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Vertical Market Structure, Commodity Exports and Trade Reform

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Abstract

In the analysis of commodity markets, comparatively little attention is paid to the fact that commodity exports from developing countries are intermediates that form inputs into the food processing and retail sectors in developed countries. This has led many commodity exporting countries to argue that access to developed country markets and the prices they correspondingly receive is determined by market structure characteristics of the downstream food sector. Given the vertical nature of these markets, they are most appropriately characterised by successive oligopoly. Moreover, the problem of successive oligopoly may also coexist with oligopsony power that is an additional determinant of commodity prices in exporting countries. In this paper, we set out a simple framework that explicitly accounts for the vertical structure of commodity markets where oligopoly and/or oligopsony power may characterise any or all stages of the downstream food chain. By characterising commodity markets in a way that explicitly accounts for vertical market structure, we can in turn explore trade policy issues facing developing country commodity exporters. Specifically, we focus on the reduction of tariffs in developed countries, the key point being that the impact of tariff reform on developing country commodity exporters is determined by the market structure characteristics of the downstream sectors. We show that the impact of trade reform is likely to be different compared to the competitive benchmark that is commonly assumed and will likely vary with specific characteristics of the vertical market structure. We highlight the effects of vertical market structure and trade reform with simulated examples. In addition, in a set-up that accounts explicitly for market structure, we show that this may also have an impact on the tariff escalation issue. We also comment on avenues for future research that arise by characterising commodity markets using the framework outlined.

Introduction

In the analysis of commodity markets, little attention is paid to the fact that commodity exports from developing countries form inputs into the processing and retailing sectors in developed countries. If these industries were generally competitive, this distinction would matter little for commodity markets which could be reasonably treated in isolation from the downstream sectors which they enter into. But the observation that these sectors are typically characterised as highly concentrated and where there has been increasing consolidation in recent years raises specific challenges for those interested in commodity market issues. Specifically, the issue of commodity exports constituting part of a vertically-related chain has important implications for how we deal with policy issues associated with commodity markets and has particular reference to the impact of globalisation on developing country exporters and the potential benefits of further trade reform. Consider three topical examples.

First, take the observation that in terms of the total value of the product that reaches consumers, the raw agricultural component typically represents a small share. This represents some of the concerns of critics of globalisation relating to inequality of the current system which is largely determined by corporate interests in developed countries. This is tied in with the perception that low and falling commodity market prices are not fully reflected in commensurate reductions in retail prices paid by developed country consumers. For example, African countries such as Burundi, Ethiopia, Rwanda and Uganda are highly dependent on exports of coffee, yet all have faced a significant decline in real prices over the past few years.[1] In key export markets such as Europe and the United States, global coffee buyers, roasters and retailers, who in total account for almost 60 percent of the share of final sales value of coffee, have benefited from lower coffee bean prices. For example, Nestlé, the second largest coffee roaster in Europe, reported a 20 percent increase in its profits in 2001, while Starbucks posted a 41 percent increase in

[1] Over the period 1998 to 2001, real coffee prices fell by 50 percent. As a result, for a country such as Ethiopia, where coffee represented 67 percent of the value of exports in 1998, the decline in world coffee prices cost Ethiopia US$ 300 million in export revenues, equivalent to 50 percent of its annual export earnings (Oxfam, 2001).

profits (Oxfam, 2001).[2] There has, however, been little formal analysis of the links between raw commodity and retail prices in developed country markets and the role of vertical market structure in influencing the distribution of surplus throughout the vertical market chain where downstream stages of this chain may be characterised by high levels of concentration. These concerns are also exacerbated by the increasing consolidation in the developed country food sectors that has been witnessed in recent years. The framework outlined in this paper addresses some of these issues where the important dimensions of market structure relate to various degrees of oligopoly at each stage of the food chain such that we have 'successive oligopoly' and where the immediate purchasers of raw commodity exports from developing countries may exercise oligopsonistic power.

Second, take the current trade negotiating round. The Doha Round of trade negotiations in the World Trade Organization (WTO) has been labelled the so-called 'development round', a key part of which will be increasing developing countries' access to developed country markets. This process will involve the reduction of tariffs on agricultural goods given that many developing countries are still major agricultural exporters and that agriculture still accounts for a large share of GDP particularly in the poorest developing countries. However, recognizing the vertically-linked nature of the food chain between agriculture, food processing and retailing, the increasing consolidation of the food industry in developed countries, may influence the magnitude of the benefits that developing countries receive from increased market access. Specifically, the downstream structure of the vertical chain will determine the nature of the perceived marginal revenue function that faces exporters of raw commodities. In this context, therefore, reducing the level of tariffs in this context will determine the increased level of market access and the distribution of the welfare effects associated with trade liberalisation. This is an issue that we address in some detail in the paper.

Third, tying the issue of accessing downstream stages of the marketing chain by exporting higher value products and the role of trade barriers is the issue of tariff escalation.[3] As is

[2] All three sectors are dominated by a small number of firms. For example, in 1995, ten firms accounted for 62 percent of global coffee bean trade, while in 1998, five firms accounted for 58 percent of sales of roasted coffee in the European market (Fitter and Kaplinsky, 2001).

[3] This issue ties in with the diversification of developing country exports that is advocated by international institutions and policy makers, in particular that developing countries should aim to export more highly-processed exports. However, the tariff that applies on high-valued exports usually exceeds the tariff on the raw commodity thus presenting a barrier to increased diversification along these lines.

well-known, tariffs on higher-processed goods are typically higher than tariffs on unprocessed goods and this is reflected in the current structure of tariffs that apply to commodity exporting countries. As such, the obvious policy prescription advocated by organisations such as UNCTAD (2002a) is that the current Doha Round should aim to reduce the degree of tariff escalation. However, such policy prescriptions typically come in the absence of any link to the vertical market structure where these differential tariffs apply. As we comment on below, such policy prescriptions may give rise to surprising outcomes when the nature of market structure that characterises the food sector in developed countries is ignored.

The overall message of this paper is that the analysis of commodity market issues that ignores the fact that commodities represent only a small part of a vertical market, where some or all parts of this vertical chain can be characterised as imperfectly competitive are missing an important part of the environment in which commodity exporters compete. By extension, understanding some of current concerns of commodity exporters related to the effects of globalisation and the impact of trade reform requires a framework that explicitly accounts for some of these key characteristics. As we show, many of the current concerns of commodity exporters regarding the distribution of the effects of declining commodity prices, the distribution of value-share throughout the commodity chain, the impact of tariffs on market access (and the commensurate welfare effects), and the impact of reducing tariff escalation can be addressed in a common framework that emphasises the role of successive oligopoly and oligopsony in downstream markets.

The paper is organised as follows. In Section 1, we provide an overview of the characteristics of the food industry in the US and the EU. This forms the basis for motivating the framework outlined in Section 2 where we use a simple model to capture various aspects of downstream market structure in a unified framework. In Section 3, we focus on the impact of trade liberalisation when downstream markets are imperfectly competitive, the main point which we illustrate here is that market power in the downstream industry is an important determinant of market access and the increase in producer surplus for any given change in the tariff on the intermediate good. In Section 4, we turn to the issue of tariff escalation and discuss recent research that suggests that, in the context of a framework where downstream sectors of the food industry are imperfectly competitive, reducing the degree of tariff escalation may affect market access of

commodity and processed good suppliers in a way that is contingent on the vertical structure of the downstream food sector. In Section 5, we conclude and discuss avenues for future research in commodity market analysis where the links between the raw commodity exporters and the downstream food sectors are made much more explicit.

It should be noted in passing that this paper provides coverage of some points that we have discussed more extensively elsewhere. For example, Sexton and Lavoie (2001) provide an overview of research in the food industry in recent years while McCorriston (2002) extends this discussion focussing in greater detail on the EU food sector. Sheldon and Sperling (2003) review econometric studies that have attempted to measure market power in the food sector. Sheldon and McCorriston (2003) discuss in more detail issues that relate to industry consolidation in developed countries and the links this has with globalisation and policy issues. McCorriston (2003) extends this discussion by considering the impact of industry consolidation in terms of both domestic and foreign acquisitions and how it may affect producer interests in developing countries as well as discussing aspects related to the impact of state trading enterprises on world trade. Sexton *et al.* (2003) outline further details of the framework which we outline below.

1. Market Structure in the Food Sector in Developed Economies

As noted in the introduction, the food industry is typically highly concentrated in developed countries at both the retail and processing stages. This is also becoming a characteristic of the food sector in some developing countries. By way of illustration, we focus specifically on these sectors in the United States and the European Union (EU).

(i) Food Processing

In the United States, a small number of large firms dominate the food-processing sector, with the top-20 food- and tobacco-manufacturing firms accounting for over 52 percent of the sector's value added in 1995. If food manufacturing is separated from beverage and tobacco manufacturing, the top-20 food-manufacturing firms accounted for 37 percent of value added in 1997, while the top-20 beverage- and tobacco-manufacturing firms accounted for 79 percent of value added (US Census Bureau, 2001). In Table 1, using a dis-aggregated data at the four-digit SITC level, we list those specific food products where the 4-firm concentration ratio was over 60 percent in 1997, the average being just below 76 percent.

Turning to food manufacturing in the EU, the data in Table 2 show that typically at the country level, average seller concentration is higher than in the United States, ranging from an average 3-firm concentration ratio of 55 percent in Germany to 89 percent in Ireland, with an average 3-firm concentration ratio across 9 EU countries of 67 percent. As in the United States, these averages hide some high levels of seller concentration for specific products in each EU country, most notably baby foods, canned soup, pet food, and coffee. It should be noted, however, that while seller concentration at the product level is high in many individual EU country markets, there are few examples of firms that dominate sales across EU countries as a whole (Cotterill, 1999).

(ii) Food Retailing

Several important differences are apparent in the food retailing market structures in the US and EU. As Table 3 reports, 5-firm seller concentration in food retailing at the national level is much higher in EU countries than it is in the US, with average 5-firm seller concentration in the former being 65 percent, compared to 35 percent in the latter. However, at the EU-wide level, 5-firm seller concentration is much lower at 26 percent (Hughes, 2002). In addition, in the US, it is important to examine concentration in food retailing at the local and regional level. Cotterill (*op. cit.*) reports that in 1998, 4-firm seller concentration averaged 74 percent across the top 100 US cities, while across major US regions, 4-firm seller concentration averaged 58 percent.

(iii) Industry Consolidation

An additional feature of market structure in the food industry in recent years has been consolidation through mergers and acquisitions which has contributed to increasing concentration. Figure 1 shows the time path of domestic mergers and acquisitions worldwide since the mid-1980s, the upward trend being readily apparent. Moreover, international mergers and acquisitions have also been increasing significantly not only involving acquisitions in developed country markets by firms located in other developed countries (which is the common feature of foreign direct investment) but also involving acquisitions in developing countries too. To give some examples, EU-based retailers such as Royal Ahold and Sainsbury have expanded into the US market (Cotterill, *op. cit*.), Carrefour and Royal Ahold have expanded into various developing country markets in Central and Latin America (Chavez, 2002; Farina, 2002; Gutman, 2002), and Wal-Mart have expanded into the EU (Hughes, *op. cit.)* and Central and Latin America food sectors

(Chavez *op. cit.*; Farina, *op. cit.*). As a result, food retailing is becoming increasingly multinational with three food retailers, Wal-Mart, Carrefour, and Royal Ahold now appear in the world's top 100 multinational corporations (UNCTAD, 2002b). In addition, as a consequence of this trend in mergers and acquisitions, food retailing in developing countries, most notably Latin America, is becoming more concentrated, with multinational firms accounting for the largest share of sales in several countries (Reardon and Berdegué, 2002). For example, the average share of the top five supermarket chains in supermarket sales in Latin America for 2001/2 was 75 percent, ranging from 47 percent in Brazil in to 99 per cent in Guatemala. At the same time the share of multinational firms in the sales of the top five supermarket chains averaged 88 percent, ranging from 18 percent in Chile to 94 percent in Guatemala (Reardon and Berdegué, *ibid.*). United States and EU-based multinational food manufacturing firms are also very prominent in some developing countries. For example, Nestlé is the leading processing firm in terms of sales in Brazil (Farina, *op. cit.*). Belik and Santos (2002) also report on the extent to which foreign-based multinational firms such as Parmalat, Danone, Unilever, and Philip Morris, have been entering the Latin American market through mergers and acquisitions. As such, with increasing levels of concentration, the vertical market framework outlined below will be of increasing relevance for commodity market issues within developing countries. In this paper, however, we focus largely on trade policy and market access issues.

2. Agricultural Trade and Importing Country Market Power

While Tables 1 to 3 are interesting in terms of characterizing the industrial organization of the food sector in developed countries, the vertical structure of the food sector will impact on how we think about policy issues, for example the impact of trade policy reform. Yet this is seldom considered by economists despite the observation that the food sector would appear to imperfectly competitive at several stages. Indeed, only in recent years have there been papers in the general economics literature considering the role of vertical market structure for thinking about (optimal) trade policy.[4] Most empirical studies of trade policy reform ignore the vertical structure of markets that characterises the agricultural-food sector and typically assume perfect competition.

By way of example, consider the recent work on the impact of protectionism in the EU by

[4] See, for example, Spencer and Jones (1992) and Ishikawa and Spencer (1999).

Messerlin (2000). In assessing the impact of tariff and non-tariff barriers, he assumed two scenarios, one where the market structure was assumed to be perfectly competitive and the other where manufacturing was assumed to be imperfectly competitive. As he showed, these alternative assumptions about market structure can have a significant influence on the net welfare and distributional effect of trade policy instruments. However, when he comes to dealing with protectionism involving the agricultural sector, he reports the perfectly competitive scenario only and assumes that the demand curve facing agriculture is the retail demand function, the implication being that imperfect competition is an inappropriate characterisation of the food sector in developed countries. This clearly conflicts with the evidence presented in Tables 1 to 3. In this section, we will therefore consider the potential impact of vertical market structure on current trade issues focusing on market access.

As a benchmark, consider a diagrammatic representation of a vertical market characterised by imperfect competition at each successive stage.[5] This is presented in Figure 2. Assume that the technology that links the successive stages is of a fixed proportions nature (and assume the conversion factor is 1:1) and that there is arm's length pricing. Since the focus is on the impact of tariffs on the upstream stage, assume there is no domestic supply of the unprocessed commodity. The retail demand curve for the final (processed) product that is sold at the retail level is given by D. Assuming neither processing nor retailing costs, if the retailing and processing sectors were perfectly competitive, equilibrium would be where the retail demand and the agricultural commodity supply curves intersect. However, if the retailing sector is imperfectly competitive, the marginal revenue curve that corresponds to this retail demand curve is given by PMR, the perceived marginal revenue function. Specifically, the slope of PMR captures the nature of competition at the retail stage. At one extreme, if the retailing sector were either a monopoly or group of firms acting as a perfect cartel, the slope of PMR would be twice that of the demand curve D. As the retail sector becomes more competitive, the slope of PMR becomes shallower as it rotates towards the demand curve. In the limit, if the retail sector were perfectly competitive, the marginal revenue curve would coincide with the market demand curve. In this vertically-related set-up, this perceived marginal revenue function is the derived demand curve facing the food processing sector. Again, assuming this sector to be imperfectly competitive, the marginal revenue function corresponding to the processing

[5] This discussion follows Sheldon and McCorriston (2003).

stage is given by PMMR, the slope of the perceived marginal revenue function reflecting competition in both the retail and food processing sectors. In this set-up, the derived demand curve facing the agricultural exporter is not the retail demand curve, but is the PMMR curve at the food processing stage.

This stylized model characterizes successive oligopoly with imperfect competition at both the processing and retail stages of the food chain. In the context of successive oligopoly, there is the 'double marginalization' problem with mark-ups characterizing the links between the import and food processing sector's output and then the processing and the retail sector's output. At the first stage, the food processing sector purchases the raw agricultural commodity from the exporting country. Assuming that a tariff is applied on the agricultural commodity, the export supply curve is given by S^T. Imports are therefore Q_M^T giving a margin of $P_P^T - P_M^T$ at the processing stage and $P_R^T - P_P^T$ at the retail stage. Export (world) prices for the agricultural exporter are given by P_W^T. Note that vertical market structure influences the extent of market access for exports.[6] If the downstream sectors were competitive, the level of market access would be given where the retail demand curve meets the export supply function at Q. In other words, market structure affects market access.

Consider now what happens of there is industry consolidation and that the form this takes is a drop in the number of firms competing at the retail stage. The impact of this is shown in Figure 3. Specifically, the perceived marginal revenue function at the retail stage shifts to PMR'. Also, because of the vertically-linked nature of the market, this has the effect of shifting the perceived marginal revenue function in the manufacturing sector. Note the effect on exporters: market access is reduced further because of industry consolidation and the price the exporter receives is also lower.

In addition, it is straightforward to add oligopsony power to this framework, an issue which is often associated with market power in downstream sectors. Suppose for example that the processors exercised oligopsony power vis-à-vis the commodity exporter. In this case, the

[6] The diagram is also consistent with the 'value-chain' approach that notes the mark-ups are relatively high for firms that constitute the downstream stages of the vertical value chain. See, for example, Kaplinsky (2000).

relevant supply curve for the processor would be the perceived marginal outlay curve which would lie above the exporters' supply curve. With a representative processor equating the PMMR curve to the perceived marginal outlay curve (not drawn), market access is further reduced and commodity prices lower. Note however that the effect of oligopsony in terms of market access and raw commodity prices is qualitatively similar to the effect of successive oligopoly.

Of course, there can be many permutations within this set-up. For example, there may be retailer market power only with the processing sector being relatively competitive. Alternatively, the food sector may be regarded as competitive vis-à-vis competition for sales but firms may exert market power with respect to upstream suppliers. This could be accounted for in the above framework by suppressing market power at any given stage or amending the framework to accommodate successive oligopsony power. The simulations below take account of these alternatives.

Within this framework, we can also consider the impact of tariff reform. This is shown in Figure 2. Assume that the initial export supply curve (S^T) is inclusive of a tariff. With a reduction in tariffs, the export supply function will now shift to S'. What is the effect of this in a successively oligopolistic set-up? The reduction in tariffs reduces costs for the manufacturing sector which in turn reduces costs for the food retailers. Market access expands, but note that the expansion in market access is considerably less than if the food sector was perfectly competitive. This can be seen by tracing down the shift in the export supply function along the retail demand curve. Note that prices at each subsequent stage come down, so that final consumers will benefit from tariff reform. However this reduction in consumer prices is less than the perfectly competitive case. This is due to a price transmission effect; specifically, the extent of competition at each stage will determine the extent to which the tariff is passed through to final consumers. Consumers gain from tariff reform but by less than they would if markets were competitive, partly because price reductions are relatively lower and that the increase in market access is dampened by the successively oligopolistic nature of the food chain. Note also that the firms that compete in the vertically-related sector also capture some of the benefits of tariff reform as their costs are reduced more than the reduction in the prices of their output i.e. the size of the firm mark-up changes. Clearly such effects would be exacerbated with industry consolidation where the price transmission effects would occur along relatively steeper PMR functions.

3. Effect of Trade Liberalisation

Using a specific linear model, we can simulate the potential impact market power in the downstream food sector has on the outcome of trade liberalisation. Further details of this exercise can be found in Sexton *et al.* (*op. cit.*). Five cases are considered that relate to alternative characterisations of market power embedded in Figures 2 and 3. They are: (i) oligopsony only (ii) oligopoly only, (iii) both oligopoly and oligopsony, (iv) successive oligopsony and retailer oligopsony, and (v) successive oligopoly and processor oligopsony.

Figure 4 depicts the absolute change in raw commodity export price from removing the tariff for alternative competition scenarios. As expected, reducing tariffs raises prices exporters receive but the extent of this is contingent on the characteristics of the downstream food sector. The simulations aptly illustrate that the effect on export prices is a decreasing function of the degree of downstream market power because an imperfectly competitive marketing sector always captures a share of the benefits of an exogenous shock of this type. Figure 4 also shows that the price increase generated from trade liberalization is dissipated considerably by significant departures from competition, especially when they occur in multiple stages of the downstream market. As is readily observed from the figure, when there is 'successive' market power, the effect on export prices is clearly greater than the impact of market power in a single stage.

The important question is the extent to which downstream market power vitiates the benefits to the developing economy of trade liberalization. This takes account of not only the price transmission effect but also the commensurate change in market access. The effect of market power on the increase in producer welfare caused by trade liberalization is more pronounced than the effect on price because producer surplus is determined both by the change in the export price and the change in output, and market power diminishes both. Figure 5 depicts the change in producer welfare from trade liberalization for alternative scenarios relating to vertical market structure. Again, the impact of market power is greater when it persists throughout all stages of the vertical chain.

Next consider the distribution of benefits from trade liberalization across producers, consumers, and firms involved in the processing and retailing stages depicted in Figures 6 and 7. If the change in producer surplus is affected characteristics of the downstream food

sector, so too will be the distribution of welfare changes throughout the downstream sectors. By way of example, Figure 6 represents the case of processor oligopsony and retailer oligopoly, while Figure 7 represents successive oligopoly plus processor oligopsony. In the case of processor oligopsony, producer and consumer welfare both decline monotonically in the degree of market power exercised while profits in the processing sector rise monotonically. A similar outcome arises in the case where we add successive oligopoly, though profits in the downstream sector decline as the index of market power rises beyond a certain level since the negative externality imposed on processors' profits when retailers increase their market power (and vice versa) dominates the higher profits earned by the retailer, causing overall marketing sector profits to fall for high levels of market power exercised at successive stages. Both Figures 6 and 7 clearly demonstrate that the distributional effects of trade reform in a set-up that allows for market power are quite dramatic. Even rather modest levels of market power enable the marketing sector to capture the largest share of the benefits from trade liberalization, and for very high levels of market power, the marketing sector captures the lion's share of the benefits. Clearly, the presence of downstream market power is an important issue when considering the impacts of trade liberalisation.

4. Tariff Escalation in Imperfectly Competitive Markets

The above discussion on the effects of policy reform when the food sector is imperfectly competitive focuses on the case where the raw agricultural commodity enters the food chain at an upstream stage. However, it is possible that commodities in semi- or highly processed form could enter at a downstream stage of the food chain. However, tariffs could apply on these products too. This scenario is particularly relevant given that an increasing proportion of international trade is in processed food commodities and where tariffs apply to both the raw and processed commodity. In the case where the tariff on the processed commodity is higher than on the raw commodity, we have the problem of tariff escalation.

Tariff escalation is a well-known problem facing developing countries that wish to gain access developed country markets where there is potentially higher returns from exporting

processed food products.[7]. However, in the context of the framework presented here, market access will be influenced by the successively-oligopolistic nature of the food market. Thus, while many commentators, international organisations and pressure groups have highlighted the issue of tariff escalation in the context of the current Doha Round, there has been a lack of formal analysis of tariff escalation when raw commodities can enter at an upstream stage and processed commodities can enter at a downstream stage, when both sources of imports are subject to tariffs and each sector is imperfectly competitive.

McCorriston and Sheldon (2003) have made an initial attempt to address this issue. They pose the question that if tariffs on raw commodities were reduced, what would be the corresponding reduction in tariffs on the processed commodity in order to avoid any discriminatory effects between commodity exporters?[8] They show that there are two effects to consider. First, the impact of the reduction in the raw tariff in this vertically-related set-up will depend on how much of the tariff reduction is passed through to the retail sector. Assuming one retail firm purchases its inputs from the domestic upstream sector and the other retailing firm imports the processed good from the world market, the reduction of the tariff on the raw commodity has a positive effect on the competitiveness of the downstream domestic retailer. This effect follows from the effect of trade reform discussed above. But the effect of the reduction in the tariff on the processed good also has to be considered. In this case, there is a 'pass-back' effect as the tariff reduction on the processed good reduces the competitiveness of the domestic retailer. This reduces the demand for the upstream good which affects upstream prices. Indeed this back-shifting effect can be positive or negative but the important point is that the back-shifting effect does not, under even fairly reasonable assumptions, cancel out the pass-through effect.[9] McCorriston and Sheldon (*ibid*) show that for a given market access rule, tariff reductions on the processed good should be less than the reduction in the raw commodity tariff. While other market access rules may give different results, the important point made by this model is that vertical

[7] For example, tariffs on raw cocoa imports into the EU are 0.5 per cent but for processed cocoa products are 30.6 per cent. Comparable data for the US and Japan are zero tariffs on raw cocoa imports in both countries, with the tariff on the final product rising to 15.3 and 21.7 per cent for the US and Japan respectively (World Bank, 2003).

[8] They assume for analytical convenience that the raw and processed commodity exporters are based in different countries. This does not dilute the generality of the results.

[9] See Ishikawa and Spencer (1999) and Colangelo and Galmarini (2001) on the impact of downstream policy changes on upstream prices.

market structure matters in determining the outcome of market access when trade policy instruments are targeted at alternative stages of the food chain.

Taken together, the above discussion highlights the fact that vertical market structure is likely to affect the outcome of trade reforms in agricultural markets. Yet there has been little research in this area as those interested in the industrial organisation of the food sector essentially assume a closed economy context while those who work on agricultural trade issues typically assume perfectly competitive markets. An important part of a research agenda on commodity market issues and the potential benefits of trade reform should emphasise a closer relationship between these two approaches.

5. Summary and Implications for Research

The starting point for this paper was the observation that commodity market research typically considers the commodity market in isolation from the downstream stages of the vertical chain which the raw commodity enters into. Given that the downstream stages can be typically characterised as imperfectly competitive, this has important implications for how we think about current policy issues. Specifically, we have shown that the effects on exporters following trade liberalisation and increased market access will likely be dependent on the nature of competition in these downstream stages. Moreover, when tariffs are applied at different stages in the vertical chain such that we can embed the issue of tariff escalation in a successively-oligopolistic framework, we have shown that the outcome of reducing effective protection will also depend on the impact of competition in the vertical chain.

There is obvious scope for further research on this issue and here we note a few (non-exhaustive) examples. The first and perhaps most obvious relates to developing a framework that can be applied to specific markets using real data rather than the artificial examples used in the text. McCorriston and Sheldon (1996) have considered the EU banana dispute in a context such as this but clearly more needs to be done. Similarly, developing the framework to incorporate the issue of tariff escalation applied with real data will also be relevant. Second, it is generally well-known that in the trade literature that when markets are imperfectly competitive, alternative trade policy instruments can have non-equivalent effects. Hence extending the framework to consider specific versus *ad valorem* tariffs and

the role of quantitative restrictions will also be relevant as the policy instrument may generate pro-competitive effects contingent on the nature of imperfect competition in the food sector. Finally, the analysis presented above takes market structure as a given and the role of developing country exporters as passive participants in the trade reform scenario. Developing the analysis such that market access rules become endogenous in a political economy sense taking into account the relative bargaining power of developing country interests and where alternative organisational forms may improve market access to developed country markets are also worthy of further investigation.

Table 1: Product Concentration Ratios in US Food Manufacturing,[1] 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/evaporat ed 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.
[1] Share of value added accounted for by the 4 largest firms.

Table 2: Concentration Ratios by Product in EU Countries[1]

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).

[1] 3-firm concentration ratios, except * which are 2-firm.

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
EU	26
United States	35

Sources: Cotterill (1999), McCorriston (2002), and Hughes (2002)

Figure 1: Domestic M&As in the Food Sector (All Countries): 1986-2002

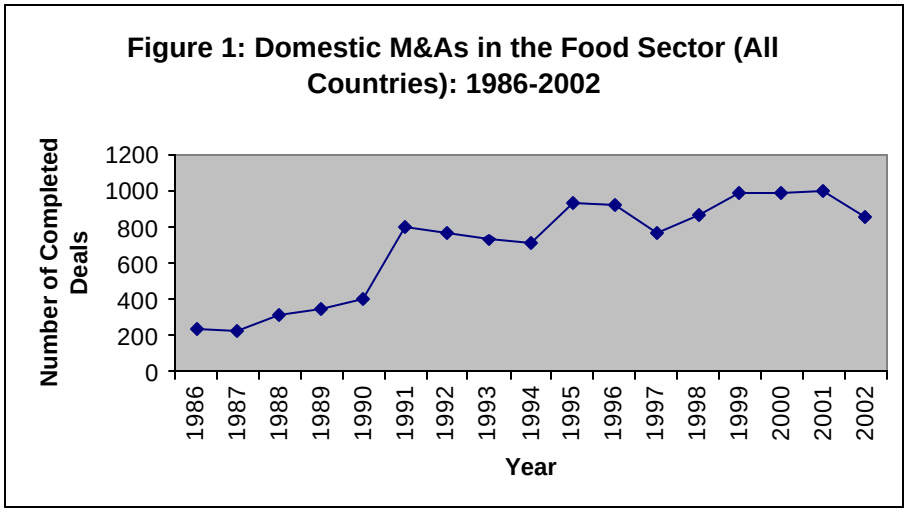


Figure 2: Trade Liberalisation with Successive Oligopoly

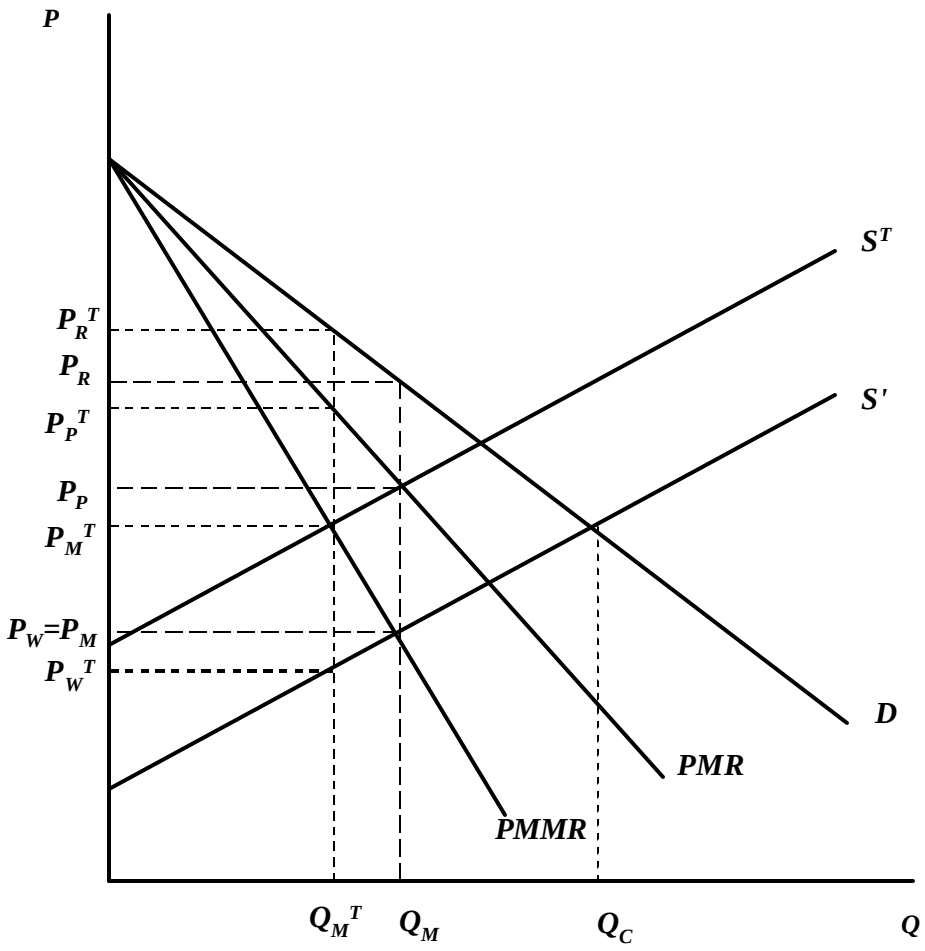


Figure 3: Increased Consolidation and Successive Oligopoly

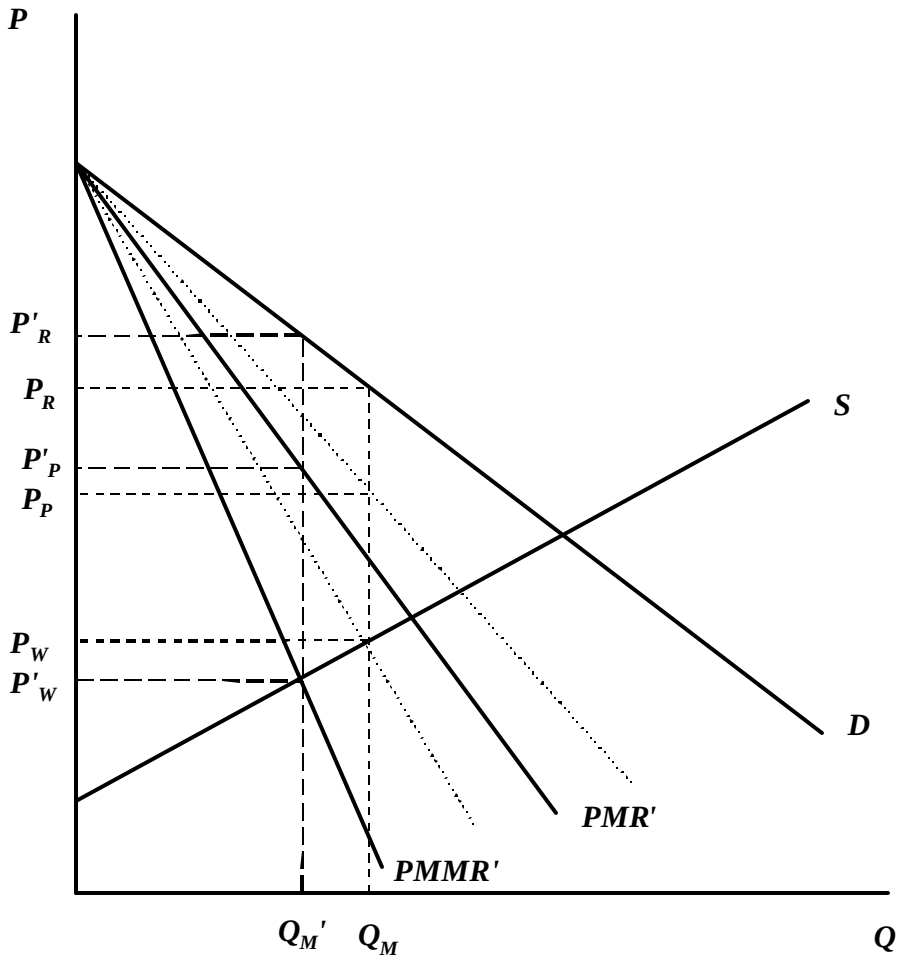


Figure 4: Change in Export Price from Trade Liberalization

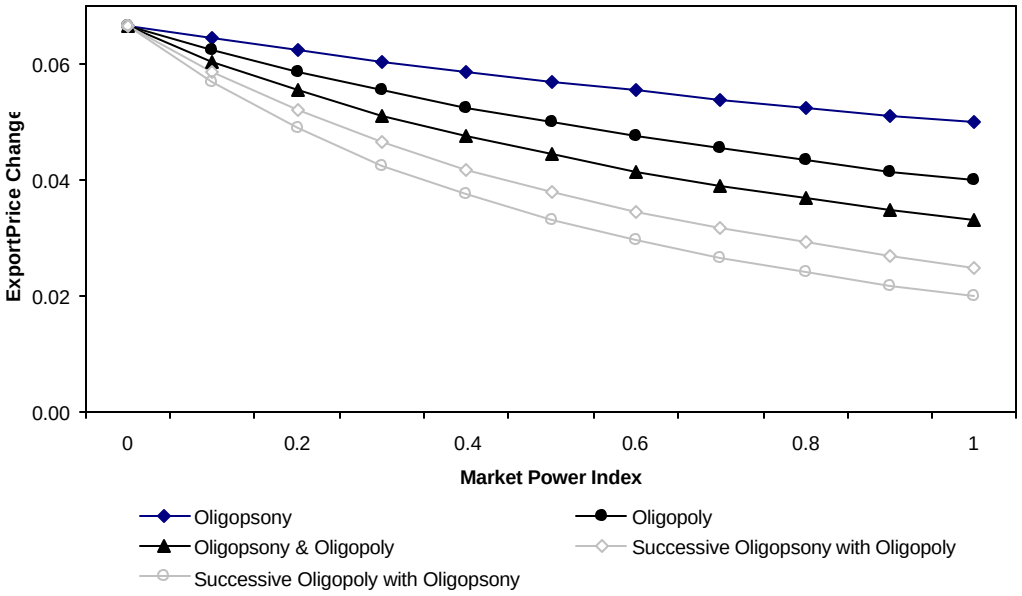


Figure 5: Change in Producer Surplus from Trade Liberalization

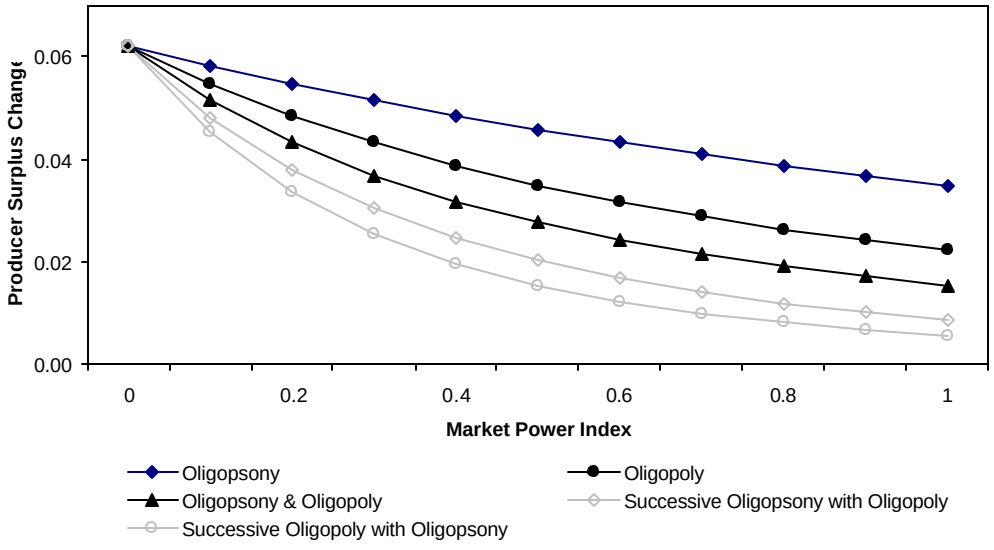


Figure 6: Change in Producer Surplus, Consumer Surplus and Marketers' Profits from Trade Liberalization for the Case of Processor Oligopsony and Retail Oligopoly

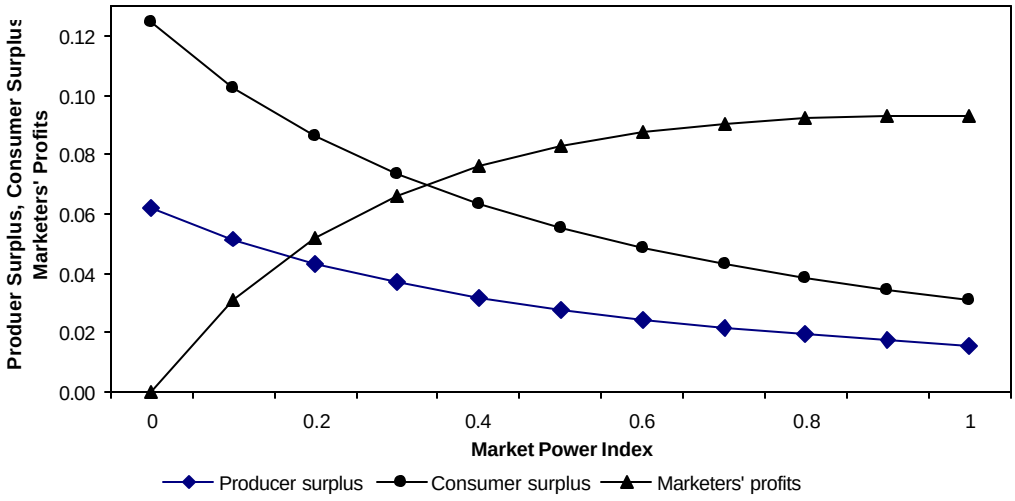
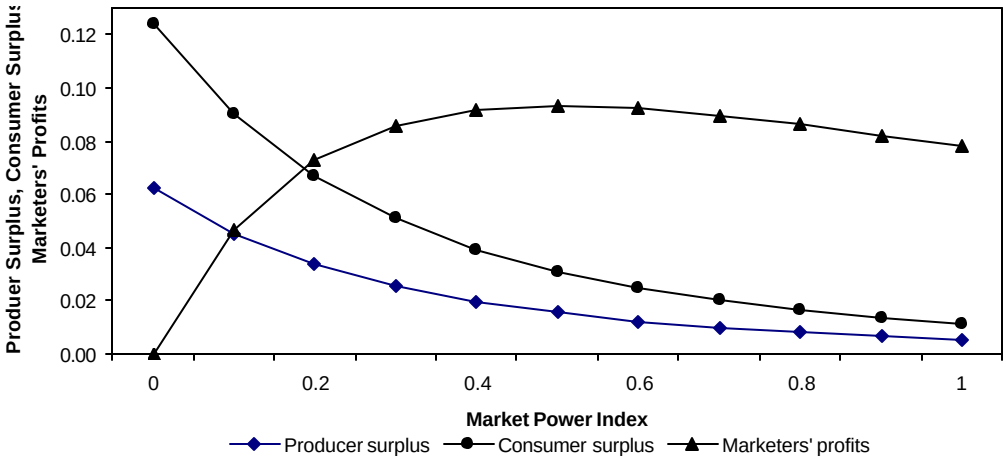


Figure 7: Change in Producer Surplus, Consumer Surplus and Marketers' Profits from Trade Liberalization for the case of Successive Oligopoly with Processor Oligopsony



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