decreasing function of past accumulated production. An interesting question is set forth is how vertical relations affect the dynamics of cost and learning-by-doing. One can consider a formal model where upstream producers supply the downstream firms with inputs and gain proficiency through the repetition of their production. Production costs then decline with accumulated output and this process affects the market outcomes in all periods. The notion of "learning-by-doing" technologies is not new. Previous theoretical studies have examined the "learning curve hypothesis" (e.g. Spence 1981, Cabral and Riordan, 1994, Lewis and Yildirim, 2002) and the implications of this hypothesis for market conduct and performance. However, these studies do not examine how the vertical structure of an industry may affect the dynamics. Within such a framework, important questions arise: How do final market outcomes depend on the "learning curve hypothesis"? Will the market competition favour an outcome with lower prices or more varieties in the market? Under what conditions can exclusive dealing emerge and be beneficial for consumers and firms? What is the strategic role of the intermediaries? In the absence of the downstream firms, do the producers take advantage of the learning-by-doing technologies in the most efficient way or is the presence of a large downstream firm necessary in order for coordination to be achieved? This set of questions is not only of theoretical interest but also of practical importance, as vertical contracting with learning-by-doing technologies is commonly observed in many industries. Kourandi and Vettas (2006) offers a theoretical treatment of how markets may work when there is both vertical contacting and learning-by-doing. The exact results depend on the assumptions one has to make about the mode of competition (i.e. whether firms compete in quantities or in prices) and the allocation of bargaining power among firms. Still, a key implication is that concentration (exclusive dealing as an extreme case) in the downstream stage may benefit final consumers when compared to a more competitive market at that stage. The reason is that with one or few buyers at the downstream (or at an intermediate) stage purchases can be concentrated, at the equilibrium of the model, to a smaller number of producers. As a result, this concentration implies (through learning-by-doing) a lower unit production cost and prices for the buyers. This welfare benefit may have to be compared with a corresponding welfare loss due to a decrease in the available product varieties in the final market.<sup>17</sup> Thus, a trade-off emerges between lower prices and increased variety that large retailers as well as policy makers should be taking into account.<sup>18</sup>

## **COMPETITION POLICY ISSUES**

Competition (or antitrust) policy has become increasingly important the last 15 years or so in almost all developed countries and, gradually, also in many developing ones. National authorities (like the Federal Trade Commission and the Department of Justice Antitrust Division in the U.S., having the

<sup>17</sup> Variety in the production of a particular agricultural product, in addition to satisfying different consumer tastes, may also be desirable for reasons related to the protection of the production process itself. In particular, it may be desirable for experimentation purposes as well as for reasons related to the protection of genetic diversity.

<sup>18</sup> While related, learning-by-doing is a distinct technological and organizational feature from economies of scale, as what matters is the accumulated production, not the current scale. Economies of scale or increasing returns may also lead to exclusive contracting. See also Fafchamps (2003) for the related implications in agricultural markets.

longer histories of important activity, as well as in other countries) and also the EU Competition Commission have become increasingly active. Competition policy has been receiving significant attention, with firms in many markets becoming very much affected in several aspects of their operation. The coordination of Competition policy at an international level has also become the subject of important studies and debates in the context of the WTO or the OECD. Agricultural and food markets have not been as affected as some other industries, perhaps due to the fact that in many countries these tend to operate in a less concentrated manner. Not surprisingly, most of the cases when competition authorities have looked into possible violations of the competition laws involve “horizontal” merger cases at the retail level, that is, increased concentration among supermarkets. I expect that, as agricultural and food markets become increasingly oligopolistic, competition cases about them will become more often and receive more attention.

The application of competition policy falls under three broad categories. These are, in general:

- *merger control* – in cases of proposed mergers or acquisitions among two or more companies (the market share or the size of which exceeds a predetermined threshold) approval will have to be given once the Competition Authority in charge finds that this increased concentration will not lead to “substantial lessening of competition” or will be compatible to some other similar criterion,
- actions against organized (hard core) *cartels*, as well as against occasional *collusive behaviour* among companies – where it may be found that companies collectively behave in a way that decreases competition in a market (through price fixing, market sharing, decreasing innovation incentives or other dimensions), whether following an explicit agreement or not, and
- actions against *abuse of dominance*, where firms found to have a dominant position in a given market have to be checked to assure that their behavior does not hurt consumers or competition – examples include predatory behavior, possibly cases of tying and forced bundling, some discriminatory practices and other.

In the EU, important is also a fourth category, that of

- “State aid” cases, where the general idea is to prevent an even competitive playing field among Member States and to protect companies from unfair national subsidies that their rivals may be receiving.

Regarding the application of competition policy in agricultural and food markets and the expected directions this will take in the future, the following observations are in order:

- Regarding merger control, I expect two issues will become increasingly important in the next decade or so. One issue concerns increased vertical integration through mergers or acquisitions. In general, vertical integration is viewed by competition policy much more favorably than horizontal concentration. This is both because the implied adverse effect on competition is lower or not existent, and because of expected technological and distributional efficiencies, more significant than under horizontal concentration. The other issue is about increased horizontal concentration either at the downstream level (large supermarkets) or at the upstream level (large producers). Regarding horizontal mergers and acquisitions, what is important to note is that both the theoretical results and the empirical evidence is mixed in vertically related markets (see e.g. Motta, 2004): increased concentration at one stage of the market, will tend to alter the relative upstream-downstream *bargaining* power and, thus, the implied terms of trade in ways that could either benefit or affect adversely the final consumers and/or the producers/farmers (for some work on bargaining in oligopolistic vertical chains, see Horn and Wolinsky, 1988, Hendricks and McAfee, 2000 and more recently Inderst and Wey, 2003 and Milliou *et al.* 2004).
- Regarding now abuse of dominance, I expect this may be, for the moment, an area of some less immediate action than merger control in agricultural and food markets. However, important cases may emerge especially regarding the behaviour of large intermediary firms (wholesalers)

when the latter face smaller and weaker farmers. Also, such policy issues may be important in segments of the market with increased product differentiation and brand-name properties.

- Regarding cartels and collusive behavior, this may also be an important area in the next few years. Again, I expect that most of the action in this category will be concerning the behavior of intermediary wholesale firms. The cases that will emerge are expected to be weaker and fewer when one looks at the behavior of large retail supermarkets, where in most countries competition appears to be working (at least for the moment!) reasonably well in the horizontal dimension (among supermarkets that fight for market share).
- Finally, in the EU there is the issue of State aid. While subsidies have been the norm in most agricultural markets in the last decades, in the EU these practices have not raised issues of state and legislation violation (other than in marginal cases). This happens for at least two reasons: one is that most producing companies in the EU are small companies, each without significant market share. The second reason is that subsidies in EU Member States generally fall under common and agreed at a central level agricultural policies, with each Member State giving priority only, at this central stage, to matters of its own national interest. Insofar as these factors may change in the future and we observe larger producing agricultural and food companies possibly with ownership that cuts across state lines, we may see an interest towards national subsidies also in the context of state aid control.

## **POLITICAL ECONOMY**

Competition policy is, of course, only one way in which policy may affect the way agricultural and food markets may work. In fact, for the reasons discussed in the previous Section, it is one of the *less* important ways that policy intervenes in these particular sectors. The reason it has received attention in this article is simply because Competition policy becomes more important as certain stages of the value stage gradually become oligopolistic. Still, other, more traditional, ways in which policy affects these markets are very important. These have included in the recent past, various types of price support programs, direct subsidies, export subsidies, import tariffs and quotas, subsidies for new products and so on. Many of these policies have welfare effects that are ambiguous and/or transfer rents among various groups of buyers and producers. The establishment of a particular policy and the exact terms it specifies may be extremely important. For example, opening up or closing the market via the control of trade barriers is crucial for the profitability of a category of producers as well as for the implied market structure. It follows that producers and other firms along the agricultural or food chain may have strong incentives to try to influence the policies that will be put in place, if they can do that.

Given the important role that policies play for the division of profits, increased concentration at some stage may affect policy because large players are usually able to shift their weight more capably and effectively, pushing for the adoption of policies that are favorable to them. The sugar industry in the U.S. with very large producers concentrated in certain southern States (e.g, Florida) and benefiting enormously from imposed quotas on sugar imports, immediately comes to mind. Policy negotiations at the international level concerning the EU position and more general rules for the banana market is another example. In these cases, profits may depend as much on policy decisions as to other production decisions of the firm. How changing concentration at certain stages of the value chain may affect the division of profit along the chain, not directly but indirectly through its influence on policy, seems a question that is both empirically important and theoretically challenging. For instance, when production is more concentrated in larger firms, does this affect the type of protection they may receive and in which way? Or, how does increased concentration downstream affect the policy protection that upstream suppliers (farmers) may receive? An important insight is that, depending on the exact form that vertical trading takes, policies that benefit firms at a certain stage of the vertical chain may either operate at the expense of firms at another (linked) stage of the same chain or benefit the entire chain. However, despite its importance, this general topic - which is clearly one of political economy - has not received much attention in the literature yet and remains open for future research.

## CONCLUSION

In this article we briefly reviewed aspects of control and competition that tend to be important along a commodity value chain. Such matters have been the subject of industrial organization theory for a long time and now become important in the area of food and agricultural economics, as parts of these markets become oligopolistic and increasingly concentrated. In analyzing oligopolistic, vertically related markets, both from the business strategy and the policy viewpoint, the focus of the analysis shifts in an important way towards issues like contracting, double marginalization, buyer power and bargaining, strategic behavior, product differentiation, specific investments, exclusivity of contracts, concentration and competition policy, and other issues. To the extent that food and agricultural markets gradually move away from the standard commodities model, a new set of possible policy interventions emerges, whereas policies designed for undifferentiated commodities may be no longer advisable. Our tools for analysis should, therefore, be accordingly modified.

In the present paper, an attempt has been made for a critical presentation of the issues that emerge as more important. The task of market analysis and identifying appropriate policy measures becomes much more dependent on the exact assumptions and details of the model than in competitive markets. Since the issues raised are abundant “rich” and the spectrum of possible different structures is wide, a challenging aspect of looking into such matters is that no single model exists that can be used as a basis for the analysis in all cases. Instead, features from different models may have to be combined for each particular application. The associated lack of robustness would have to be seriously taken into account by researchers and policy advice should always be given with caution. Thus, I expect and hope that more research, theoretical and empirical, will emerge in the near future, with specific applications in the important food and agricultural sectors.



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# Trade Liberalisation under Imperfect Competition in Commodity Markets

Steve McCorrison<sup>19</sup>

## ABSTRACT

This paper focuses on the potential impact of imperfect competition in determining the outcome of trade liberalisation in commodity markets where the commodity sector forms only a part of the vertical chain. Specifically, we consider the role of imperfect competition in the vertical chain where one or more downstream markets may be imperfectly competitive and where both selling and buying power may exist. In the first part of the paper, the main lessons that arise from the general trade literature are reviewed. In the second part, we outline the issues relating to market power that may arise in commodity markets with special emphasis on *successively* imperfectly competitive markets. A simple model of a vertical chain with successive market power is outlined. We then show that the welfare effects of trade liberalisation are largely determined by market power throughout the vertical chain. We conclude by highlighting issues that need to be addressed in future research.

## INTRODUCTION

The 1980s witnessed a considerable sea-change in the analysis of international trade. Previously tied to the neoclassical model of trade, most analysis of trade flows between countries relied upon the stringent assumptions of perfect competition, constant returns to scale and product homogeneity. This was also true of the analysis of trade policy with the impact of trade instruments being restricted to deadweight loss triangles and, where relevant, terms of trade effects though alternative trade policy instruments could give rise to issues concerning the allocation of quota rents. As such, the study of trade liberalisation was relatively straightforward, the increase in welfare being associated with the trade-off between efficiency gains and potential terms of trade effects. However, it became increasingly clear that the standard trade models were ill-equipped to explain a significant proportion of trade flows: rather than trade being explained by differences in relative factor endowments (i.e. inter-industry trade), the data showed the majority of trade being between countries where relative factor endowments were similar and with two-way trade in differentiated goods (i.e. intra-industry trade). This gave rise to theoretical developments broadly referred to as “new” trade theory, the key features of which were imperfect competition, product differentiation and non-constant returns to scale<sup>20</sup>. In general, the gains from trade reflected these features with increasing market size giving rise to pro-competitive effects, increasing variety of goods available to domestic producers and (depending on the assumptions made) greater efficiency through scale effects. In many ways, the key feature of these developments being to move away from the country as the agent of trade to increasing focus on the firm, with the main methodological developments in trade being to have a closer marriage between trade theory and developments in industrial organisation.

Subsequent developments moved on to considering the role of imperfect competition on trade policy issues. At the risk of over-simplifying, there are two broad themes that have been the focus of this literature. First, if imperfect competition matters for understanding trade flows, does it change the way we would think about the normative role for governments in using trade policy instruments? This is commonly associated with the pioneering work of Brander and Spencer (1984, 1985) who showed that there may be a first-best case to use trade policy when markets are oligopolistic since policy may induce “rent-shifting” between countries such that protectionism may increase national welfare<sup>21</sup>. Second, if trade flows between countries can be, in large part, better explained by models of imperfect

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<sup>20</sup> The major developments in this area are summarised in Helpman and Krugman (1985).

<sup>21</sup> See Brander (1995) for an overview.

competition and if market structure influences how we think about the use of government instruments, the follow up question to ask is how the effects of trade liberalisation may be influenced by these concerns? Trade liberalisation, therefore, has the potential to affect not only the standard mechanisms associated with deadweight losses and terms of trade effects but also efficiency via economies of scale and by affecting the profits of (the limited number of) firms competing in the market (or, depending on the model used, through changes in the number of varieties of the goods available in the market). In sum, not only does market power change the mechanisms via which trade liberalisation may affect national welfare but also may lead to the quantitatively impact from trade liberalisation being more significant.

The aim of this paper is not to provide a detailed overview of these issues but rather to consider the role of imperfect competition in understanding trade liberalisation in commodity markets. As such, we will draw upon the key lessons that have arisen from this research area as our starting point though, in the process, highlight the differences that will likely arise with respect to imperfectly competitive vertical chains. However, at the outset it should be noted that, by and large, these developments in the mainstream economics literature have, with some exceptions, more or less by-passed agricultural economics. Specifically, if we take the recent *Handbooks of Agricultural Economics* to be representative of the “state of the art” in this sub-discipline, the links between trade policy and imperfect competition are hardly ever-addressed. For example, surveying research on the industrial organisation of agricultural and food markets (see Sexton and Lavoie, 2001), the reported research is mainly done in a closed economy context, the main focus of food industry research being to characterise the nature and extent of competition on these markets with little attention given to the “so-what?” question of how the resulting market structure may influence the understanding of policy issues including trade policy. Similarly, the research of agricultural trade issues reviewed by Karp and Perloff (2002) also pays little attention to market structure issues and when it does, the research mainly addresses whether commodity markets are imperfectly competitive or not, with little or no attention on the implications for trade policy. As such, there is a significant gap in the understanding of how imperfect competition affects the outcome of trade liberalisation in commodity markets, not because of a widespread belief that commodity and related markets are necessarily competitive (though this view is still common among some researchers) but because the links between market structure and trade policy have typically been ignored.

This paper addresses these issues. A number of topics are covered including a justification as to why imperfect competition should be a serious consideration when characterising commodity markets, the mechanisms via which imperfect competition may affect the outcome of trade liberalisation and the overall implications of getting the story wrong when imperfect competition is inadequately accounted for. Particular attention is given to issues that arise in dealing with imperfectly competitive vertical markets; this is an area that has not received much attention in the mainstream literature so there are likely new challenges in addressing this issue. The paper is organised as follows. In Section 1, I summarise briefly the main issues addressed in the international economics literature with respect to trade liberalisation and market structure and the overall lessons that arise from this including reference to selected empirical studies and the methods and data that are employed. In Section 2, I turn to the issue of market structure in commodity markets. Reflecting the role of primary commodities as inputs into a vertical chain, the downstream sectors of which are imperfectly competitive, attention will be paid to the issues involved in characterising imperfect competition in vertically-related markets. This is arguably one key issue that does not arise in the standard trade literature which is largely concerned with horizontal issues, though there are important exceptions<sup>22</sup>. In large part, the mechanisms via which imperfect competition affects trade reform will remain intact but, where additional issues arise, these will be highlighted. In Section 3, a simplified model of a vertical chain is presented which highlights the role of imperfect competition in determining the margins at each vertical stage, the effect of trade reform on the change in this vertical margin and the distribution of welfare between consumers, producers and downstream firms. The implications of omitting imperfect competition

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<sup>22</sup> In large part, research that has identified the importance of vertically-related imperfectly competitive markets has focussed on optimal policy issues. See, for example, Ishikawa and Spencer (1999).

when evaluating the outcome of trade liberalisation are addressed in Section 4 and, in Section 5 we summarise and conclude by highlighting potential avenues for future research in this area.

### **Trade Liberalisation and Market Structure: Some General Lessons**

As noted above, the impact of imperfect competition on trade liberalisation is now firmly grounded in the international economics literature not only from a theoretical perspective but it has also featured in empirical work. In this section, I provide a cursory overview of the main mechanisms via which market structure can influence the outcome of trade reform and the results from selected empirical studies. These issues are informative in highlighting the methodological tools employed but also serve to form the basis how the issues reflecting aspects of market structure in commodity markets may differ from the competitive benchmark.

#### *Theoretical Considerations*

As a starting point, consider the effects on national welfare following trade reform. Omitting the technical details which can be found elsewhere (see, for example, Feenstra, 1995), the effect of a change in a tariff can be divided into four effects:

$$\Delta Welfare = \Delta DWL + \Delta ToT + \Delta SCALE + \Delta PROFITS \quad (1)$$

Assuming perfect competition, the change in national welfare depends only on the first two effects.  $\Delta DWL$  represents the gains associated with the deadweight losses associated with the distortion to production and consumption decision caused by the tariff. With trade liberalisation, this effect will be positive. The second effect represents the terms of trade effect associated with trade policy which exists if the country is sufficiently “large”. With trade liberalisation, this effect is negative such that the net welfare effect for a large country depends on which effect dominates. In the small country case, only the former effect exists and the effects of trade reform are therefore unambiguously positive.

With imperfect competition, the latter two effects ( $\Delta SCALE$  and  $\Delta PROFITS$ ) become potentially important though the existence of these effects will depend directly on the specifics of the model employed. Scale effects relate to the size of the market so, with the possibility of an exporter given increased market access through trade liberalisation, there is also the potential to benefit from cost reductions due to unutilised economies of scale. With imperfect competition, there are generally speaking two alternatives. First, with monopolistic competition with free entry and exit, each firm produces individual varieties guaranteeing that super-normal profits do not exist. If profits do appear (say through the opening of markets), the assumption of free entry assumes that they rapidly disappear. In this case, the benefits from trade reform will depend on lower prices, product variety and scale effects. To the extent that imperfect competition gives rise to super-normal profits, for example, in the context of game-theoretic models, the effect of trade liberalisation is then to affect the level of profits attained by the domestic firm. Specifically, trade liberalisation will have a pro-competitive effect leading to lower prices, the mechanism being via changes to the price-cost margin.

Since this will be the focus of our discussion later, I provide a bit more detail on this. Consider the following example where the importing firm is subject to a specific tariff. Profits for a representative firm are given by:

$$\pi_i = (p - c_i - t)q_i \quad (2)$$

Assuming quantity setting strategies, the first order condition for profit maximisation is given by:

$$\frac{\partial \pi}{\partial q_i} = p - p' \frac{\partial Q}{\partial q_i} q_i - c'(q_i) - t = 0 \quad (3)$$

which, assuming constant marginal costs and aggregating over  $n$  firms, gives:

$$p \left(1 - \frac{\theta}{n\eta}\right) = c + t \quad (4)$$

where the parameter  $\theta$  represents an index of market power: explicitly, if  $\theta = 0$ , the market is competitive; if  $n = 1$ , then  $\theta = 1$ , this is the monopoly outcome and if  $\theta = 1/n$ , we have the Cournot outcome<sup>23</sup>. (4) can be re-written as:

$$p = \left(\frac{n\eta}{n\eta - \theta}\right)(c + t) = \lambda(c + t) \quad (5)$$

The effect of trade reform on the price cost margin is via the change in the elasticity of demand. Then the change in the mark-up will be given by:

$$\frac{d\lambda}{dt} = \left(\frac{\theta}{n\eta - \theta}\right) \frac{d\eta}{dt} \quad (6)$$

Intuitively, trade reform lowers costs which increases the quantity of the good available. This will increase the demand elasticity as firms will price in a more elastic region of the demand function thus representing a pro-competitive effect from trade reform. Note, at this point, that the general trade literature has generally dealt with “horizontal” issues i.e. the pro-competitive effects arise from increasing competition among firms competing in a specific market. In the analysis of vertical chains, ideally we would wish to consider “horizontal” issues combined with “vertical” issues where the presence of imperfect competition throughout the chain can influence the magnitude of the pro-competitive effects.

In general, when evaluating the effect of trade liberalisation when markets are imperfectly competitive, we need to account for effects that are additional to those that arise from the assumption of perfectly competitive markets. The next question that arises relates to whether these additional effects are quantitatively significant?

### ***Empirical Evidence***

Accounting for the potential role of imperfect competition in influencing trade liberalisation outcomes has featured in empirical work. There are essentially two approaches taken: the first is to use calibration models in which a theoretical model is specified and calibrated with often limited (and selective) data; the second approach is based on econometric models largely focusing on whether trade reform affects price-cost margins. The data for these studies are country and/or industry specific with the data relating to plant level observations. With reference first of all to calibration methods, these can be either general or partial equilibrium. The advantage of these models is that since they have explicit micro-foundations that are used as the basis of the calibration, they have the advantage of being theoretically consistent and generally can rely on limited data (though this does not appeal to all observers). Aside from the data issues, the drawback of these methods is that you get back what you put in. So, for example, if one specifies a model where product varieties do (or do not) matter, the effects of trade reform will reflect an outcome where product varieties do or do not matter! On the other hand, econometric studies focusing on changes on price-cost margins are data intensive; not only to they have to focus on country-specific cases where trade reform has been undertaken but rely on plant or firm-level data on price cost margins which potentially limits the number of cases where this

<sup>23</sup> Although the use of conjectural variations faces criticism from game theorists, it is a convenient way of benchmarking an index of market power.

methodology can be applied. Moreover, these econometric studies rely on case studies where the reform programme is specific and observable<sup>24</sup>. Both approaches have their potential uses in giving a clear picture of trade reform. The interesting issue is whether the effects of trade reform with imperfect competition are potentially more significant than those arising from perfectly competitive models.

Early work by Richard Harris on computable general equilibrium models allowing for scale and imperfect competition showed that these characteristics of market structure could have a significant impact on the outcome of trade reform. Focusing on Canada as a small open economy, when engaged in reciprocal trade liberalisation, the presence of imperfect competition and scale was to increase more than three-fold the net welfare increases one would have expected from confining the analysis to a perfectly competitive environment (Harris, 1984). Since then, imperfect competition and scale have become commonplace in computable general equilibrium models. For example, Francois *et al.* (1994) allowed for these influences in their analysis of the possible Uruguay Round outcomes. More recently, Francois *et al.* (2005) have allowed for scale and imperfect competition in the analysis of the Doha Round. They also provide a decomposition of the net welfare changes due to allocative effects (i.e. associated with the deadweight loss triangles), the terms of trade effects and effects due to variety (since their theoretical underpinnings relate to a model of monopolistic competition) and scale. There are two interesting observations to be made from their results. First, the effect of scale and variety is potentially significant. For example, from global trade liberalisation, the sources of the gains from trade reform are split 50:50 between the standard allocative effects and the changes due to variety and scale. In other words, not accounting for imperfect competition can lead to a serious mis-measurement of the welfare effects of trade reform. The second observation to be made is that, from an individual country's perspective, the role of imperfect competition may reduce rather than increase the benefits from trade liberalisation, a result consistent with earlier general equilibrium studies. For example, if protection provides a larger market for the domestic (and potentially relatively less efficient) firms to serve, increased competition may lead to a potential welfare loss at the national level, even though global welfare may increase.

With reference to computable partial equilibrium models, perhaps the most notable is by Venables and Smith (1988). Focussing on the potential changes brought around by the Single European market, they showed that the effects on net welfare due to imperfect competition were potentially large. Moreover, the effects of trade reform were larger when free entry and exit was assumed leading to further efficiency effects. By contrast, calibrating a game theoretic model with a fixed number of firms, the analysis of Dixit (1988) suggested lower net gains though the distributional effects were potentially significant particularly in shifting rent between domestic and foreign firms. More recently, in his comprehensive analysis of EU trade policy, Messerlin (2001) showed that significant pro-competitive gains could arise following EU trade reform if trade liberalisation resulted in a more competitive market structure. It should be pointed out though that the incorporation of the pro-competitive effects were rather *ad hoc* and arose from arbitrarily imposing the pro-competitive effect. Nevertheless, taken with the results from other studies, the main lessons we can draw from these studies is that allowing for imperfect competition has the potential to give a significant kick to the welfare impact arising from trade liberalisation. The consensus from most studies is that assuming perfect competition will likely under-estimate the welfare effects from trade reform. If imperfect competition matters in terms of characterising industries, it also matters for considering when these industries face larger markets and more competition.

In terms of econometric studies of the impact of trade reform on price-cost margins, they have progressed from the earlier inter-industry studies of the impact of import penetration (see Schmalensee, 1988, for a review). Recent best practice is to use the methodology developed by Hall (1988) which provides a growth decomposition that links output growth to inputs, productivity and mark-ups. With trade reforms, the mark-up should vary by influencing the elasticity of demand (see

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<sup>24</sup> For example, if the government introduces a definitive reform package where the before and after effects are potentially identifiable, then the impact of trade reform can be measured. For a recent example of this applied to economic reform in Colombia, see Eslava *et al.* (2004).



the discussion above). Using plant level data for Turkey, Levinsohn (1993) confirms the pro-competitive effects from trade reform while Harrison (1994) shows declines in price-cost margins following trade reform in the Ivory Coast. In a recent study using data for Turkey, Kambhupati *et al.* (1997) also show that price-cost margins fell with trade reform.

### ***Further Considerations***

The above theme is fairly straightforward: if imperfect competition is seen to be an important characteristic of industries, we should incorporate this in trade models. When focussing on trade liberalisation, imperfect competition may determine the welfare outcome via either scale, variety and/or pro-competitive effects. Recent efforts to incorporate these mechanisms in empirical models confirm the presence of these effects and suggest that their role may be potentially significant. In other words, limiting ourselves to perfect competition, while relatively easy, carries the risk we under-sell the effects of trade reform. But the story does not end there. First, trade reform may also lead to productivity improvements but where economies of scale and mark-ups exist, there may be a tendency to under-estimate the extent of the productivity boost that may arise. This is confirmed in Harrison's study of the Ivory Coast who estimated that productivity growth was around four times higher in the less protected sectors (Harrison, *op. cit.*). Second, recent studies have highlighted a vertical link between imperfect competition in product markets and labour markets. For example, since the impact of trade liberalisation is to increase the demand elasticity, import competing firms may reduce profit margins and increase their demand for labour. Thus, although we would a priori expect wages to fall in the import competing sector, in the presence of imperfect competition there may be off-setting effects. Recent research by Krishna *et al.* (2001) using data for India confirms this. In addition, using data for Morocco, Currie and Harrison (1997) show that trade lead to more elastic demand in the product market, smaller mark-ups and higher productivity. Therefore, trade reform with imperfect competition leads to not only a static pro-competitive effect in the product market but also an increase in the demand for labour and higher productivity.

## **IMPERFECTLY COMPETITIVE VERTICAL COMMODITY CHAINS**

Commodity markets are often perceived as being perfectly competitive thus perhaps rationalising why issues relating to market power are inadequately recognised in the literature. Yet, this perception often misses the point that raw commodities are inputs into a vertical commodity chain, such that the raw commodity is only a relatively small proportion of value-added, the downstream stages of which may be imperfectly competitive. This is true of both developed and developing countries. Taking the example of a developed country, farmers account for around 15-20 percent of total value added in the food chain in the UK. In developing countries, commodity exporters also receive a small proportion of the total value. For example, coffee producers account for 10 percent of total value added while processors, roasters and retailers receive between 20-30 percent respectively. In the cocoa market, the data is rather similar with cocoa farmers receiving around 15 percent of the total value of the finished product. Even where the commodity involved does not require much processing, the shares received by commodity producers can be rather small. For example, in the banana sector, the division of value-added is: plantations, 10 percent; international trading companies, 30 percent; ripeners, around 15-20 percent; and retailers as much as 40 percent.

In this context, we also need to recognise the alternative means by which market power can be exerted. For example, if the retail or processing sector is highly concentrated, then there is the possibility of oligopoly power being exerted but, in the context of explicitly recognising the links in the vertical chain, there is also the possibility of buying power where the downstream firms can act as oligopsonists. Where the retail and processing sectors are imperfectly competitive, there is also successive market power that relates to market power exercised at each stage of the food chain. Moreover, even in certain cases where the output market would appear to be competitive, market power can still exist; for example, in a country that exports a raw commodity to a competitive world market, farmers may face domestic market power via a state trading enterprise that acts both as monopolist and monopsonist. Finally, in characterising aspects of the vertical chain, the means by which alternative stages of the vertical chain exchange goods, can also impact on the overall degree of

market power in the vertical chain. In this context, specific contractual arrangements covering a range of alternatives from spot market sales through to vertical integration also matter in characterising the degree of competition in a vertical chain.

Most of the available evidence on the potential for market power exists for developed countries. In Table 1 below, data is reported in the 3-firm across the food industry for selected countries in the European Union, the key observation being the generally high concentration ratios. US data also show relatively high levels of concentration (in this case, the 4-firm concentration ratios) in the food manufacturing sector as highlighted in Table 2. Moreover, the retail sector is often highly concentrated, as the data in Table 3 shows. These figures relate to the 5 firm concentration ratios in the retailing sector across the European Union. Though there is significant country variation, the overall impression is one where concentration ratios are relatively high particularly in the UK, Germany, Finland, the Netherlands and Sweden. Market power is also an important issue in developing countries, in many ways potentially more so, given the relatively small size of the market and the existence of high trade barriers. For example, in Harrison's study of the Ivory Coast (Harrison, *op. cit.*), the highest price-cost margins were to be found in the food processing sector. Commodity chains that cross international borders can also exhibit the presence of market power with multinational firms dominating commodity chains. Relating to the commodity markets discussed above, the banana industry is known to be concentrated downstream (McCorrison, 2000), while in the coffee sector, three roasters (Philip Morris, Nestlé and Sara Lee) account for just less than 50 percent of the total market (FAO, 2004). In the cocoa market, six chocolate manufacturers account for around 50 percent of total sales. Other commodity sectors exhibit the same features. For example, three global companies account for 80 percent of the total soybean crushing industry in the European Union and 70 percent of the market in the US (FAO, *ibid.*).

Given these data, the appropriate characterisation of the food chain across many developed and developing countries is one of successive oligopoly where various stages of the downstream food sector are imperfectly competitive<sup>25</sup>. In this rather scant summary of the food sector, there are nevertheless some additional points to be made. First, in recent years, there has been increasing consolidation in the food sector: as documented elsewhere (McCorrison, 2006), mergers and acquisitions have been increasing rapidly since the mid-1980s. This has taken the form of both domestic and international mergers and acquisitions. Moreover, they have not been confined to developed countries (though it counts for the largest proportion of total merger and acquisition activity) but there has also been significant activity of developed country firms acquiring firms in developing countries.

Second, in characterising the overall level of competition in the food sector, the concentration ratios are informative of the potential but not conclusive of the degree of imperfect competition that does exist. As is well-known, numbers does not necessarily equate with behaviour so it may be the case that the firms are behaving competitively despite their small numbers. However, recent surveys relating to the new industrial organisation approach to measuring market power in the food sector do confirm that market power is potential issue (see, for example, Sexton and Lavoie, *op. cit.* and Sheldon and Sperling, 2003). Third, the means by which firms in alternative stages of the vertical food sector interact is also important in characterising the competitiveness of the food chain. For example, depending on the links between the various stages (ranging from arm's length pricing, a variety of vertical restraints, the way in which contracts are constructed between parties, through to vertical integration) all have an influence as they may, on the one hand lead, to vertical foreclosure (which exacerbates the imperfect competition in the vertical food chain) or, on the other hand, improve competitiveness by ameliorating the double marginalisation problem that characterises successively oligopolistic markets. Fourth, even if a market may appear competitive, geography may result in a fragmented market where market power can be exerted. This is particularly an issue in large developing countries where poor infrastructure or other regional factors may lead to producers being

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<sup>25</sup> Of course, numbers do not necessarily translate into the exercise of market power. However, the consensus from the empirical studies measuring the extent of market power cannot reject that market power is exercised across a large number of markets.

able to sell to only a few (regionally concentrated) firms that could exert market power. For example, Osborn (2005) confirms the existence of buying market power in the Ethiopian grains market due to poor roads and inadequate infrastructure that permits market segmentation and the existence of mark-downs exercised by commodity traders<sup>26</sup>. Finally, state trading enterprises (STEs) continue to play an important role in many commodity markets. Though there has been a tendency towards the de-regulation of parastatals in many developing countries (though this process may not be as progressed as commonly believed), in many developed and developing countries, commodity regimes are still characterised by the dominance of STEs. The most notable examples would include, on the export side, Canada, Australia and China and on the import side, Japan, Korea, China and India among many others. Not only do these STEs have the potential to distort trade via the exclusive rights that give them, to varying degrees, monopoly and/or monopsony power (see McCorrison and MacLaren, 2005 and forthcoming) but will also influence how the producers and consumers will respond to trade liberalisation that affects the commodity sectors involved. Moreover, in the context of a vertical chain, they can act as a countervailing power against imperfectly competitive downstream private firms. An equivalent role may arise with the presence of cooperatives and other intermediaries which pursue non-profit maximising objectives.

Taken together, market power seems to be a potentially relevant characteristic of the food sector, the main feature of which being successive market power i.e. where alternative stages of the food chain are characterised by market power. Thus even if one accepts that the raw commodity market is competitive, the raw commodity is an input into the vertical chain which may not be competitive. Second, the high levels of concentration give rise to the possibility of oligopoly power which, even in the absence of buying power, will still have an impact on the upstream sectors of the vertical chain. Of course, oligopsony power is also a possibility where “mark-downs” may coexist with “mark-ups” thus exacerbating the imperfectly competitive aspects of the food sector and their impact on producers. The role of contracts in exacerbating or ameliorating market power becomes important, as do spatial issues (particularly in developing countries) and the role of STEs. In the following section, we discuss how imperfect competition in vertical markets affects the outcome of trade liberalisation.

Finally, in this context, it should be pointed out that one should not read this evidence as relating to a closed economy context. Many of the firms in the food sector (including retail) have an increasing international reach such that the impact of market power in the downstream food sector is not only pertinent for domestic upstream producers but also commodity suppliers in other countries who need to access downstream sectors of the food chain when exporting their commodities.

## **VERTICAL MARKETS AND TRADE LIBERALISATION**

Some of the mechanisms via which imperfect competition can affect the outcome of trade liberalisation are covered in Section 1 but nevertheless there will be important differences. To recall, when imperfect competition exists, trade liberalisation may have a pro-competitive effect and reduce price cost margins and potentially have a scale-related effect. This may affect the gains from trade liberalisation. However, in the context of vertical markets that are characterised by successive market power, the issues may differ. In part, the issue is one of degree in that successive market power compounds the impact of single stage market power and hence the pro-competitive effect may be stronger. However, to fully understand the effects of trade liberalisation throughout the vertical chain, some further issues are involved. First, we need to understand how trade liberalisation at one stage is transmitted throughout the vertical chain. This is important since the policy-makers' concern (or at least the selling of the benefits or costs of trade liberalisation) may relate to the welfare of constituent groups. In the context of this paper, this relates not only to producers and consumers but also the distribution of rents between alternative stages of the vertical chain. Moreover, constituent parts of the

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<sup>26</sup> While the link to geographical segmentation and market power may arise in developing countries, it may also be a feature of developed country markets. An alternative approach to market power that captures these features relates to spatial oligopoly/oligopsony.

vertical chain may not exist in the same country hence changes in the distribution of rents may act against the “national interest”.

Second, the stage which is directly affected by trade liberalisation matters for the impact on alternative stages in the vertical chain i.e. changes in the distribution of vertical rents may depend on whether trade liberalisation relates to the processed or raw commodity. Third, we should also consider the impact of oligopsony as well as oligopoly power on the trade liberalisation outcome. In sum, while the general economics literature gives us some broad indicators in establishing the links between imperfect competition and trade liberalisation, there are further issues to account for. In this section then, the discussion is divided into three parts covering (a) the mechanics via which trade liberalisation effects are transmitted throughout the vertical chain and the implications that arises for the distribution of vertical rents; (b) an outline of a simple vertical model to capture the effects of trade liberalisation and (c) some results relating to the links between successive market power and trade liberalisation.

### ***Mechanics***

Return for a moment to our discussion in Section 1. There we showed that where there are positive mark-ups, trade liberalisation could affect the price cost margin via changing the demand elasticity in the product market such that the sector became more competitive when the intensity of international competition increases. This effect will also exist in vertical markets but we also have to consider the vertically-related aspects to gauge the overall impact. To do this, it is useful to think about price transmission which concerns how price changes occurring at one (imperfectly competitive) stage are transmitted to other stages in the vertical chain and ultimately commodity producers and final consumers. Focussing on this mechanism has several advantages. First, it is easy to benchmark against the competitive outcome; second, the mechanism via which the price transmission effect arises in a vertical context with imperfect competition is essentially the same as the price-cost margin effect in the trade literature discussed above; and third, within this context, we can consider additional concerns that may arise in a vertically-related context.

Consider a vertically-related food industry where the raw commodity enters at an upstream stage and that the technology linking these stages is fixed proportions and there is arm's length pricing. Suppose initially the (single stage) downstream food sector is competitive. Tariff liberalisation relating to raw commodities will reduce the downstream firms' costs. The effect here would be to reduce the retail price the extent of this reduction being equivalent to the share of the raw commodity in the food industry cost function i.e. there would be perfect price transmission. For example, if the share of the raw commodity equals 1, then the retail price would rise by the same amount as the raw commodity price. In other words, in a competitive vertical industry, the downstream sector has no role in affecting the outcome from trade liberalisation and the standard effects we would get in a textbook competitive model would continue to hold.

If, however, the downstream sector is characterised by oligopoly, the results do differ as price transmission will not equal one. There are two effects here: (i) there is a direct effect reflecting the change in costs in the downstream industry's cost function since its costs have now changed due to trade liberalisation but also (ii) the change in costs affects the price cost mark-up for the food industry, the magnitude of this second effect being determined by the *change* in the elasticity of demand in the product market which is exactly the same mechanism outlined in equation (6) (see McCorrison *et al.*, (2001) for a fuller discussion of these issues). Under reasonable conditions, the change in the retail price will be less than the change in the raw commodity price<sup>27</sup>. This discrepancy in the way in which market power affects the changes in the two prices nevertheless has an important implication; if raw commodity prices fall but retail prices fall by less, then the increase in consumer surplus one would expect from trade liberalisation will be diluted. Moreover, the firms that make up the downstream sectors in the food chain will see their rents increase. Finally, in the presence of oligopsony power, trade liberalisation may also moderate the buying power effect thus affecting the change in producer

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<sup>27</sup> Specifically that the retail demand function is not too convex. For example, with a constant elasticity demand function, the pro-competitive effects will not hold as the price cost margin will not change. For demand functions that are sufficiently linear, the pro-competitive effects will hold.

surplus. In sum, imperfect competition will affect who gains and by how much from trade liberalisation.

There are still further issues to account for. First, tariff reductions may directly affect alternative downstream stages of the food sector. In this case, we may have to consider the “pass-back” effect with price signals being passed from retail to processors to farmers rather than (or perhaps in addition to, depending on the characterisation of the vertical chain) the “pass-through” effect with the transmission of price signals going the other way. If the food sector is competitive, this “pass-back” effect would be the reciprocal of the “pass-through” effect so that they would be observationally equivalent. However, in the context of imperfect competition, these effects will not be equivalent with the “pass-through” effect being diluted by market power and the “pass-back” effect being exacerbated by market power. Again, this will affect the magnitude of the welfare changes arising in the food sector. Second, as noted in Section 1, scale effects may also be important. Scale also affects the price transmission effects though again it affects the “pass-through” and the “pass-back” effects differentially (see McCorrison *et al.*, 2005).

These effects all relate to the role of oligopoly in the downstream industry. Three further considerations. First, to the extent there are successive stages in the vertical chain with oligopoly at each, these effects will be exacerbated. For example, suppose we have oligopoly at the processing and retail stages respectively. The change in the retail price cost mark-up will depend on the elasticity of demand at the final stage but also at the intermediate stage, the change in the elasticity of demand will reflect market power at both the retail and processing stages. Specifically, it will reflect the perceived derived marginal revenue function. In other words, given the inter-linked nature of the vertical market, the price transmission effect (even if focussed on a single part of the vertical chain) will reflect market power throughout the vertical chain as a whole. Second, oligopsony power may also be important and in turn can affect the price transmission effects. This is an issue that has been largely ignored in the general literature. Nevertheless, the mechanism is similar to that which arises with selling power. With oligopsony, the change in the mark-down following trade liberalisation will reflect changes to the elasticity of supply in the raw commodity market (see Weldegebriel, 2004). Finally, relating to our other aspects of market power in commodity markets (i.e. segmented markets or the role of STEs), the effects discussed here will be ameliorated or exacerbated by these features of commodity markets. For example, with STEs, if the aim of the STE is to countervail the impact of buyer power on producers, the oligopsony pass-back effect will not arise in this case since the STE will not price along the marginal outlay curve and the mark-down will be zero. To the extent that the market is geographically fragmented, these effects may be exacerbated by regional factors such as poor infrastructure.

The important point to take from this discussion is that the effects of trade liberalisation will be determined by imperfect competition that exists *throughout* the vertical chain. Though the impact of imperfect competition has been recognised in the general economics literature, there are therefore a range of concerns about imperfect competition that are specific to issues that are likely to arise in vertical commodity chains. But the bottom line remains the same. Imperfect competition will potentially determine the welfare impact of trade liberalisation but it will also influence the distribution of the welfare impact throughout the vertical chain. We return to this issue below.

#### ***A Simple Vertical Chain with Imperfect Competition***

To highlight the effects of imperfect competition in a vertical chain, I outline a simple model. Assume there are three stages which are based in a given country: the raw commodity supply; a downstream processing sector that is imperfectly competitive in that there is both horizontal (oligopoly) power and vertical market power in that firms in this sector may act oligopsonistically via commodity suppliers; finally, there is a retail stage that is also oligopolistic though we assume arms’ length pricing between the manufacturing and retail sectors of the chain. Thus we have successive oligopoly throughout the vertical chain and oligopsony with respect to the commodity market. To ease the exposition, we assume a fixed proportions technology with an input:output coefficient equal to one and firms set quantities to maximise profits. In terms of the introduction of trade, we assume that when trade is liberalised, the processors can procure the raw commodity from the world market thus

reducing the demand for the domestically-produced commodity (though as noted above, the stage at which the trade reform is directed could influence the overall outcome).

As usual with these types of models, we solve the model by backward induction starting with the retail stage thus determining the perceived derived marginal revenue function that the firms in the processing stage face. Since we want an explicit solution, linear functional forms for the retail demand and inverse agricultural supply functions are assumed, as given by:

$$Q = h - bR \quad (6)$$

$$P = k + gQ \quad (7)$$

where  $Q$  is total availability of the raw commodity.

For a representative retail firm, profits are given by:

$$\pi_i^R = R(Q)q_i - W(Q)q_i - M^R(q_i) \quad (8)$$

where  $R(Q)$  is the inverse retail demand function,  $W(Q)$  are costs relating to supplies from the upstream processing stage and  $M^R$  are other marketing costs which are assumed to be constant. The first-order condition for profit maximisation gives (and aggregating over  $n^R$  firms at the retail stage):

$$R - \left( \frac{\theta^R}{n^R b} \right) Q = M^R + W \quad (9)$$

The interest here is in the market power parameter  $\theta^R$  which relates to the conjectural variations of the retail firms. If this parameter is equal to zero, then firms in the retail stage behave competitively and the retail price equals marginal cost. However, the closer this parameter is to 1, then the less competitively firms behave. If  $\theta^R = n^R = 1$ , we have the monopoly outcome.

The inverse demand curve facing the processing firms is the derived marginal revenue function which is given by:

$$W = R - \frac{\theta^R}{n^R b} Q - M^R \quad (10)$$

Profits for a representative firm at the processing stage is given by:

$$\pi_i^W = W(Q)q_i - P(Q)q_i - M^W(q_i) \quad (11)$$

where  $P(Q)$  relates to prices of the raw commodity and  $M^W$  are other marketing costs which are assumed to be constant. Profit maximisation gives:

$$W - \left( \frac{\theta^R \theta^W}{n^R n^W b} \right) Q = M^W + P + \frac{g\mu}{n^W} Q \quad (12)$$

where  $\theta^W$  relates to oligopoly power at the processing stage with the same interpretation as given for  $\theta^R$ . The parameter  $\mu$  however relates to oligospony power vis-à-vis commodity suppliers. If  $\mu = 0$ , there is no oligospony power and commodity prices are set competitively; if  $\mu = 1$  (and  $n^W = 1$ ) then commodity suppliers face a monopsonist.

There are several features to note about this model where we have market power throughout the vertical commodity chain. First, the total amount of vertical rent reflects the nature of competition throughout the vertical chain. Specifically, defining total vertical rent as the gap between retail and processing prices plus the gap between processing and commodity prices, we have:

$$(R - W) + (W - P) = M^R + M^W + \left( \frac{\theta^R}{n^R b} + \frac{\theta^R \theta^W}{n^R n^W b} + \frac{g\mu}{n^W} \right) Q \quad (13)$$

Note that  $\theta^R$ ,  $\theta^W$  and  $\mu$  (as well as  $n^R$  and  $n^W$ ) all play a role in determining the total vertical rent. Second, and related to this, note that the inverse demand curve faced by commodity suppliers relates to the perceived derived marginal revenue functions that also reflect competition throughout the vertical chain and not just at the next stage. This captures the fact that, in the context of vertically-related markets, the stages are explicitly tied together. Specifically, the inverse derived demand function that commodity producers face is given by:

$$P = W - M^W - \left( \frac{\theta^R \theta^W}{n^R n^W b} + \frac{g\mu}{n^W} \right) Q \quad (14)$$

This is clearly different to the consumer demand function that perfectly competitive models tend to assume. Note that the greater the degree of market power exercised in the downstream sectors (i.e. the closer  $\theta^R$ ,  $\theta^W$  and/or  $\mu$  are to 1) and/or the lower the number of competing firms ( $n^R$ ,  $n^W$ ) at any stage, the lower the prices likely to be received by farmers. To close the model, we solve out explicitly for  $Q$  and related prices. We then consider the changes in the distribution of welfare that may arise following trade liberalisation.

### ***Effects of Trade Liberalisation***

The aim is to use the simple model outlined above to highlight the distributional effects of trade liberalisation when the vertical chain is imperfectly competitive. It should be borne in mind that these numbers are essentially “back-of-the-envelope” calculations to highlight the results that may arise out of an imperfectly competitive vertical chain. As such, we assume specific values for each of the parameters, the key purpose of the exercise being to highlight the relative sensitivity of the welfare effects when the market power parameters change. Trade liberalisation is captured by assuming the downstream food sector can access supplies of the raw commodity from world markets. As such, trade liberalisation is seen as an exogenous shock to this vertical food sector and is more typical of an import surge rather than a tariff reduction *per se*<sup>28</sup>. While formally modelling trade in a set-up like this is possible, the simple scenario outlined here is sufficient to highlight the role that vertical market structure may play in determining the overall outcomes of trade reform. The key difference from the competitive case will be two-fold. First, our welfare metric will now include profits for the downstream firms (at both the processing and retailing sectors) as well as consumer and producer surplus. Second, in the presence of market power, the effect of increased trade will be to affect the welfare outcomes of constituents of the vertical chain differentially i.e. trade liberalisation will influence the distribution of downstream rents. This is because, as discussed above, the margins of the downstream firms will also change when faced with imports. The focus here, then, is how this

<sup>28</sup> In principle, the level of imports should be endogenously determined by the tariff and the parameters of the model, so that the effect of tariff reductions can be derived. This would be a straightforward extension of the model.

characterisation of trade reform translates into changes in welfare relative to the competitive outcome. In each case, we assume  $n^R = n^W = 1$  and, at least initially,  $\theta^R = \theta^W = \mu$ .

In Table 4, we show the relationships between total welfare changes and distributional effects and imperfect competition following trade liberalisation. The competitive outcome is the benchmark case with  $\theta^R = \theta^W = \mu = 0$ . There is a net welfare increase (albeit one that is relatively small) which is comprised of gains to consumers and losses to producers. Note that in this case there is no change in the profits made by firms in the retailing and processing stages since these stages are competitive so that the price-cost mark-up is zero. However, when the vertical chain is imperfectly competitive, the relative change in net welfare is greater particularly for consumers whose welfare rises considerably. Since the impact of imperfect competition throughout the vertical chain is to reduce baseline consumer surplus, the effect of greater imports is considerably more marked. For the numbers used here, the change in producer surplus is similar to the competitive case but there is an increase in profits throughout the vertical chain. Taken together, the increase in net welfare is relatively greater than in the competitive case.

The remaining two lines in Table 4 highlight reductions in the degree of imperfect competition throughout the vertical chain. In the third line, we retain successive monopoly power but remove monopsony power. Finally, in the last entry, we further remove oligopoly at the processing stage but retain it at the retail stage thus moving from a vertical chain characterised by successive monopoly to one of single stage monopoly. The entries follow a common trend. As the degree of market power decreases, the relative effect of trade liberalisation is reduced. The effects continue to go in the same direction (i.e. consumer surplus increases as does rent for the firms involved as well as net welfare) but the relative magnitude of these changes is reduced the more competitive the vertical chain becomes. In sum, as with our discussion covering the general trade literature with imperfect competition, these results would seem to suggest that there is more to be gained from trade liberalisation when industries are imperfectly competitive.

## FURTHER ISSUES

The theme running through this paper is straightforward: imperfect competition influences the outcome from trade reform. This is well-known from the trade literature but perhaps less-well recognised in the agricultural economics literature. However, in the context of vertical chains in which commodity markets are a subset, there are further issues to consider though the overall message remains intact. In this context, it is worth asking the question in a slightly broader context: what is the potential cost of omitting issues relating to market power in the vertical chain?

The most obvious is that we do not fully recognise the winners and losers from trade reform as is highlighted from the results presented above. Trade reform is sold on the basis of overall welfare gains and the distribution between constituent groups though usually the measurement of these effects comes from standard, perfectly competitive trade models but this is clearly not the full story as the above example highlights. Related to this is the political economy of liberalisation. Clearly, firms that constitute the vertical chain have an interest in trade reform as their profits will change at the expense of producers and/or consumers. When imperfect competition in the vertical chain matters, we do an inadequate job in fully accounting for the effects of trade liberalisation or indeed what is at stake for the constituents of each stage of the vertical chain.

Moreover, reforming market structure itself can be an important aspect of the reform process either as an end in itself or as a mechanism to complement the reform of more formal trade barriers. For example, McCorrison and MacLaren (2006) show that de-regulation which directly changes the market structure characteristics can be an important aspect of trade reform and lead to significant distributional effects following the reform of the Indonesian STE responsible for imports of rice.



There are, some “real” cases that confirm the role of market structure in influencing policy outcomes. The recent examination of the case of reform in the cashew nut sector in Mozambique is informative in this regard (McMillan *et al.*, 2002). They show that despite the claims that reform would be successful, market structure issues were the key to understanding how these reforms were not as successful as hoped. In addition, in the context of the recent focus on trade and poverty, Balat and Porto (2005) show that the success of the cotton sector reforms in Zambia were determined by the emergence of regional monopsonies following the removal of the export parastatal. More recently, Brambilla and Porto (2005) show that trade reform had less to do with increases in agricultural productivity and more to do with changes in market structure.

## **SUMMARY AND FUTURE RESEARCH ISSUES**

The theme running through this paper is that imperfect competition influences the outcome of trade liberalisation. This has been an issue subject to considerable investigation in the general economics literature though it is inadequately recognised when it comes to considering trade reform issues relating to commodity markets. Yet, given that commodities are only one part of a vertically-related chain that may be more appropriately characterised as imperfectly competitive, these issues will also apply here though there will be specific challenges to modelling vertical as opposed to horizontal issues. Moreover, to the extent that the vertical commodity chains are more appropriately characterised as successively oligopolistic and where buying power may also exist with selling power, there are a range of additional challenges to identifying the effects of trade reform in vertically-related, imperfectly competitive markets. Here we have focussed on the mechanism via which imperfect competition may affect the outcome, the additional issues that arise in the context of a vertical chain, and how the distribution of the welfare effects of trade reform may be affected by these factors. To summarise the main message, imperfect competition matters for understanding the outcomes of policy reform more generally and trade liberalisation specifically. At present, these issues are inadequately addressed by those involved in commodity market research.

In light of this, what are the future directions for research? Clearly there are a number of specific issues relating to the theoretical approaches that will apply in order to capture aspects of vertically-related markets. But rather than construct a detailed list, I highlight two generic issues. First, in analysing commodity markets, current research falls short of best practice reflected in the general (and specifically the international) economics literature. There are additional issues in dealing specifically vertical commodity chains but, in general, the analysis of imperfect competition and its effect on policy outcomes remains an activity among a relative minority of commodity market researchers. Yet, it clearly matters and arguably policy-makers and other interested parties have been quicker than the academic community in recognising these issues.

Second, it is also worth highlighting some methodological issues. A common approach to dealing with imperfect competition in trade models is to utilise calibration methods. This is where a theoretical model is set out and where some (limited) data that applies to the specific commodity market is used to compute the equilibrium following which various policy-related scenarios can be conducted. Although the foundations for these models are firm-based, they are nevertheless aggregative in practice. Econometric methods have the advantages of “realism” though are intensive in data requirements. However, recent practice in the economics literature has focussed on firm level data that captures the heterogeneity of firms that characterise an industry and use recent econometric methods to analyse the decision to export, impact on profitability and productivity and so on. Though data intensive and time consuming, this approach gives further insights as to what happens with policy reform and is arguably more informative than the more crude, simulated outcomes. Clearly, in progressing research in this area, researchers should consider the potential of these alternative but complementary methods. A significant and challenging research agenda lies ahead.

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**Table 1: Concentration Ratios<sup>1</sup> by Product in EU Countries**

Product	Ireland	Finland	Sweden	Denmark	Italy	France	Spain	UK	Germany	Average
Baby food	98	100	100	99	96	93*	54	78	86	91
Canned soup	100	85	75	91	50	84	--	79	41*	87
Ice cream	--	84	85	90	73*	52	84	45	72	76
Coffee	91	72	71	70	60	100	--	74	67	75
Yoghurt	69	83*	90	99*	36	67	73	50	76	70
Chocolate confectionary	95	74	--	39	93	61	79	74	--	74
Pet food	98	80	84	40	64*	73	53	77	87	79
Breakfast cereals	92	--	52	70	88	70	82	65	67	73
Tea	96	90	63	64	80	82	62	52	55	72
Snack foods	72	70*	80	78	71	50	56	73	48	68
Carbonates	85	50	62	--	60	69	79	55	60*	71
Butter	--	--	--	100	--	32*	--	65	30	65
Pasta	83	97	82	61	51	57	65	37	49	65
Frozen meals	--	--	63	--	90	62	39	39	65	62
Wrapped bread	85	44	47	59	80	70	96	58*	9	59
Biscuits	83	73	51	44	55	61	53	42	50	58
Canned fish	--	70	72	49	68	43*	33	43*	--	55
Mineral water	--	100	74	70	37	--	31	14	22	50
Fruit juice	--	70	50	65*	62	26	38	35	46	48
Canned vegetables	--	68	47	50	36	29	--	--	--	47
Average	89	79	69	69	67	63	61	56	55	68

Source: Cotterill (1999). <sup>1</sup> 3-firm concentration ratios, except \* which are 2-firm.

**Table 2: Product Concentration Ratios in US Food Manufacturing<sup>1</sup>, 1997**

Product	CR4 (%)
Dog and cat food mfg.	63.4
Malt mfg.	66.5
Wet corn milling	73.7
Soybean processing	73.4
Other oilseed processing	72.7
Breakfast cereal mfg.	86.7
Sugar cane mills	61.8
Cane sugar refining	96.4
Beet sugar mfg.	82.7
Chocolate and confectionary mfg.	86.6
Condensed/evaporated dairy mfg.	68.8
Cookie and cracker mfg.	64.6
Snack food mfg.	63.0
Brewing	90.7
Distilling	64.8
Cigarettes	98.0
Average	75.9

Source: US Census Bureau, 2001. <sup>1</sup> Share of value added accounted for by the 4 largest firms.

**Table 3: Seller Concentration in US and EU Food Retailing, 1990s**

Country	CR5 (%)
Austria	79
Belgium-Luxembourg	57
Denmark	78
Finland	96
France	67
Germany	75
Greece	59
Ireland	50
Italy	30
Netherlands	79
Portugal	52
Spain	38
Sweden	87
UK	67
United States	35

Source: Cotterill (1999), McCorrison (2002), and Hughes (2002).

**Table 4: Welfare Effects of Trade Liberalisation with an Imperfectly Competitive Vertical Chain (% Changes)**

	Change in Consumer Surplus	Change in Producer Surplus	Change in Vertical Rent	Net Welfare Change
$\theta^R = \theta^W = \mu = 0$	6.6	-12.5	0	0.2
$\theta^R = \theta^W = \mu = 1$	42.4	-12.7	11	12
$\theta^R = \theta^W = 1; \mu = 0$	34.9	-12.5	7.7	9.5
$\theta^R = 1; \theta^W = \mu = 0$	20.3	-12.5	2.6	5.5

<sup>1</sup> Vertical rent relates to profits at both the retail and wholesale stages. However, in the final entry where the processing sector is set as being competitive, the vertical rent relates to retail profits only.

# The Fall and Rise of Vertical Coordination in Commodity Chains in Developing and Transition Countries

*Miet Maertens and Johan F.M. Swinnen<sup>29</sup>*

*“Private agricultural marketing companies have become dominant providers of smallholder input credit in Sub-Saharan Africa. In various countries of the region, they are today in practice the sole providers of seasonal input advances to the small-scale farming community.”*

*IFAD (2003, p.5)*

*“Trade credit from private suppliers comprised virtually all of the family farm credit and the biggest share of liabilities of agricultural companies [in Lithuania in 2004].”*

*World Bank (2005)*

*“69% of 35 billion \$ credit in the Brazilian agri-food system is supply-chain credit”*

*D. Alcantara, Managing Director, Banco do Brasil (March 2004)*

## ABSTRACT

Food and agricultural commodity supply chains in developing and transition countries have undergone tremendous changes in the past decades. An important part of these changes is the decline of state-controlled vertical coordination in commodity chains in the 1980s and 1990s and the emergence and spread of private sector driven vertical coordination in more recent years. In this paper we explain the causes of these changes, illustrate their importance, discuss the implications for efficiency and equity, and provide empirical evidence on these effects from several case-studies in developing and transition countries.

## INTRODUCTION

Twenty-five years ago, a vast share of the poor and middle income countries, covering a large share of the world's agricultural areas and farmers, were characterized by state-controlled supply chains for agricultural and food commodities. This was most extreme in the Communist world, spreading from Central Europe to East Asia, where the entire agri-food system was under strict control of the state. However, also in many African, Latin-American and South Asian countries the state played a very important role in the agri-food chains. For example, in Brazil and Mexico, wholesale markets were run by the state (Reardon and Swinnen, 2004); in South Asia the state heavily regulated food markets and many African commodity markets and trade regimes were controlled by (para-)state organizations. In many of these countries, the state played an important role in agricultural production and marketing in the decades after independence from colonial power. Governments in Sub Sahara Africa (SSA) and South Asia were heavily involved in agricultural marketing and food processing through the creation of marketing boards, government-controlled cooperatives and parastatal processing units. These

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government institutions were often monopoly buyers of agricultural products, especially for basic food crops and important export crops.<sup>30</sup>

This system of state intervention and control and, with it, the vertical coordination has undergone tremendous changes in the 1980s and the 1990s as a global process of liberalization induced dramatic changes in many of these regions<sup>31</sup>. In the transition world, the liberalization of prices, trade and exchanges, the privatization of the state enterprises etc. removed much of the state control over the commodity chains as well as the vertical coordination in the chains. Similar processes of privatization and liberalization of domestic and international commodity and financial markets reduced the control of the state and vertical coordination in many developing and emerging economies.

Moreover, processes of globalization have at the same time induced changes in the governance structure of food chains. This globalization of the food chains in transition and developing countries has (partly) been driven by the liberalization of the trade and investment regimes in transition and developing countries – policy reforms which often accompanied the privatization and domestic price reforms – and the spread of food standards.

First, trade liberalization caused major changes in trade of agri-food products. For example in Central and Eastern Europe it caused a major reorientation of the agri-food trade from “east to west”, i.e. from trade with the former Soviet countries to trade with western Europe, and a shift of the agri-food trade position from net exporters to net importers. Also the participation of developing countries in world agricultural trade has increased. In addition, also the structure of world agriculture trade changed considerably during the past decades. There has been an increase in the share of high-value products – mainly fish and fishery products, and fruits and vegetables – in world agricultural trade. Especially developing countries experienced a sharp increase in such high-value exports while the importance of their traditional tropical export commodities – such as coffee, cocoa, and tea – has decreased (Aksoy, 2005).

Second, the liberalization of the investment regimes induced foreign investments in agribusiness, food industry, and further down the chain, with major implications for farmers (Dries and Swinnen, 2004). Several food sectors in Eastern Europe, such as the sugar, dairy, and retail sector, have received massive amounts of foreign investment, which now holds dominant market shares. A well-advertised example of these investments is the rapid growth of modern retail chains (“supermarkets”) in transition and (some) developing countries and which was triggered by the reform process in former state-controlled economies (Reardon and Swinnen, 2004).

Third, associated with these changes is the spread of (private and public) food standards. Consumers are increasingly demanding specific quality attributes of processed and fresh food products and are increasingly aware of food safety issues. Food-standards are increasingly stringent, especially for fresh food products such as fruit and vegetables, meat, dairy products, fish and seafood products, which are prone to food safety risks. These food quality and safety demands are most pronounced in western markets (and increasingly also in urban markets of low-income countries) and affect traders and producers in transition and developing countries through international trade.

<sup>30</sup> For example, in Indonesia marketing of rice was controlled by the state through the marketing board BULOG (National Logistical Supply Organization). Similarly, marketing of grain and other basic food crops was controlled and organized by government marketing boards e.g. in Malawi, through ADMARC (Agricultural Development and Marketing Corporation); in Zambia, through NAMBOARD (National Agricultural Marketing Board) and in Kenya through NCPB (National Cereals and Produce Board). Also marketing and processing of major export crops was in many countries state-controlled through state-owned processing and exporting companies and organizations; e.g. for cotton in Malawi, through CMDT (Malawi Textile Development Company), in Cameroon, through SODECOTON, in Ghana, through the Ghana Cotton Development Board and in Kenya through CLSMB (Cotton Lint and Seed Marketing Board); for tea in Kenya, through KTDA (The Kenyan Tea Development Cooperation); for coffee through coffee marketing boards in Uganda, Kenya, Zimbabwe and Ethiopia; etc.

<sup>31</sup> In the so-called Berg report of 1980, the World Bank argued that government marketing organizations should be reformed to operate on a commercial basis and the private sector should be permitted to enter agricultural marketing systems to provide competition and encourage efficiency. This report laid the basis for economic reforms, including privatization and market liberalization, which started in the late 1980s and continued throughout the 1990s in many developing countries. The transition reforms actually started in 1978 in China and after 1989 in Europe.

Following the privatization, liberalization and globalization waves, new, private forms of vertical coordination (VC) have emerged and are growing (Swinnen, 2005, 2006). This paper analyzes and documents the fall of state-controlled VC and the rise of private VC and presents evidence on its effects in transition and developing countries.

## SOME CONCEPTS

Vertical coordination can take various forms, which can be thought of as institutional arrangements varying between the two extremes of spot market exchanges (0) and full ownership integration (1). Within this 0-1 interval, there is a large variety of different forms of coordination and an equally vast literature trying to classify and explain these various forms<sup>32</sup>. An often made distinction, which is useful for our purposes, is between marketing contracts and production contracts. *Marketing contracts* are agreements between a contractor and a grower that specifies some form of a price (system) and outlet ex ante. *Production contracts* are more extensive forms of coordination and include detailed production practices, extension services, inputs supplied by the contractor, quality and quantity of a commodity and a price.<sup>33</sup>

Key factors determining the use of various contract forms or other forms of vertical coordination are the costs and uncertainties involved in the transactions, which themselves are affected by the economic and institutional environment, the need for asset- or transaction-specific investments, the frequency of interacting, commodity characteristics such as perishability, costs of measuring and monitoring product characteristics, uncertainty over product quality, or reliability of supplies.<sup>34</sup>

In the literature, VC in state-controlled systems is sometimes referred to as outgrower schemes while private sector VC initiatives are referred to as contract-farming (e.g. Little and Watts, 1994). We roughly stick to this terminology but indicate that the distinction is not always straightforward. The public-private dichotomy is complex: a state-controlled VC scheme may be under private management or a private VC scheme may be supported by subsidies and public extension and research.

## A HISTORICAL PERSPECTIVE ON THE FALL AND RISE OF VERTICAL COORDINATION

### *State-controlled vertical coordination*

Vertical coordination (VC) was widespread in state-controlled food supply chains. Again this was most extreme in the Communist system where production at various stages and the exchange of inputs and outputs along the chain was coordinated and determined by the central command system. The agricultural supply system was fully integrated and completely state-controlled (Rozelle and Swinnen, 2004). Production, processing, marketing, the provision of inputs and credit, retailing, etc were all directed by the central planning authorities. Although there were some variations in countries in the extent and scope of control, this was the basic system extending from Central Europe, the Soviet Union to China and Viet Nam.

However also in other regions where the state played an important role in food chains vertical coordination was widespread. For example, many of the African parastatal organizations provided

<sup>32</sup> There is a significant literature on supply chains and contracting in food chains, some of it on developing and transition countries (see World Bank (2005) for a survey). There is also a related, mostly theoretical, literature which focuses on optimal contracting and interlinked markets in developing countries (e.g. Bardhan, 1989).

<sup>33</sup> There is important variation within "production contracts". For example production contracts which provide inputs, credit and some extension to farmers is the most common form of state-controlled VC in developing countries, while production contracts in private VC, especially in the case of high-value products, sometimes go much further in their technical assistance and include also certain management decisions (such as timing of planting & harvesting; timing, quantity and type of fertilizer application, etc).

<sup>34</sup> The basic explanations draw often on the seminal work of Ronald Coase and Oliver Williamson. However, in two recent surveys of the literature (Hobbs and Young, 2001; and Rehber, 2000) no less than seven different strands of literature are identified as being important to understand and explain those differences: transaction costs economics, agency theory, competency/capability models, strategic management theory, convention theory, life-cycle theory, and contract economics.

both inputs to farmers and purchased their outputs. Government marketing organizations and parastatal processing companies used VC systems with upstream suppliers. The dominant form of state-controlled VC was that of seasonal input and credit provisions to small farmers in return for supplies of primary produce. In fact, state-controlled VC was often the only source of input and credit provision for peasant farmers (IFAD, 2003). For example, the government marketing boards ADMARC in Malawi and NAMBOARD in Zambia provided seasonal inputs to peasant farmers deducting the value of the inputs from the payment made for marketed output at harvest time (Poulton et al., 1998). Also parastatal cotton companies such as CMDT in Mali, SODECOTON in Cameroon and the Ghana Cotton Development Board in Ghana provided credit and inputs to cotton farmers (Poulton et al., 1998). Also extension services were offered by the government, either implicitly within VC of marketing boards and parastatal processing companies – e.g. the Ghana Cotton Development Board – or through other channels. Also more complex and extensive systems of state-controlled VC existed. For example, the Ghana Cotton Development Board also provided extension services (Poulton, 1998) and the Kenyan Tea Development Cooperation was involved in effective control at all levels of the operation including planting material, production processes, quality control and extension services (Bauman, 2000).

In many SSA countries, state-controlled VC has been particularly important – and still remains important in some countries. For example in Kenya, by the mid-1980's more than 230,000 rural households, or about 16% of the rural population, were involved in outgrower schemes with large parastatal companies and government marketing boards for the production and marketing of tea, sugar, oilseeds and tobacco (Baumann, 2000).

State-controlled VC in centralized agricultural marketing systems in developing and Communist countries was often motivated by political motives and by objectives to provide cheap food for urban markets; the maximization of foreign exchange earnings; the creation of rural employment; ascertaining the viability of certain businesses; etc. State-controlled VC was often viewed as a way to protect peasant farmers and stimulate rural development.

Most analyses point at the deficiencies and inefficiencies of these systems. For example, the inefficiency in the processing, agribusiness, and marketing systems and in the central allocation of production factors are considered one of the primary causes of the inefficiency of the Soviet farming complex (Johnson and Brooks, 1983; Swinnen and Rozelle, 2006). Also in Africa, several studies conclude that state-controlled outgrower schemes were inefficient and poorly managed, which manifested itself, among other things, in low credit repayment rates (Warning and Key, 2002)<sup>35</sup>.

#### ***Liberalization, privatization, and the break-down of vertical coordination***

This system of vertical coordination has undergone tremendous changes in the 1980s and the 1990s. In the transition world, the liberalization of exchange and prices, and the privatization of farms and enterprises caused the collapse of vertical coordination and caused major disruptions in the food chain. These effects occurred most dramatically in the collapse of the state-controlled system in Central and Eastern European countries and the former Soviet Union.<sup>36</sup> Widespread forms of contract problems occurred such as long payment delays, non-payments for delivered products or non-delivery. Payment delays were a major problem for companies in Eastern European countries and caused major drains on much needed cash flow for farmers. Food companies in Eastern Europe in the late 1990s considered late payments one of their most important obstacles to growth (Gorton et al, 2000).

The disruptions in relationships of farms with input suppliers and food companies also resulted in many farms facing serious constraints in accessing essential inputs (feed, fertilizer, seeds, capital,

<sup>35</sup> Some studies also point at successful state-controlled VC. For example, Poulton et al. (1998) point to some large government outgrower schemes in a poor district in Malawi, which were successful in achieving very high repayment rates. Also the outgrower schemes of the Kenyan Tea Development Authority are referred to as a success story, which is attributed to its extensive form of VC (Bauman, 2000).

<sup>36</sup> Interesting, the early Chinese liberalization of the marketing and input supply system also led to major exchange problems, which caused the Chinese government to make a U-turn on the reforms and reimpose state control on the marketing and fertilizer supply systems, which was then gradually liberalized much later (see Rozelle (1996) for an extensive discussion, and Rozelle and Swinnen (2004) for a summary).

etc.). Also in many developing countries privatization and market liberalization led to the decline of input and credit supply to farms as it disrupted the working of various government-controlled agricultural institutions, cooperative unions and parastatal processing companies.<sup>37</sup> As government marketing boards and cooperatives have ceased to play a major role in the procurement of agricultural produce, so has the provision of credit and agricultural inputs through state-controlled VC. In addition, market liberalization led to the removal of price supports and input subsidies, a reduction in government research and extension services, and a decline in government (subsidized) credit to the agricultural sector.

### ***The emergence of private vertical coordination***

However, following privatization and liberalization, new forms of vertical coordination have emerged and are growing (IFAD, 2003; Swinnen, 2006; World Bank, 2005). New forms of vertical coordination are no longer state-controlled but are introduced by private companies. Private traders, retailers, agribusinesses and food processing companies increasingly contract with farms and rural households to whom they provide inputs and services in return for guaranteed and quality supplies. This process of interlinked contracts is growing rapidly in the transition and developing world.

The emergence and spread of private VC is caused by the combination of, on the one hand, an increasing demand for products of high quality and safety standards with private sector investments and increasing consumer incomes and demands (both domestically and through trade) and, on the other hand, the problems which farms face to supply such products reliably, consistently and timely to processors and traders due to a variety of market imperfections and poor public institutions.

Farmers in developing and transition countries face major constraints in realizing high-quality, consistent supplies. These include financial constraints as well as difficulties in input markets, lack of technical and managerial capacity etc. Specifically for high-standards products, farmers might lack the expertise and have no access to crucial inputs such as improved seeds. To guarantee consistent and quality supplies, traders and processors engage in VC to overcome farmers' constraints.

The importance of VC in developing and transition countries is further explained by the lack of efficient institutions and infrastructure to assure consistent, reliable, quality and timely supply through spot market arrangements. VC is in fact a private institutional response to the above described market constraints. To overcome problems of enforcement and constraints on quality supplies, private VC systems are set up by processors, traders, retailers and input suppliers.

Increasing consumer demand for quality and food safety is another driving force behind private VC in transition and developing countries. Investment by modern processors and retailers (supermarket chains) reinforces the need for supplying large and consistent volumes by their use of private standards and requirements of extensive supervision and control of production processes.

Emerging empirical evidence suggests that these new forms of private VC can be an engine of economic growth, rural development and poverty reduction. The next section presents evidence on its effects in transition and developing countries.

### ***The Importance of Private Sector Vertical Coordination***

The importance of private VC is increasing in developing and transition countries. At the end of the 1990s, in the Czech Republic, Slovakia and Hungary, 80% of the corporate farms, who dominated farm production in these countries, sold crops on contract, and 60-85% sold animal products on contract; numbers which are considerably higher than the shares of farms in the US and the EU (table 1). A survey of agri-food processors in five CIS countries (Armenia, Georgia, Moldova, Ukraine and Russia) found that food companies which used contracts with suppliers grew from slightly more than one-third in 1997 to almost three-quarters by 2003 (table 2).

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<sup>37</sup> For example in Kenya, the economic reforms have led to the collapse of the National Cereals and Produce Marketing Board, the Cotton Lint and Seed Marketing Board, the Kenya Grain Growers Cooperative Union, etc. (IFAD, 2003).

**Table 1: Share of farms selling on contract in Central Europe (as % of total)**

Type of Contract	Czech		Slovak	Hungary	Bulgaria
	NRIF*	RIF*			
<b>Individual farms</b>					
Selling crop products on contract	4	37	29	8	5
Selling livestock products on contract	1	13	4	10	3
Selling animals on contract	2	7	6	na	na
Selling on contract	5	46	35	17	7
<b>Corporate Farms</b>					
Selling crop products on contract		79	82	86	42
Selling livestock products on contract		73	83	59	23
Selling animals on contract		49	77	na	na
Selling on contract		96	98	94	43

\*RIF = Registered individual farms ; NRIF= non-registered individual farms

Source: Swinnen, 2005

**Table 2: Supply relationships in sourcing raw materials in Armenia, Georgia, Moldova, Ukraine and Russia, 1997-2003 (% of companies)**

Relationship	1997	1999	2001	2003
<b>Spot Markets</b>				
With all farmers	27.2	43.5	47.1	50
With small farmers	25	41.3	44.2	47.2
With larger farmers	15.6	25.5	25.5	23.1
<b>Contracts</b>				
With all farmers	41.3	61.7	73.1	77.4
With small farmers	36.2	43.8	46.2	49.1
With larger farmers	37	58.3	69.2	73.6
Own farms	6.4	8.3	17.8	26.4
Other agents	16.7	28.6	46.2	49.1

Source: White and Gorton, 2004

**Table 3: Farm assistance programs offered by dairy companies in Central Europe**

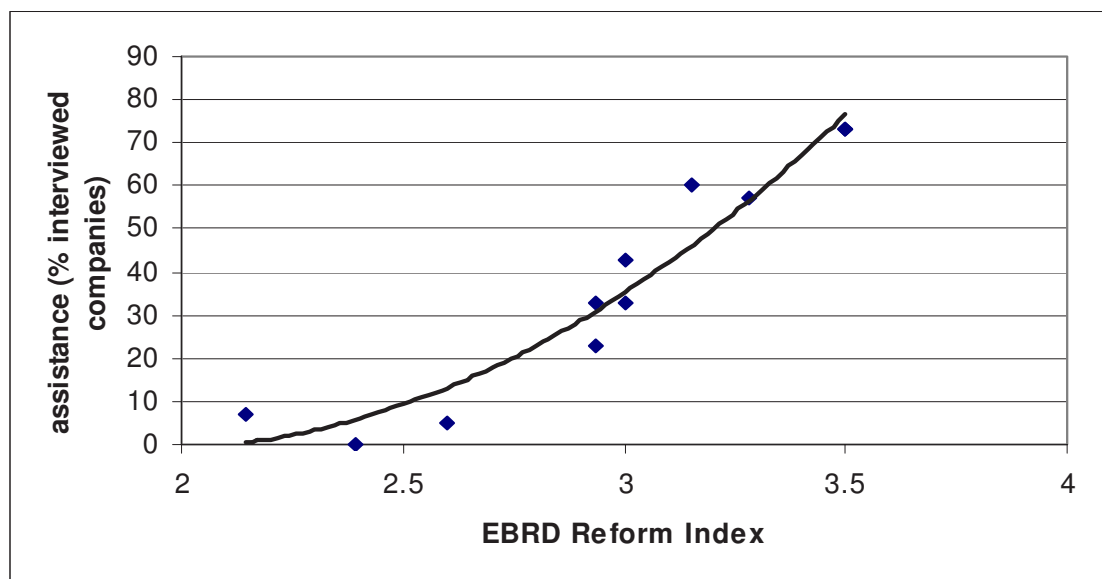
Company Name	Credit – specific	Credit - general	Input supply	Extension service	Veterinary service	Bank loan guarantee
<b>POLAND**</b>						
Mlekpól	Y		Y	Y	N	Y
Mleczarnia	N		Y	N	N	Y
Kurpie	Y		Y	Y	N	Y
Mazowsze	Y		Y	Y	N	N
ICC Paslek	Y		Y	Y	N	Y
Warmia Dairy	Y		Y	Y	Y	Y
<b>BULGARIA</b>						
Merone	Y(2000)	N	Y(???)	Y(1992)	N	N
Fama	Y(1994)	N	Y(1994)	N	N	Y(once)
Mlekimex	Y(1997)	Y(1998)	Y(1997)	Y(1999)	Y(1997)	Y(1998)
Danone	Y(1997)	N	Y(1998)	Y(2000)	Y(1995)	Y(1999)
Iotovi	N	N	Y(1995)	N	N	Y(1995)
Milky World	Y(1999)	Y(2000)	Y(1999)	Y(1999)	N	Y(1999)
Markelli	Y(1999)	N	Y(1998)	N	N	N
Mandra Obnova	Y(1998)	N	Y(2000)	Y(2000)	N	N
Meggle	Y(2001)	N	Y(2001)	Y(2001)	N	N
PRL	N	N	N	Y(2002)	N	N
Serdika 90	Y(1997)	N	Y(1997)	Y(1997)	N	N
<b>SLOVAKIA</b>						
Liptovska	Y(2000)	N	N	Y(1994)	N	N
Mliekospol	Y(1999)	N	N	Y(1992)	Y(1992)	Y(1992)
Rajo	Y(2001)	N	Y/N	Y(1992)	N	N
Levicka	Y(1998)	N	Y(1998)	Y(0000)	N	Y(1998)
Tatranska	Y(2001)	N	Y(2000)	Y(0000)	N	N
Nutricia Dairy	Y(2000)	N	N	N	N	Y(2000)
<b>ROMANIA</b>						
Danone	Y		Y	Y		Y
Friesland	Y		Y	Y		Y
Promilch	Y		Y	Y		Y
Raraul	N		Y	Y		N

\* Either the company provides inputs and the farmer pays back later, or the company offers forward credit, which the farmer uses to buy inputs.

\*\* In Poland no distinction is made between credit for dairy-specific investments and general investments. Farm-level evidence shows that the dairy companies mainly support dairy-specific investments

There is also significant growth of supplier support measures as part of the contracts and more farms are getting access to these. Credit, inputs, prompt payments, transportation, and quality control are the most commonly offered forms of support. Over 40% of processors in the CIS sample offer credit to at least some of the farms that supply them; and 36% offered inputs, in 2003. In several sectors, including the dairy sector in Poland, Bulgaria, Slovakia and Romania, farm assistance programs offered by private dairy companies are quite extensive and include credit provisions, input supply, extension services, and veterinary services and in some cases bank loan guarantees (table 3). Figure 1 shows how the growth of VC is closely and positively related to the reform process in transition countries.

**Figure 1: Impact of economic reforms on vertical coordination (\*) in the dairy sector of transition countries (\*\*)**



\* Share of dairy companies providing substantive assistance to farms as part of production contracts

\*\* Data based on surveys in Albania, Bulgaria, Poland, Slovakia (between 1994 and 2004)

Source: Swinnen, Dries, Gemenji and Noev (2005)

In developing countries private VC is emerging and growing in many sectors. In South and Southeast Asia, there has been a sharp increase in VC of primary production with input suppliers and processing/exporting firms during the past 20 years (Gulati et al., 2005). Especially in animal production and dairy farming, VC is widespread. In SSA, private VC has become a dominant system of rural financing. For example, in Mozambique and Zambia it is virtually the only source of finance for agricultural households (IFAD, 2003). In Mozambique, an estimated 400,000 rural households, representing 12% of the rural population, are included in contract-farming (table 4). Also in Kenya and Zambia, a high number of rural households are producing agricultural commodities on contract with agro-industrial firms (table 4). The main crops that are grown under contractual arrangements in SSA include cotton, tobacco and horticulture crops. Also in Latin-America, VC is widespread over many different agricultural commodities and includes various contractual arrangements ranging from purely marketing contracts to production contracts with provision of inputs, credit, technical assistance and marketing assistance (table 5).

**Table 4: Contract-farming in Sub Sahara Africa**

Country	Commodity	Number of contracted smallholders
Kenya	tea	406,000
	sugar	200,000
	horticulture	15,000 - 20,000
	tobacco	> 10,000
Zambia	cotton	150,000
	tobacco	570
	horticulture	13,500
Mozambique	cotton	270,000
	tobacco	100,000

*Source: IFAD, 2003*

Finally, while private sector involvement has grown and the role of the government in agricultural production and marketing diminished, in several countries, especially in SSA, the government is still involved in agricultural supply chains, e.g. through minority or majority shares in privatized food processing companies, through state-owned banks and government credit schemes (sometimes as part of multipartite VC), provision of extension services, etc. Zambia is one of the only countries in SSA with almost complete absence of the government in production, marketing, regulation or direct financial contributions to the agricultural sector, although the government continues to play a major role in the distribution of fertilizers (IFAD, 2003).



**Table 5: Vertical coordination in Latin-American agri-food chains**

Product	Destination	Contracting					Vertical Integration
		Marketing	Technical assistance	Credit	Inputs	Management	
<b>Tomato(paste)</b>							
Nicaragua	Domestic	X					
Paraguay	Domestic						
Ecuador	Domestic						X
Mexico	Domestic	X					X
Peru	Domestic						X
<b>F&amp;V</b>							
Guyana	Domestic	X					
Ecuador	Domestic	X					
Trinidad & T	Domestic	X					
Mexico	Export	X	X	X	X	X	X
Guatemala	Export	X	X	X	X	X	X
El Salvador	Export	X	X	X	X		
Peru	Export	X					X
<b>Chicken</b>							
Trinidad & T	Domestic	X	X	X	X		X
Jamaica	Domestic	X		X			
<b>Tobacco</b>							
Chile	na	X	X	X	X		
Guatemala	na	X	X	X	X		
<b>Sugarcane</b>							
Nicaragua	Exp&Dom	X	X		X		X
Guatemala	Exp&Dom						X
<b>Sesame Seed</b>							
Nicaragua	Export	X		X			
Guatemala	Export	X					
El Salvador	Export						
<b>Malt. barley</b>							
Chile	Domestic	X	X		X		
Peru	Domestic	X		X	X		
<b>Rice</b>							
Trinidad & T	Domestic	X	X		X		
Paraguay	na	X		X			
Dominican R	na	X					
<b>Dairy</b>							
Trinidad & T	Domestic	X	X	X			
Jamaica	Domestic	X					
Ecuador	Domestic	X					

Source: Dirven (1996)

## COMMODITY SPECIFIC VERTICAL COORDINATION PATTERNS

In the *dairy* sector, we observe extensive production contracts between dairy processors and farms in transition countries, including the provision of credit, investment loans, animal feed, extension services, bank loan guarantees, etc. (Swinnen et al, 2006). This is different from the West since there is no production contracting going on in countries like the US. In South and Southeast Asia, VC in the milk sector involves contracts with cooperatively owned processing and marketing units, large scale state-owned processing companies and with the emerging private sector (Gulati et al., 2005).

In South and Southeast Asia, typical contract farming schemes in *animal production* involve feed millers who supply young animals, feeds, veterinary services and extension advice on credit to farmers who provide holding sheds, dispose of waste, and provide all required labour, water and electricity (Gulati et al., 2005). In Thailand nearly all commercially produced broilers are produced under contract arrangements with private companies (Gulati et al., 2005); and for the Philippines this is 80% (Delgado et al., 2003). These contract schemes are either based on fees per unit of product return for the farmer's labour, land, buildings, water and electricity; or on guaranteed prices.

In the *sugar* sector, we find, as in the developed economies, extensive marketing agreements, but the contracts are much more extensive in transition and developing countries, including also input provisions, investment loan assistance, etc. (Swinnen, Gow and Maviglia, 1999).

In *cotton*, the standard model in the US and Australia, two major cotton producers, is that the cotton (from seed to baled cotton) remains in ownership of the producer and the processing is paid for as a service. In transition countries and developing countries, the dominant player in the chain is the gin who typically contracts farms to supply seed cotton and provides them with a variety of inputs. This gin supply chain structure has developed in SSA countries as well as in Central Asia and involves quite extensive forms of private VC, with credit, seeds, irrigation, fertilizer, etc. being provided by the gins (Sadler, 2004). In Ghana e.g., the privatisation of the Ghana Cotton Development Board (who provided production inputs, extension services and guaranteed purchase of the supply to farmers under state-controlled VC) into the Ghana Cotton Company and market liberalization resulting in increased competition in the market has induced more extensive VC. Competing private companies have increased their services to farmers, including timely plowing services, reliable fertilizer and pesticide supplies, prompt payment after harvest and even plowing for farmers' food crops (Poulton, 1998).

In *fresh fruits and vegetables*, the rapid growth of modern retail chains with high demands on quality and timeliness of delivery is changing the supply chains in developing and transition countries. New supplier contracting is developing rapidly as part of retail investment and includes private VC with extensive farm assistance programs. In Africa, particularly in Kenya and Senegal, smallholder horticulture production under private contract arrangements has increased sharply after liberalisation but in recent years smallholder production is decreasing in favour of fully-integrated corporate horticulture farming (Maertens et al, 2006; Humphrey et al., 2004).

Traditional *tropical products* (coffee, tea, cocoa, rubber and oil palm) are traditionally grown on fully integrated large scale plantations because of large economies of scale in both production and marketing of these crops. However, these perennial crops are increasingly being grown by smallholders under contract farming arrangements and outgrower schemes. For example, cocoa in Ghana and Nigeria; rubber in Malaysia, Nigeria and Sri Lanka; coffee on the Ivory Coast, Kenya and Madagascar; oil-palm in West Africa and tea in Kenya and Malawi. In Kenya, half to the coffee is produced by smallholders (Baumann, 2000). Some of the largest outgrower schemes such as palm oil in the Philippines and rubber in Malaysia are state-controlled schemes involving parastatal companies while other schemes involve private VC. Some companies (and parastatals) combine large scale integrated production with contract farming and outgrower schemes in a 'nucleus estate' surrounded by outgrowers, especially when the economies of scale of the processing plant (such as for palm oil) depend on a certain volume of throughput. Contract farming provides farmers with inputs, new

technologies, credit and extension services, either private services or priority treatment from the public extension services as part of multipartite VC.

In *grains* VC is also elaborated and complex. In transition countries, there is extensive contracting going on for malting barley, but the VC is often much more extensive than in western countries, with brewing and malting companies vertically coordinating across several stages of the chain. Moreover, there is a remarkable amount of full vertical integration in wheat production in Russia and Kazakhstan, where large agro-holdings and grain trading companies own several large grain farms in some of the best grain producing regions, sometimes owning 100,000s of hectares. For example, large, vertically integrated grain companies are the dominant types of farming in the north of Kazakhstan. Also in Russia VC in grains has grown rapidly after 1998, but there it was the state which was the driving force behind the vertical coordination.

### **THE EFFECTS OF EMERGING PRIVATE VERTICAL COORDINATION**

The emergence of private VC is often mentioned as a new engine for economic growth, rural development and poverty reduction. In this section we review the empirical evidence on the impact of VC in transition and developing countries. We distinguish between efficiency effects and equity effects.

#### ***Efficiency effects***

The impact of private VC systems on productivity is difficult to quantify as several other factors affect output simultaneously and as company level information is difficult to obtain. Still, the evidence suggests that successful private VC has important positive effects, both direct and indirect.

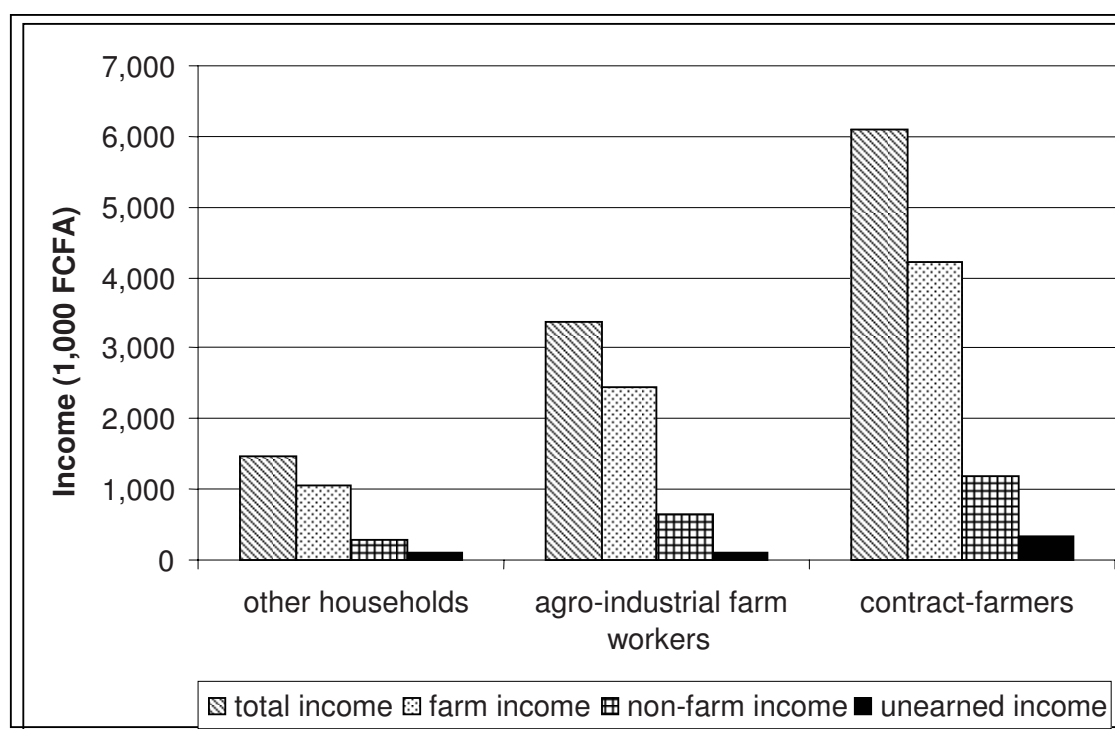
The direct impact is on the output and productivity of the processing company that initiates vertical contracting and of its suppliers involved in VC schemes. Supplying farmers have experienced beneficial effects on output, productivity, and product quality – and ultimately on incomes – through better access to inputs, timely payments, and improved productivity with new investments. Case studies indicate that private VC programs can lead to double digit annual growth in output and productivity. For example, case studies of the sugar and dairy sectors in East Europe show how new private contracts and farm assistance programs caused output, yields, and investments to grow dramatically (Gow et al, 2000; Dries and Swinnen, 2004; Swinnen, 2006). A major IFPRI-FAO study finds that contract broiler farmers are significantly more efficient and produce higher profits than independent farms in the Philippines and Thailand (Gulati et al., 2005). Moreover, farm profits are higher through lower production and marketing costs for contract farms compared to independent smallholders in VC schemes for milk, broilers and FFV in India (table 6). Maertens et al. (2006) find that the benefits from contract-farming in horticulture production in Senegal in terms of higher rural incomes are substantial (figure 2).

**Table 6: Production and transaction cost of milk, broiler and vegetable production in contract and non-contract farming in India (Rs/ton)**

Commodity	Contract farming			Non-contract farming		
	Production cost	Transaction cost	Total cost	Production cost	Transaction cost	Total cost
Milk	5,586	100	5,686	5,728	1,442	7,170
Broiler*	808	38	846	27,322	90	27,412
Vegetable**	1,485	35	1,520	1,630	437	2,067

Note: For broiler, the firm provides free chicks, feed and medicines to the contract farmers. Vegetable costs refer to spinach.

Source: Birthal, Joshi and Gulati, 2005.

**Figure 2: Household income (in 1,000 FCFA) from different sources for contracted and non-contracted horticulture households in Senegal**


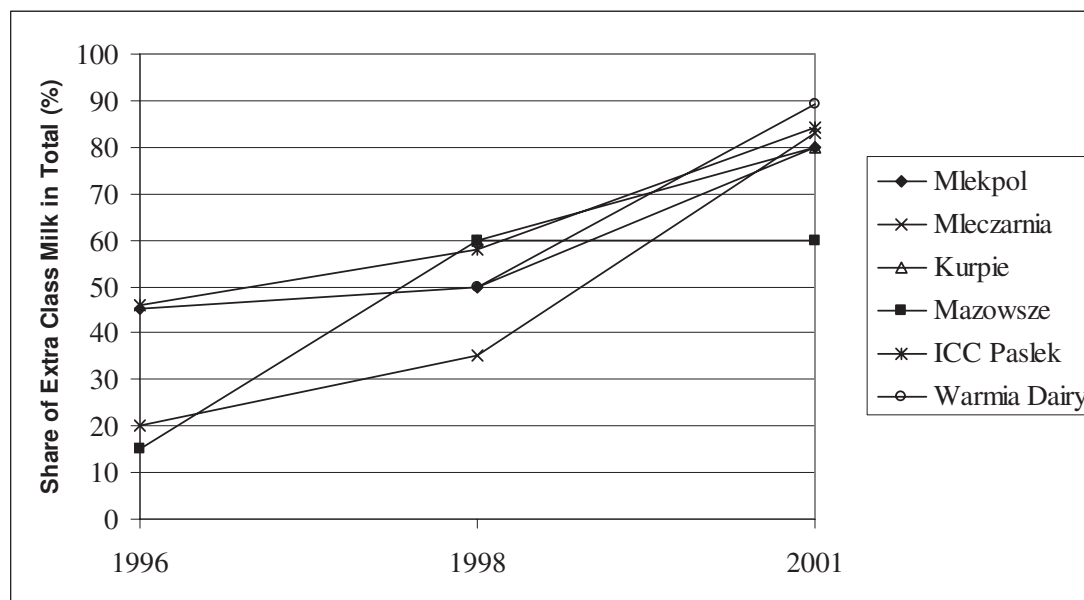
Source: Maertens et al., 2006

In their survey of CIS agri-business enterprise executives, White & Gorton (2004) concluded that various contract support measures had caused (separately) an average increase in yields of around 10%. The measures with the greatest impact on yields were specialist storage (especially cooling equipment in the dairy sector), veterinary support and physical inputs. Specialist storage in the form of on-farm cooling tanks has been particularly important in raising yields and quality in the dairy sector, an effect also found in other countries (Dries and Swinnen, 2004). Market measures such as prompt payments, guaranteed prices, and market access also had large positive effects.

Quality of output also improved due to these measures. In the case of Polish dairy farms, milk quality rose rapidly following contract innovations by dairy processors in the mid 1990s. The share of the market held by highest quality milk increased from less than 30% on average in 1996 to around 80% on average in 2001 (figure 3). VC loans and loan guarantee programs contributed strongly to this by encouraging farm investments. In the Polish study, more than three quarters (76%) of all farmers in the

survey made investments in the past years, including many small farmers of less than 10 cows (Dries and Swinnen, 2004). Dairy loans are used for investments in enlarging and upgrading the livestock herd (30%) and cooling tanks (56%). Moreover, dairy assistance in the form of guarantees for bank loans helped farm investments. Also, programs which assist farms in accessing inputs (mainly feed) enhance investment indirectly by lowering input costs, or reducing transaction costs in accessing inputs, and consequently, through improved profitability.

**Figure 3: Share of extra class milk in total deliveries in Poland\***



\* Dairy companies in the North East of Poland  
Source: Dries & Swinnen, 2004

Successful state-controlled VC programs exist. However, some case-studies point out that state-controlled VC is generally less effective in realizing farm productivity growth than private VC. For example, in Ghana, liberalisation of the cotton market and privatisation of the Ghana Cotton Company induced more extensive VC programs including timely plowing services, reliable fertilizer and pesticide supplies, prompt payment after harvest and even plowing for farmers' food crops (Poulton, 1998). As a result of improved farm assistance programs cotton production and yields increased dramatically (Poulton, 1998). Another example from the peanut industry in Senegal by Warning and Key (2002) illustrates this further. After independence in 1960 the state began the confectionary peanut program (ABP – *Arachide de Bouche Programme*) which grew into an outgrower scheme with 32,000 farmers providing peanuts destined for direct consumption. The ABP was completely privatised in 1990 and VC was extended from marketing contracts under state-controlled VC to production contracts in which the company handles all aspects of production, including selection and training of contracting farmers, provision of inputs, close monitoring of production, collection and processing of the harvest and export of the produce, mainly to the EU. Comparing the private ABP VC program with the state-controlled VC program of the majority state-owned company SONACAS for oil-peanut processing, reveals that this state-controlled VC program has much lower yields than the private VC program of ABP (800 kg/ha versus 1300 kg/ha) and that they have much lower credit repayment rates (58% compared to 98%). In addition, participation in the ABP program was found to significantly increase the income of farmers and improve their living conditions.

Indirect effects emerge through (1) cross-company spillover effects and (2) household and farm spillover effects.

Cross-company spillovers occur as firms competing for the same suppliers, and their fixed inputs, are forced to offer similar contractual arrangements. For example, in the case of the Slovak sugar sector, competition induced other sugar processors to introduce similar contracts. With some delay, this resulted in increases in productivity in the rest of the sugar sector. Other studies confirm the importance of this competition effect. Noev et al. (2004) and Dries et al. (2004) find that, respectively, in the case of the Bulgarian dairy sector and in contracting by modern retail companies in Croatia, competition for suppliers forces other companies to replicate farm assistance programs in order to secure supplies. This issue of competition and cross-company spillover effects is dealt with more explicitly in Swinnen and Vandeplas (this volume).

Household and farm spillovers occur as households' risk reduces; their access to capital increases and the productivity of non-contracted activities increases. First, VC does not only imply the provision of inputs, working capital and technical assistance to farmers, it also implies guaranteed sales, often at guaranteed prices. This comes down to decreased marketing risk for farmers. In addition, coordinating firms share in the production risk of farmers through ex ante provision of inputs and credit. Reduced production and marketing risks improves stability of farmers' income, which is an important benefit for farmers operating in high risk environments and in the absence of insurance markets<sup>38</sup>. Second, credit arrangements and prompt cash payments after harvest in VC programs improves farmer's cash flow and access to capital. This might ease farmers' financial constraints and benefit investment in other farm and non-farm activities. This effect is particularly important in the case of capital market imperfections. Third, contract-farming can lead to productivity spillovers on other crops, resulting from management advice, access to improved technologies, better input use, etc.

A number of empirical studies provide evidence for these household spillover effects. In a study on VC in South and Southeast Asia, Gulati et al. (2005) show that there is significantly less variation in yields and prices during the year for contract broiler farmers in India because they share risk with the contracted firm. A study on contracted vegetables in Uganda by Henson (2004) shows that there are important benefits for rural households from reduced risk and improved access to credit from vegetables production under contract in Uganda. Govereh and Tayne (2003) find important spillover benefits from VC in contracted cotton production on increased productivity on non-contracted activities.

Another illustrative example comes from Minten et al. (2006) on the FFV sector in Madagascar, one of the poorest countries in the world. The vast majority of FFV export from Madagascar goes through one company, who has regular contracts with five supermarkets chains in Europe. The company buys vegetables from more than 9,000 small farmers based on contracts. The firm provides seeds, fertilizer and pesticides and engages in intensive monitoring and extension advice. Farmers largely benefit from this contract production through a combination of effects. The firm teaches farmers better technologies and management practices, such as the use of compost, and this results in productivity spillovers on rice with yields being 64% higher on plots under contract. In addition, smallholders who participate in contract-farming have higher welfare, more stable incomes and shorter lean periods.

There are a number of studies specifically examining the motivations of farmers to engage in contract-production. These show that guaranteed sales and prices, access to inputs and credit are the most important motivations rather than direct income effects, which further proves the importance of household spillover effects from contract-farming. For example, table 7 shows how the dominant motivation for farms in Central Europe at the end of the 1990s was guaranteed access to markets (52% of the farms listed this as their primary motive) and to a lesser extent guaranteed prices (21%). The motivations for small cotton farmers in southern Kazakhstan to enter into contracts with gins are

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<sup>38</sup> Guaranteed prices can also work counterproductive for farmers. For example, Gulati et al. (2005) point out that profits for contracted swine producers in the Philippines and Thailand were much lower than for independent producers in 2002. This was in part due to the strengthening of pork prices during the year, which did not benefit contracted farmers producing at guaranteed fixed prices.

mainly the improved access to credit (table 8). For FFV farmers in Senegal, guaranteed market access and access to inputs are the most important motivations for farmers to sign contracts while in Madagascar this is income stability and shorting of the lean period (table 9).

**Table 7: Contract Motivations for farms in Central Europe**

Most Important Reason for Contracting (%)	Czech	Slovak	Hungary
	1999	1999	1997
Higher prices	9	8	10
Stable prices	7	22	33
Guaranteed sales	64	50	43
Pre-payment	7	13	3
Access to credit	0	0	9
Access to inputs and assistance	7	6	2
Other	6	2	0

Source: Swinnen, 2005

**Table 8: Contract Motivations for Cotton Farms in Kazakhstan, 2003**

Reason for contracting (%)	Yes	No	Most important reason
Guaranteed product sales	9	91	8
Guaranteed price	4	96	3
Access to pre-financing	81	19	75
Access to quality inputs	11	89	10
Access to technical assistance	0	100	0
Other	4	96	3

Source: Swinnen, 2005

**Table 9: Contract Motivations for FFV farms in Sub Sahara Africa**

Reasons for contracting (%)	Madagascar	Senegal
	2004	2005
Stable income	66	30
Stable prices	19	45
Higher income	17	15
Higher prices		11
Guaranteed sales		66
Access to inputs & credit	60	63
Access to new technologies	55	17
Income during the lean period	72	37

Source: Minten et al., 2006; Maertens et al., 2006

### *Equity Effects*

There are two potential equity issues with VC processes. The first concerns the distribution of rents in vertically coordinated food supply chains. The second concerns the participation and exclusion of smallholders and poorer farmers in contract-farming.

First, VC implies sharing risks, costs and benefits between the coordinating firm – mostly food processors, exporters and retail chains – and farmers / suppliers. By introducing an interlinked contract, farms can access credit, inputs, etc. which were unavailable before and processing companies can have access to higher quality and timely supplies. Productivity and therefore income increases for the supply chain as a whole. However, a key question is who benefits from this increase in efficiency and total income? If the supplier and the processor benefit, both parties share in the gains from the institutional innovation, and everybody is better off. However, if the processing firm can set the terms of the contract such that it captures most or all of the rents, the productivity growth may not benefit the farms; and interlinking may even bestow additional monopoly power upon the processing company. Contract-farming has often been criticized as being a tool for agro-industrial firms and food multinationals to exploit unequal power relationships with farmers and extract rents from the chain (Warning and Key, 2002). However, our review of empirical evidence on the effects of VC presented above indicates that farmers do share importantly in the benefits of contract-farming and VC.

Second, the capacity of emerging VC in agri-food supply chains to serve as an engine of pro-poor economic growth critically depends on the types of farmers that are included in contract schemes. VC has the potential to affect the way income is distributed within a rural economy and can exacerbate existing patterns of economic stratification (Warning and Key, 2002). If agro-industrial firms prefer to contract with wealthier farmers, then poorer households will be excluded from direct benefits. There are three important reasons why this might be so. First, transaction costs favour larger farms in supply chains. Second, when some amount of investment is needed in order to contract with or supply to the company, small farms are often more constrained in their financial means for making necessary investments. Third, small farms typically require more assistance from the company per unit of output.

However, there are also reasons why agro-industrial firms do contract with smallholders and poorer farmers. First, the most straightforward reason is that companies have no choice. In some cases, small farmers represent the vast majority of the potential supply base. This is, for example, the case in the dairy sector in Poland and Romania, and in many other sectors in Eastern European countries (Swinnen, 2006). Second, case studies from transition countries suggest that company preferences for contracting with large farms are not as obvious as one may think. While processors may prefer to deal with large farms because of lower transaction costs in *e.g.* collection and administration, contract enforcement may be more problematic, and hence costly, with larger farms. Processors repeatedly emphasized that farms' "willingness to learn, take on board advice, and a professional attitude were more important than size in establishing fruitful farm-processor relationships". Third, in some cases small farms may have substantive cost advantages. This is particularly the case in labour intensive, high maintenance, production activities with relatively small economies of scale. Fourth, processors may prefer a mix of suppliers in order not to become too dependent on a few large suppliers.

Empirical studies and interviews with companies in Central and Eastern Europe and Sub Sahara Africa generally confirm the main hypotheses coming out of global observations: transaction costs and investment constraints are a serious consideration; and companies express a preference for working with relatively fewer, larger, and modern suppliers (Swinnen, 2006; Maertens et al., 2006). However, empirical observations show a very mixed picture of actual contracting, with much more small farms being contracted than predicted based on the arguments above. In fact, surveys in Poland, Romania and CIS find no evidence that small farmers have been excluded over the past six years in developing supply chains. In the CIS, the vast majority of companies have the same or more small suppliers in 2003 than in 1997 (Swinnen, 2006; World Bank, 2005). Also for the peanut sector in Senegal, no evidence was found for a bias in the participation of farmers in contract-schemes towards better-off households (Warning and Key, 2002).



A case-study on FFV exports from Senegal by Maertens et al. (2006) finds that relatively wealthier households have a better access to contracts with agro-exporting firms. However, the overall equity effects of VC are nuanced here. The export of FFV from Senegal to the EU have increased considerably during the past decade but due to increasingly stringent food standards, the VC system is changing since the past couple of years towards fully integrated production on agro-industrial holdings. This has decreased contract-farming and increased employment on agro-industrial farms. The study shows that contract-farming is biased to household with more land, livestock and other assets while employment in the agro-industry is not. The effects on income, from both contract-farming and agro-industrial employment are significantly positive but contract-farming has a large effect (figure 2). This suggest that, as smallholder contract-farming and large-scale industrial farming reach different groups of the poor, mixed VC systems are best suited to reduce adverse equity effects.

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## Contracting Issues at Various Levels of the Value Chain

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### INTRODUCTION

Agro-enterprises in most developing countries face severe competitive disadvantages compared to agro-enterprises in developed regions. Sources of primary supply often are unreliable with respect to quality and timeliness, and tend to be inefficient due to small scale of operation and geographical dispersion. Infrastructure services – including from roads, energy, ICT – are costly when even available. Many countries lack publicly supported market information, quality and safety assurance and certification systems. Financial and risk management systems are underdeveloped and the costs of debt investment capital are often high.

To improve efficiency and competitiveness, agro-enterprise firms must be linked together in value chains and clusters so they can coordinate actions to reduce inventories, improve logistics and introduce advanced ICT systems. Competitiveness in high rent chains requires coordinated and tightly aligned actions to support product innovation and differentiation, including branding, as well as traceability and certification systems (Gereffi, Humphrey, Sturgeon, 2003). While the building of competitive value chains depends mostly on inter-firm trust, alliances and information flows (Humphrey and Schmitz, 2001), little is said in the value chain or supply chain management literature about contracting. Nevertheless, contracting – formal and informal – is a key mechanism for inter-firm vertical and horizontal coordination. The more environments are conducive to contracting, the more rapid will be the development of competitive value chains.

Largely because of gains in efficiency and value chain performance, the percentage of agricultural product value produced under contracts is increasing at a rapid pace in developing as well as developed countries. According to Key and MacDonald (2006), the share of farms contracting in the USA has remained stable over the past decade but as of 2003 accounted for 39 percent of the value of agricultural production – up from 11 percent three decades earlier. In Brazil, 75 percent of poultry production is coordinated via contracts; in Viet Nam there are indications that 90 percent of cotton and fresh milk, 50 percent of tea and 40 percent of rice are being purchased by enterprises through contracts (figures reported in Da Silva, 2005).

Thus far, contract farming has received the bulk of attention with respect to contracting in the agricultural sector - particularly in developing countries. Contract farming is not new but it is growing in importance in both developed and developing regions (Da Silva, 2005). A lot of case material has been assembled in order to assess advantages and disadvantages of contract farming, contract models and specifications, motivations for entering into contracts, and factors affecting success and sustainability (e.g. Minot, 1986; Glover, 1994; Key and Runsten, 1999). Little and Watts (1994) is a collection of case studies covering contract farming experiences and issues in sub-Saharan Africa. Glover and Ghee (1992) characterized contract farming in South East Asia [Reported in Eaton and Shepherd (2001)]. Eaton and Shepherd (2001) reviewed contract farming based on case studies from all developing regions, and drew lessons for developing and managing contracts. Singh and Asokan (2005) examined experiences of contracting between agro-processing firms and farmers in India.

While contract farming has received considerable attention in developing regions, notably less attention has been given to policies, programs and institutional frameworks to foster and strengthen contractual relations at various levels of value chains. There is as a consequence a lack of case study materials and empirical assessments to reliably appraise downstream contracting issues.

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Between 2000 and 2005, FAO conducted a series of case studies and regional workshops on agribusiness development and farm-agribusiness linkages. While these cases mainly focused on farm-agribusiness linkages, broader policies and institutional support requirements for agribusiness development and business linkages were covered in the case studies and regional workshops. The findings from these cases and workshops point to several specific issues that can be expected to affect the development, success and sustainability of contracting at various levels of value chains in developing regions.

This paper will draw on the findings from the FAO farm-agribusiness linkages study, as well as complementary case studies carried out on contract farming (Eaton and Shepherd, 2001) and a recent report by Da Silva (2005) on the growing role of contract farming in agri-food systems development, to identify important contracting issues in the agricultural value chains of developing regions. Since the case study material mainly relates to farm-agribusiness linkages, the relative importance of issues identified on the basis of these FAO case studies clearly will require further attention and validation. Nevertheless, they should give a first indication on the most important issues from the perspectives of value chain stakeholders in all developing regions.

The structure of the paper is as follows. The second section briefly identifies the sources of FAO case material on contract farming, agribusiness development, and farm-agribusiness linkages. The next three sections identify key issues based on the FAO case material, with cross reference to findings from others studies as appropriate. The first of these sections summarizes the stakeholder views on the main advantages and disadvantages of contracting. The second identifies key success factors and constraints affecting agribusiness linkages. The third identifies four key policy and institutional issues that emerge from all three regions covered by the FAO cases. The penultimate section briefly three identifies issues that did not emerge as major stakeholder concerns in the FAO cases and workshops, but are expected to be critical for contracting among post-production agro-enterprises. Conclusions and recommendations are given in the last section.

## **FAO CASE STUDIES**

Over the past decade, market liberalization and governmental decentralization policies have interfaced with globalization and urbanization trends to dramatically transform social, political, economic and cultural lives. In this context of rapid change, FAO launched two complementary appraisals in 2000. One dealt with the specific issue of contract farming; the other was a cross regional appraisal of strategies and programs for supporting agribusiness development with a particular focus on strengthening farm-agribusiness linkages.

### ***Contract Farming***

The appraisal of contract farming was based on a series of case studies covering contract farming arrangements in seven countries: Colombia, Guyana, India, Malawi, Croatia, the Philippines and Kenya. Additional information on contract farming arrangements was provided by agribusiness firms in Malaysia, Thailand and Pakistan. The case studies addressed the advantages and problems of contract farming, conditions for success, contract farming models and the specifications of contracts. Guidelines based on the findings were presented in “Contract Farming: Partnerships for Growth” (Eaton and Shepherd, 2001).

### ***Farm-Agribusiness Linkages***

The purpose of the farm-agribusiness linkages cross regional appraisal was to appraise trends, opportunities, and capacity building needs on the basis country case studies and the views of value chain stakeholders actively involved in agribusiness development and linkages in one manner or another.

The cross-regional appraisal started with a series of country studies in Asia (covering Cambodia, India, Indonesia, Malaysia, Nepal, the Philippines, the Republic of Korea and Thailand), followed by regional workshop held in September 2000 in Bangkok, Thailand (FAO, 2000). The main objectives in Asia were to characterize country experiences on the development of agribusiness linkages, and to

develop recommendations on strategies and approaches for strengthening the linkages between farmers and agribusiness firms. The overall picture emerging from the country studies and consultation was that immense opportunities exist for agribusiness in Asia based on stronger partnerships between farmers and processors.

During 2001 and 2002, case studies and a regional workshop on agribusiness linkages were carried out in Latin America (Santacoloma, Suárez, Riveros, 2005). Twelve case studies were carried out in seven countries: Argentina, Chile, Ecuador, Colombia, Costa Rica, Guatemala, El Salvador. Different types of organizations were covered by the cases. Seven of the cases were based on cooperatives, two on somewhat less formal producer associations, two involved privately own processing and marketing businesses, and one was a community-based business. The country cases and workshop in Latin America showed that the strengthening of business linkages and contracts enabled commercial ventures to move forward and adapt in highly competitive environments. A particularly important issue arising in the Latin America cases was the need to improve negotiation and compliance capabilities. A follow up workshop was held to further discuss capacity building priorities and approaches in Peru in late 2003 (Santacoloma and Riveros, 2005).

Work in Africa began in 2002 with preparation of five case studies (Rottger, 2004) covering three or four agribusiness models in each of Kenya, South Africa, Uganda, Ghana and Nigeria. These cases, as well as other contributed cases, were discussed during a regional expert consultation held in early 2003 in Nairobi, Kenya (Rottger, 2005). The purpose of the consultation was to identify opportunities for strengthening farm-agribusiness linkages, and identify possible actions to be implemented by government institutions, private sector organizations and NGOs. The consultation concluded that contracts and formal agreements assist in establishing successful farm-agribusiness linkages – but that building trust and mutual accountability is far more important since in many cases contract enforcement is weak or not cost effective.

## **STAKEHOLDER ADVANTAGES AND DISADVANTAGES**

The FAO agribusiness linkages cases and regional workshops showed that there are strong commonalities in stakeholder views about the advantages and disadvantages of stronger linkages and contracts between farmers and agribusiness firms – mainly agro-processing firms but also exporters. Similar advantages and disadvantages for farmers and the firms contracting with the farmers were identified by Eaton and Shepherd (2001). Da Silva (2005) summarized and further elaborated drawing on other references. The rest of this section is adapted from Da Silva (2005), integrating complementary observations from case material.

### ***Advantages for Farmers***

Provision of inputs – Inputs can be provided by agribusiness firms, thereby reducing uncertainties associated with input availability, quality and costs. Failures in input markets can be circumvented and the economies of scale allowed by the larger purchases of inputs by agribusiness firms can be passed on to farmers. Input quality and adequacy is ensured and can result in higher productivity and higher returns.

Provision of services – Mechanization, transportation and other services can be provided by agribusiness firms, often at lower costs than otherwise available to the farmer.

Technical assistance - Technological assistance often is offered by the contracting firm, or is made available through third parties. Farm production and management skills are enhanced by the technical assistance provision, leading to spill-over benefits for other enterprise activities.

Market outlets and prices - A market outlet is secured for the contracted production, and so the uncertainty and the transaction costs involved in the search for markets are reduced. Uncertainty about sales price is often reduced, since contracts typically specify at the beginning of the growing cycle the prices to be paid at product delivery.

Access to credit – Under a resource provision contract, working capital credit is typically supplied in kind via input provision. The contract firm sometimes offers investment credit for the acquisition of machinery, buildings, etc. Financial services often can be guaranteed by the existence of the contract between the borrower and the agribusiness firm.

By-products - By-products and residues from the contracted farming activity can be used in complementary farm enterprises. Increase in household maize production following fertilization of cotton is a common example from West Africa.

### ***Disadvantages for Farmers***

Most of disadvantages for farmers stem from the uneven relationship between individual farmers and the agribusiness firm. The firm often exercises power and takes advantage of information asymmetries in defining terms of the transactions.

Contract renegotiation, manipulation and “hold-up” - Substantial variations in the realization of firm expectations can lead firms to force renegotiation or to engage in contractual hold-up, including such actions as rejection of products delivered. In the absence of effective enforcement mechanisms, there is little that farmers can do to avoid the negative impacts of contractual hold-ups.

Technology prescription – One of the advantages of contracting for farmers is improved access to technical advice and inputs. This can also increase dependency on a prescribed technology package, making farmers vulnerable to mistakes or manipulation by agribusiness firms. In many cases firms minimize their risks by specifying higher than necessary levels of inputs, and as a consequence increase the production costs of the farmers.

Price determination – Agribusiness firms often propose the prices paid under the contracts, and in doing so might intentionally avoid transparency in price determination. Formula prices related to quality attributes and hard-to-observe criteria that require laboratory measurement lend themselves to manipulation.

Loss of flexibility - Bound to a crop or livestock enterprise by a contract, farmers cannot adjust production mixes so as to benefit from market opportunities. Over time, farmers also can lose contacts with other intermediaries, lenders and input providers. Once these linkages are broken, they can be difficult to re-establish leading to dependence on the contract partner and further loss of flexibility.

Social and cultural disruptions – In societies where the division of labour and family responsibilities are shared by males and females in distinctive ways, contracts can significantly impact on gender roles and resources access. Social tensions might arise when the benefits and burdens of contracts differentially affect men and women or particular households within communities.

Dependency - Firms often provide social services and do small favours to farmers beyond the requirements of contracts. Farmers can develop a reliance on the firm to provide such services and favours. This weakens a farmer’s bargaining position and reinforces the firm’s ability to exercise monopsonistic conduct.

### ***Advantages for Agribusiness Firms***

The main potential advantages to agribusiness firms are as follows:

Assured supply – With contracts, firms can schedule deliveries so as to optimally utilize their processing capacity and distribution infrastructure. They can also better coordinate product delivery with the timing of the demands from their own clients. Firms can also gain greater control over conformity to desirable product quality attributes and to safety standards.

Access to land - Access to the large land areas needed by agribusiness enterprises may be precluded by legislation that caps farm sizes or exclude private companies from land ownership. Contracting allows circumventing these limitations.

Improved financial conditions and services - Reduction of risk in a firm’s supply chain and the economies of scale associated with contracting operations can improve the conditions available to the



firm from financial institutions. Governments in several countries also provide incentives and subsidies to promote contracting, including tax breaks, profit repatriation flexibility, tariff reduction for imported inputs, etc.

Labour costs - Labour costs, including wages, social benefits, supervision and training, can represent a significant share of production costs in vertically integrated agribusiness firms. Farmers will use family labour and when hiring, they may not be bound to the same labour laws as agribusiness firms. Hence, labour costs tend to be lower under contracting schemes.

Expansion and contraction of production - Without fixed assets in land or specialized housing for animals, for example, agribusiness firms have greater flexibility to expand or reduce operations. This allows better adjustment to market developments.

### ***Disadvantages for agribusiness firms***

As for farmers, agribusiness firms incorporate new risk sources in their operations when opting for contractual arrangements with farmers. These risks bring disadvantages for the use of contracts.

Risk of contractual hold-ups - Just as a firm may be prone to renege on contractual terms when market conditions change, a farmer may be compelled to sell all or part of his or her production to a third party when prices are higher outside the contractual bond. This is especially problematic where alternative markets for the crop or livestock grown under contracts are easily accessible and where contractual enforcement is weak. Contractual hold-ups by farmers, known locally under terms such as “pole vaulting” and “side-selling”, were identified in the Asian cases as a particularly important risk to firms.

Transaction costs - A contracting firm will typically be linked to large numbers of farmers, scattered over wide regional areas. Managing a commercial relationship with a myriad of partners is a complex task, requiring investments in personnel, in controls and in monitoring systems. The logistical costs tend also to be high when inputs must be distributed and production assembled by the contracting firm.

Inputs diversion - In resource provision contracts, a common problem is use of the distributed inputs in alternative crop and livestock enterprises. Farmers may use fertilizers in their subsistence crops or may feed domestic herds or flocks with feedstuffs provided for the contracted animal rearing.

Support service costs - In many contracts, the costs of extension services, transportation services, financing, quality monitoring and other services are the responsibility of the agribusiness firms. Such new costs must be internalized and can lead to a competitive disadvantage compared to firms that can access supply without paying these costs (e.g. by encouraging side selling).

Loss of flexibility - Bound by a contract, a firm is precluded from sourcing from alternative suppliers when economic conditions would so advise. Contracting firms that honour their contractual commitments and may as a result lose competitiveness.

In summary, there are potential benefits and costs for all partners involved in contract farming. The same is true of all contracts and many of the potential benefits and costs identified above will be relevant to contracting at different levels of value chains. One of the first steps in extending knowledge about contracting in agricultural value chains will be to further clarify benefits and costs for all relevant stakeholders along value chains.

## **SUCCESS FACTORS AND CONSTRAINTS**

The case studies and workshops from Asia, Latin America and Africa identified a large number of success factors and constraints affecting farm-agribusiness linkages. Taken together the factors identified give an illustrative range of issues that would have to be addressed in establishing successful and sustainable contracting along value chains. In many cases, successful contracting might well depend on broader macro policy changes and developmental circumstances.

### *Success factors*

Most of the important success factors identified depended directly on the performance and will of the contracting partners. These included:

- technical upgrading of technologies;
- guaranteed markets for farmers and in many cases better prices;
- awareness creation that farming is a business;
- wide participation in decision making and transparency in management of resources;
- timely delivery of inputs for production;
- prompt payment to farmers for their produce;
- adequate provision of technical and managerial support;
- education on GAP standards and certification of farmers.

Other success factors were beyond the control of the contracting parties:

- solid and expanding domestic markets;
- explicit public and private cooperation policies;
- high levels of education and training;
- extension services provided by non-governmental organizations;
- improvements in road infrastructure.

### *Constraints*

The main constraints to establishing agribusiness linkages identified in Asia, Africa and Latin America related to broader policy and developmental issues. Some of the identified constraints could be addressed, or at least mitigated, through contracts along value chains, while others could not. The constraints that could not easily be addressed through contracts along value chains:

- inconsistent and not transparent business rules and regulations;
- poor tax administration and high levels of corruption;
- poor monetary policies leading to high interest rates and artificial exchange rates;
- poor co-ordination and co-operation between the public and private sectors;
- research and development policies are not co-ordinated with agro-industry policies;
- low levels of education and training among the rural population and limited skilled labour;
- limited capacity to save and invest;
- lack of adequate infrastructure - road, water, electricity, communications, storage.

The broader constraints that could be addressed or at least in part through improved business linkages and contracts along value chains included:

- limited effective demand for products;
- delays in payment to agribusiness firms by their clients;
- insufficient local suppliers of processing equipment, packaging and ingredients;
- not enough space on exporting ships and lack of storage facilities at ports;
- business and industrial development strategies lacking;
- little information on markets, prices, trends, or key market players;
- high cost of raw materials for both farming and processing;
- extension agents lack skills required to increase farmers' business skills;

## **POLICY AND INSTITUTIONAL ISSUES**

The case studies and regional workshops pointed to four cross-cutting considerations and challenges in establishing successful and sustainable business linkages. These would appear to be important issues to address in efforts to promote and support contracting at all stages of agricultural value chains.

### ***Enabling environments***

All the case studies and workshop indicated that a fundamental prerequisite for agribusiness development and farm-agribusiness linkages is an enabling environment. No successful contracting scheme can exist or remain sustainable where the institutional and political setting is not conducive to it. The importance of the policy and institutional framework cannot be overemphasized - governments wishing to promote farm-agribusiness linkages via contracts should start by assessing, streamlining and expunging restrictive features (Da Silva, 2005).

Problems relating to enabling environments were particularly stressed in the African case studies and consultation. There was unanimity in the African consultation that government's main role is to create an enabling environment for business development which includes providing macro-economic stability, investment friendly policies, and infrastructure development. The lack of an enabling environment was emphasized in the Nigeria case study. Rother (2004) reported that there is not specific national policy that focuses on development of agribusiness in Nigeria, including issues such as quality standardization, packaging, transport and marketing. Other enabling environment problems reported for Nigeria were the lack of infrastructure, particularly electricity, high cost of funds, uncertainty and lack of confidence about government policies towards the private sector, and a weak and inconsistently applied regulatory framework. While Nigeria often is signalled out, most of the same difficulties are faced by agribusiness firms in other African countries.

Improving the enabling environment also was identified as a top priority in the Asian cases and consultation. The Cambodia case, for example, showed that due to the lack of policy guidelines, farmer contractors are not well protected from disadvantages resulting from the contractual arrangements.

One issue raised in the regional consultations and workshops was the importance of the formal legal framework for contracts among agro-enterprise firms. While the establishment of a legal framework for contracting was considered to be a necessary condition, this was not seen as sufficient since in most cases the contracting parties, particularly farmers, cannot afford to seek enforcement of contracts through judicial systems. The existence of an appropriate legal system for contracts is likely to matter more for contracting among processing, exporting, transport and retail firms than do the legal frameworks for contract farming.

### ***Facilitation and linkage programs***

All of the cases showed that programs and mechanisms to bear transactions costs and public goods dimensions of building linkages are extremely important. While the contract farming literature indicates that contracts tend to be initiated by the contract firms, the FAO cases showed that governmental (including donor agency) and non-governmental organizations often play an initiator and facilitator role in the development of linkages.

The Asian cases and consultation showed that both the public and non-profit sectors were playing active roles in the development of business linkages and contracts. The country report from Malaysia described a chili production contract between small farmers and the multinational Nestle in which a farmer organization facilitated the linkage between the farmers and Nestle. In the Philippines, the public sector, non-government organizations (NGOs) and banking institutions were assisting in the development of business linkages and contracts between growers and buyers in poultry, hogs, mangoes, and asparagus, among others. The Thailand report pointed out that active support of the government had contributed to the success of business linkages through support for upgrading, post-harvest handling and packaging of products to meet requirements of agribusiness firms.

The participants in the consultation concluded that there are several ways in which governments and non-governmental organizations might facilitate agribusiness linkages and contracts:

- development of guidelines to encourage companies to invest and at the same time provide protection to the producers;
- information dissemination on proper production and post-production technologies;
- training to strengthen leadership and management in farmers' organizations and cooperatives;
- provision of market infrastructure and information system;
- fiscal incentives for research and development, as well as training.

The Latin American workshop recommended the establishment of explicit policies and programs for the promotion and development of farm-agribusiness linkages. These policies should be oriented towards promoting the linkage formats that have the greatest potential for innovation and for bolstering competitive abilities of the relevant organizations and producers (Santacoloma and Riveros, 2005).

Based on the African case studies, Rottger (2004) concluded that successful farm-agribusiness development depends on the role played by the initiator. In general, linkages are initiated by a business entity or, more traditionally, by a government agency responsible for the development of a particular commodity. Private sector enterprises have proven faster in establishing linkages with the agricultural sector than public institutions. However there is a trade off for profit making entities between developing sustainable relationships and the costs associated with providing farmers with necessary incentives to produce.

Several of the African cases showed that NGOs in particular have proven successful in providing business advisory services including capacity building in farm management and extension services (Rottger, 2004). With under-funded government extension services and limited knowledge, experience and financial strength of many agribusiness companies, NGOs can play a fundamental role in establishing and maintaining farm agribusiness linkages.

The Africa consultation reaffirmed that farmers need to be helped to link with agribusiness as well as be the target for farm-business development interventions. There is a need for partnerships between the private and public sector. NGOs, donors and governments should take their role in support services such as education, training support, support in organising and strengthening farmers' organisations. However, several private sector stakeholders expressed concerns about the business and service activities of NGOs, and strongly advised that NGOs should place their focus on facilitation, and not get involved in operating businesses. NGOs also should be aware of not creating unfair competition by offering subsidised (and hence long-term unsustainable) incentives such as subsidised farm-gate prices, credit, and inputs (Rottger, 2005).

Cutting across all three regions, the FAO agribusiness linkages case studies indicate that the public sector and NGOs can play key roles in fostering contract development and supporting related capacity building activities. There is a need to reinforce public and non-profit sector institutional frameworks and services for promoting and supporting farmer linkages into high rent value chains. Governments should initiate promotional linkage strategies and programmes through public-private sector initiatives and non-governmental organizations (Rottger, 2004).

### ***Farmer organizations***

The important roles of farmer groups and organizations in contract farming are recognized in the contract farming literature. Glover (1987) and Glover and Kusterer (1990) indicate that farmer groups can facilitate contract management by dealing with disagreements between growers and contractors and assisting in technology transfer. Through their associations, farmers can have stronger voices in negotiation processes and in this way better protect their interests. Firms, on the other hand, can reduce transactions costs by working through farmer organizations, leaving organizations with the responsibility for organizing and coordinating individual farmers. Coulter et al (2000) argue that providing credit and distributing inputs through groups reinforces peer pressure processes and in this way discourages non-compliance with the obligations individually assumed.

The importance of farmer organizations also emerged as one of the main conclusions of the FAO cases and workshop. The Latin American regional workshop agreed that cooperatives and producer associations can help promote the development of linkages between producers and agribusiness firms. The Africa consultation similarly concluded that farmer organisations should act as intermediaries between smallholders and agribusiness, and that strengthening of such organisations is an essential for sustainable links. They further agreed that it is vital to bring together professionals for self-regulation and standardisation of practices.

Farmer organisations can offer several services to their members that can support farm-business linkages and reduce the costs firms face in working with individual, smallscale farmers. Some of the services found in the FAO cases included:

- collective input procurement,
- saving schemes,
- dissemination of extension messages,
- farm-produce collection centres,
- sorting, grading and bulking services.

Farmer organizations also played a key role in acting as the intermediary with agribusiness firms. When dealing with farmer organizations, agribusiness firms can reduce transaction costs for contract negotiations, which can be done collectively, extension services, which might be delivered to groups, and group lending, which as we saw can reduce the likelihood of default (Da Silva, 2005). Farmer associations also can assist their members in understanding and meeting market requirements through training, technology and inputs acquisition, and co-ordinating harvesting-delivery schedules (Rottger, 2004).

The FAO cases suggest that support to farmer organisations is one of the most important capacity building activities to promote farm-agribusiness linkages. Capacity building programmes are needed to assist groups to define their objectives and develop group coherence. Organizations also need training in specific management and intermediation tasks including management of savings, record keeping, marketing, and preparation of business plans. Governments can also provide accreditation for successful farmer organisations and other service providers.

The Asian and African consultations also concluded that strengthening of inter-professional associations will be critical for supporting agribusiness development as well as strengthening farm-agribusiness linkages. The role of inter-professional associations is likely to be of even greater significance for fostering and supporting linkages contracting among post-production agro-enterprises, including linkages between processors, equipment and input importers, exporters and transnational corporations.

### ***Management capacity building***

A common conclusion from all three regional workshops was that participating producers need to be given support for the development of entrepreneurial, management and negotiation skills.

In Latin America, four main areas of capacity building were identified: production planning based on market requirements; collective bargaining for production inputs and advisory services; design and use of risk management mechanisms; appraisal of costs, benefits and priorities for contract negotiations (Santacoloma and Riveros, 2005). At the farmer's level, there is a need for systematic training on quality and quality. At the farmer organization level, there is a need to improve knowledge of production and commercialization costs and prices, as well as trends and requirements in international markets. Capacities need to be reinforced for evaluation of market risks and development of new products.

The Asia consultation also concluded that farmers need adequate and appropriate training on management as well as technical assistance in production and post-harvest operations and effective and efficient market information or intelligence (FAO, 2000).

Rottger (2004) also found that training in farm level production and management skills is one way governments can intervene to develop effective agribusiness linkages. All three cases in Ghana, for example, showed that lack of production skills was major constraint, and that training provided to farmers was instrumental in helping farmers meet contractual requirements.

### **UNDER-EMPHASIZED ISSUES**

The focus of the FAO cases on agribusiness development and farm-agribusiness linkages clearly limits potential insights with respect to the strengthening of linkages and contracts among downstream firms in agricultural value chains. Some of the following issues – not signalled as major issues in the farm-agribusiness linkages case studies but covered somewhat more extensively in the contract farming literature – are expected to be critical issues as contracting increases at all levels of agricultural value chains.

#### ***Nature of the product***

Rottger (2004) noted that the nature of the product or commodity is a significant factor influencing the nature of the contracts and extent of coordination but differences in coordination and contracting requirements for different types of value chains were not systematically addressed in the FAO cases and workshops. The importance of product traits was emphasized by Da Silva (2005) in his review of the growing role of contracting in agri-food systems. As noted by Da Silva, perishable products require careful handling and synchronization of production, transportation and processing. There are high incentives to all chain actors for strong coordination and contracting. The value chain and supply chain management literature also points to the nature of the product as a critical factor influencing the nature and strength of vertical coordination in value chains. Contracting issues along value chains almost certainly will be different depending on the product and the specific requirements for chain coordination and leadership. This would appear to be an important issue for additional study and clarification.

#### ***Risk mitigation and management***

One key factor affecting sustainability of contracting will be risk management and who bears the risk under contractual arrangements. Mitigating risk is one of the most important motivations for contracting, while perception of who bears the risk is an important factor affecting the sustainability of contractual relations. The FAO cases identified sources of risk to both farmers and agro-processors but did not systematically address strategies and approaches for risk mitigation in contracts.

Da Silva (2005) notes that some risk sources can be known *a priori* and their sharing among transaction parties can be negotiated, but many sources of risk cannot be foreseen or fully covered by contractual clauses. Strategies are needed to cope with unexpected events that otherwise could undermine the contractual relationship. For example, in the case of known risks, or even in the case of so called “force-majeure” events, insurance mechanisms might be developed to provide the needed compensations. For circumstances that can not be foreseen, arbitration mechanisms need to be put in place to resolve ensuing disputes.

The related issue of mutual asset specificity was mentioned in the South Africa case (Rottger (2004) and was discussed in the African consultation (Rottger, 2005) but was not systematically assessed. Mutual asset specificity mitigates risk of contract hold-out or pole-vaulting but increases risk to changing market and consumer requirements.

#### ***Contract specifications***

Eaton and Shepherd (2001) provided basic guidelines on contract specification, but the FAO agribusiness linkage cases and workshop discussions were surprisingly silent on the details of contract specifications. This stands in rather stark contrast to much of the contract farming literature, which at least characterizes different types of contract models distinguishing categories such as resources provision contracts, marketing contracts, production control contracts, etc.

Bogetof and Olesen (2002) provide one of the most useful and concise discussions on practical features in contract design. They introduce a “rules of thumb” checklist for contract design based on

lessons from contracting in Danish agriculture. The concise but highly useful examples given make it clear that many of the problems and sources of risk identified in the FAO cases could have been addressed through more innovative and appropriate contract specifications. As Bogetof and Olesen note, many contracts are inappropriate when first developed and are improved through trial and error over a period of several years. They rightly argue that systematic attention is needed to identification of appropriate contract specifications for different needs and circumstances. There would appear to be a related capacity building in contract negotiation and compliance

## **DISCUSSION AND CONCLUSIONS**

Agro-enterprise firms are turning to business alliances and related contracts in order to manage risks, gain access resources, improve logistical efficiency, reduce inventories and, in general, achieve increased control over competitiveness factors that are beyond their firm boundaries. The shift to contracting in developing regions is most evident at the stage of primary product supply – through contract farming. In terms of government policies and programs, less attention is being given to business linkages and contracting all along value chains. Due to the severity and range of competitive disadvantages faced by agro-industries in developing regions, there are several reasons why establishment of enabling environments – policies, services and institutional frameworks – for contracting along value chains could be particularly catalytic to modern agrifood system and agro-industry development.

There is a surprising lack of attention to contracting issues in the value chain and supply chain management literature. Articles and guidelines characterizing the evolution of tightly aligned agricultural value chains tend to identify technological factors such as information and logistical technology, monitoring and measuring technologies, and economies of scale as key drivers or enablers of aligned chains. With respect to governance, much emphasis is given to mutual trust, willingness to accept a collaborative approach, equitable sharing of power and risk, etc. Although most inter-firm relationships within value chains will be governed by formal and formal contracts, contracting is not identified as a central issue.

Policy debates relating to value chains and supply chain management are focusing on national commodity strategies, fostering transparency, upgrading producer organizations, corporate social responsibility, public-private partnerships, managing shocks and risks, enabling environments, etc. With respect to enabling environments, one issue is legislation and operation of the judicial branch to support business operations. Contracting policy and legal frameworks are not specifically targeted as a key priority but it certainly will be one of the first challenges to be tackled.

Perhaps one reason for the relative neglect of contracting issues in the literature is cultural bias, reflecting circumstances in countries where supply chain management issues are being most hotly debated. The critical and pervasive role of contracts is just part of the background landscape; taken for granted and not seen as a key challenge or entry point for the forging of business linkages.

The FAO case studies and consultations on farm-agribusiness linkages point to a number of issues that are likely to affect contracting at all levels of value chains. One of the most important issues is to clarify stakeholder perceived advantages and disadvantages of linkages and contracts. The possibility of forging alliances and corresponding contracts will depend mainly on the gains of the contracting parties. In many cases autonomy and flexibility will be lost, and the contracting parties will need to perceive significant compensating gains (Key and MacDonald, 2006).

The FAO cases further suggest that the contracting firms can through their own actions substantively influence whether successful linkages and contracts can be established, but the cases equally show that many of the constraints on overall performance of the value chain – and therefore competitiveness and sustainability of the value chain - are likely to be beyond control of the firms. Contracting along value chains in developing regions will continue to be affected by the broader circumstances that constrain efficiency and competitiveness in developing regions.

The contract farming literature most often focuses on the contracting partners – farmers and the firms that offer contracts. The FAO agribusiness linkages case studies and consultations indicate that attention to enabling environments, facilitation and linkage programs, to strengthening of farmer and professional organizations, and to building technical and management skills can all play important roles in reinforcing business linkages. There would appear to be an important role for both governmental and non-governmental organizations in developing and reinforcing linkages and contracts among private sector firms. There also are risks of market distortions and unwelcome interferences, and so further attention needs to be given on appropriate value adding roles for governments and NGOs in facilitating alliances, linkages and contracting at various levels of value chains.

Due to the scarcity of information on contracting in the value chain and supply chain management literature, and the specific focus of the FAO agribusiness linkages case studies, the relative importance of different contracting issues at various levels of value chains cannot yet be determined. Appraisals based on real world experiences, such as that carried out Bogetof and Olesen (2002) for Danish agriculture, but focused on contracting among downstream agricultural firms in developing regions are clearly needed. The FAO cases point to some of the issues that require further attention.



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