



# The State of Agricultural Commodity Markets *IN DEPTH*

## Competition and food security<sup>1</sup>

### What are the issues?

Competition in food and agricultural markets is a crucial but often ignored dimension of food security and is a key factor in determining the impact and effectiveness of government policies aimed at promoting food security. At the core of the competition/food security issue is the functioning of markets and how this impacts on consumers and farmers.

Competition issues in agricultural and food markets have attracted increasing interest from policy-makers and academics in recent years; yet, when designing government policies and potential reforms of existing policies, how and why competition may matter is typically ignored.

Addressing competition in food and agricultural markets is complex: the concerns associated with competition are multi-dimensional and the difficulty in addressing the impact of market power is challenging and from a policy-maker's perspective both onerous and time-consuming. How the lack of competition impacts on the effectiveness of policies adds another layer of concern. Despite these challenges, this does not imply that the competition issue should be ignored when addressing food security issues. On the contrary, given the central role that competition could play in ensuring food security, greater attention should be paid to the functioning of food and agricultural markets.

<sup>1</sup> This technical note was prepared for *The State of Agricultural Commodity Markets 2015-16* by Steve McCorriston, Professor, University of Exeter, Exeter, UK.

In this note several issues about competition in food and agricultural markets and how likely it will impact on food security outcomes are discussed. Specifically: (i) the range of concerns associated with competition in food and agricultural markets and how they may apply in developing countries; (ii) evidence on how substantive the losses due to lack of competition may be and how

competition may impact on the effectiveness of other government policies that may be focused on food security issues; and (iii) how competition and market structure may specifically impact on price-related food security metrics associated with price shocks and price volatility. It concludes with summarizing the key concerns and the insights from recent research.

## Concerns about competition in food and agricultural markets

### *Summarizing the potential concerns*

The potential impact of increasing market power and restrictions on competition in food and agricultural markets, and how this impacts on consumers and producers, has drawn increased attention in recent years.<sup>2</sup> Food and agricultural markets have experienced common trends, most notably, growing concentration throughout the stages of the food chain downstream from agriculture and, in particular, the growing dominance of retail chains and fewer firms competing at the processing stage. With farmers at the bottom of this chain, (together with the increased importance of coordination through value chains and the potential for increased bargaining power), this raises concerns about market power in procurement while also raising concerns about the prices for key food commodities paid by consumers. In a vertically related food chain which is the appropriate way to characterize markets when few firms may dominate different stages of the value chain, this will give rise to the problem of “double marginalization”. In Box 1, the issues associated with double marginalization are highlighted. In sum, in a vertically-related food chain where there is a small number of firms that dominate various stages of the food chain, market power *may* impact on the overall availability of food and prices paid by and to consumers and farmers respectively hence raising concerns about distribution and fairness throughout the chain.<sup>3</sup>

Note the emphasis on “may” in the previous sentence. Firm numbers is often the place to start when discussing competition issues, but concerns about competition can be more complex. Specifically, concerns about competition should more directly relate to how firms behave. For example, the concern is not *per se* that there are few of competing firms but whether the few firms can abuse their dominance in a particular market. This abuse can arise in different ways including cartelization of markets or price-fixing; exclusion from competing in certain segments of the market or market-sharing arrangements, market foreclosure where suppliers have limited opportunities to access different buyers. In the context of a multi-stage food and agricultural chain, these anti-competitive practices have both horizontal and vertical dimensions. At either end of the chain, these practices can result in lower prices for farmers and higher prices for consumers.

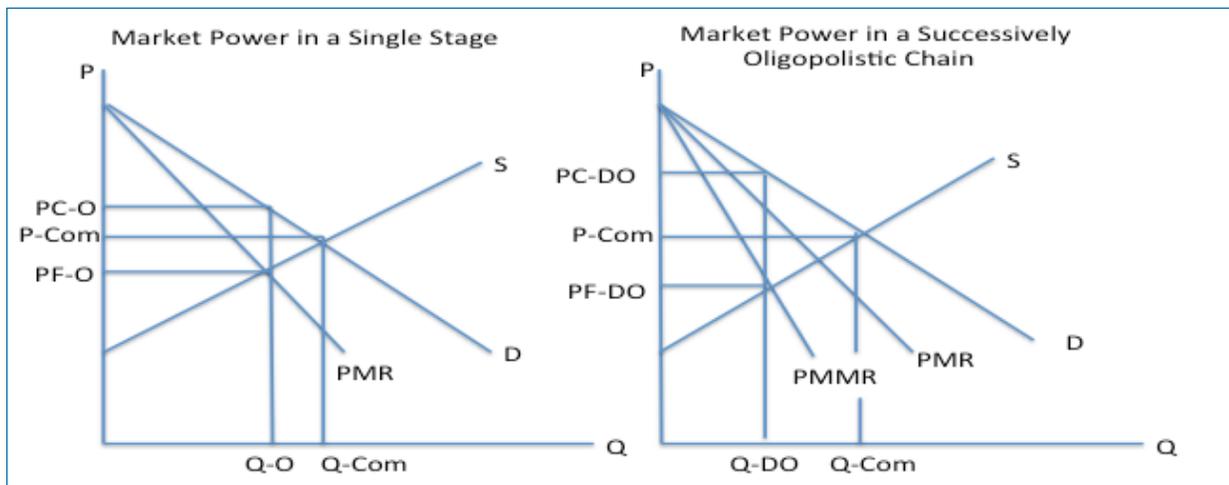
Four other concerns about competition in food and agricultural markets should be noted. First, the definition of the “market” is important. For many food markets, this may be national in scope but, in some cases, market power may exist at the local or regional level. For example, suppose there are several processing plants at the national level. The market may look sufficiently competitive insofar as there are a large number of firms but, due to high transport costs or poor roads, local farmers may be confined to supplying a single processor who may give a lower price to exert lower buyer power. Second, even with a small number of firms, there is a potential trade-off between limiting competition and ensuring efficiency. “Too much” competition may inhibit reaping economies of scale so that costs (and hence consumer prices) are higher because firms cannot maximize returns to scale. Third,

<sup>2</sup> For overviews on more general issues regarding competition and issues related to the industrial organization of food and agricultural markets, see Sexton and Lavoie (2001) and McCorriston (2002).

<sup>3</sup> The note focuses on competition issues that arise in downstream markets and does not discuss issues related to market structure in agricultural input markets.

### Box 1: Market power in vertically-related food markets

The standard benchmark for thinking about market power is well-known (see left-hand side figure) and a variant of this is shown in the right-hand side figure.



Consumer demand is given by the demand curve and agricultural output by the upward sloping supply curve. If markets were competitive (an assumption common in agricultural markets), prices would be given by P-Com with quantities procured from farmers and sold to consumers being given by Q-Com. With market power in distribution, the relevant curve for setting prices and quantities is PMR: this is the perceived marginal revenue function that depends on the extent of competition in the distribution market. If competition in this market was more (less) intense, this curve would swivel to the right (left) and prices paid by consumers (received by farmers) would rise (fall) to PC-O (PF-O). Welfare would be lower in this case for both consumers and farmers with the rectangle that relates to the wedge between PC-O and PF-O being the profits to the distribution sector. Often the costs of market power are associated with the deadweight loss triangle but this misses the important distributional effects on consumers and producers that are also key when considering food security issues.

But the food and agricultural sector is more appropriately characterized as a series of successively linked markets with agriculture at the bottom of this chain and “processing” and “retailing” accounting for the downstream sectors. Market power may exist at either or both of these stages. So the figure is now

amended (as shown on the right hand side) to account for this. The main difference is that the perceived marginal revenue function arising from the retail sector now becomes the derived demand curve facing the processing sector and how steep this curve is depending on market power in retailing.

If there is market power in “processing”, then we have the perceived marginal revenue function for processing which is marginal to the retail perceived marginal revenue function. The outcome in this successively related market is clear. Output procured and sold is now lower in this vertical chain; consumer and farm-gate prices are now higher and lower respectively. Welfare for both consumers and farmers both decrease further with the split in the chain rents being dependent on the extent of market power at the processing and retailing stages.

The key challenge in addressing competition in food and agricultural markets is that there is both a horizontal and vertical dimension as we have to take into account, not only the effect of competition at a single stage on consumers (often the main focus of competition issues) but also the vertical impact of buyer power on farmers and how firms at various stages in the vertical chain interact.

the framework outlined in Box 1 implies that consumers and farmers may both lose from market power in food markets; but it could be the case that market power at retail impacts more on farmers as intense competition across food retailers may be reflected in the exercise of bargaining power in the food chain and even lower prices for farmers.

Fourth, in many developing countries, the state can often directly manipulate market structure either through state ownership or through parastatals. This can complicate the competition issue since what is important is not *per se* firm numbers but how the objectives reflect government concerns about food and agricultural policy. For example, the objectives of the parastatal may, in principle, directly reflect food security objectives not necessarily profit maximization. That said, the direct role of the state in markets is also associated with lower levels of efficiency than could be achieved with private sector alternatives.<sup>4</sup> Related to this, the effects of deregulation of parastatals is contingent on the form that deregulation takes and, in many developing countries, has often been partial in nature. The greater or lesser involvement of the state in determining market structure also has an important bearing on food security outcomes.

A final point that should be made is that much of the concerns about competition often focus on so-called “static” effects i.e. the level of (consumer and producer) prices. But dynamic concerns will also matter since the exercise of market power may lower the incentives to invest in new technology or expand farm size.

### *Prevalence of competition issues in agriculture*

There are two ways to explore this. First, bearing the caveat above in mind, firm numbers is often the place to start since-if there are a large number of competing firms-the potential for abuse of market power is limited. Porto *et al.* (2011) present some useful evidence for several commodity chains in Sub-Saharan Africa. In the cotton sector, for example, the

market share for the leading two firms is 100 percent in Malawi, 75 percent in Zambia, and 75 percent in the Ivory Coast. In Rwanda, the three leading firms account for around 83 percent of market share in the coffee supply chain.

A second means for detecting concerns about competition in food markets is to refer to anti-trust investigations across developing countries. This, of course, may be imperfect as it will depend on the capacity and effectiveness to conduct anti-trust investigations. That said, a review of cases is informative. In an early review, Evenett and Jenny (2004) highlighted a number of anti-trust cases related to food and agricultural markets in Sub-Saharan countries. These include: a vertically-related monopoly in the Malawi sugar sector; a miller cartel in Zambia; price fixing and market sharing in the fertilizer market in Kenya; a buyer cartel in the Zimbabwean cotton industry; and a sugar cartel in South Africa. A wide range of anti-trust cases can also be found through surveying recent activities of competition authorities in developing countries. Recent cases include: a bread and maize milling cartel in South Africa; an onion cartel in India; collusion in the agrichemical market in India; anti-competitive agreements in the dairy sector in Brazil; and market rigging by two food companies in Botswana.

Of course, formal anti-trust investigations need not give the full picture relating to concerns with competition issues in developing countries. Evenett and Jenny (2006) compiled a database of allegations of anti-competitive practices in Sub-Saharan countries. The data shows that concerns with competition are pervasive. During the period 1997-2004, there were 122 allegations, covering 148 different anti-competitive practices across 23 Sub-Saharan countries. The incidence of allegations was higher in the food sector than in any other sector of the economy.

What this brief review of evidence indicates is that market dominance is often a key feature of food chains in developing countries, that anti-competitive practices are wide and varied and that they range across most regions from Asia, to Africa to Latin America. Despite the recent focus of much research on competition in food markets in developed countries, arguably there is reason to suggest that concerns about competition in the food sector are likely to be more prevalent in developing countries.

<sup>4</sup> For background on inefficiency and other issues associated with state trading enterprises and parastatals, see Rashid *et al.* (2008). As an example of recent concerns addressing the functioning of a key state enterprise, see the Report of the High Level Commission 2015 on the Food Corporation of India.

## What impact does the lack of competition have?

The lack of competition in food and agricultural markets can have important impacts on welfare of both consumers and farmers and also on the effectiveness of government policies.

### Welfare impacts

Evidence on the impact due to the lack of competition is limited due to two factors: (a) researchers have given insufficient attention to this issue, and (b) obtaining the required data is difficult. Two recent studies are premised on comparing the lack of competition in the market with an “ideal” competitive benchmark. In broad terms, they focus on a single stage characterization of the market as in the left-hand figure in Box 1. Importantly, in addressing specifically the food security implications from the lack of competition is the distributional impact on consumers and farmers, and not the net welfare effects associated with deadweight loss triangles.

Porto *et al.* (2011) have derived estimates of the potential impact of market power across several Sub-Saharan countries covering the cotton, coffee, cocoa and tobacco sectors. They apply two methodological approaches to estimate these effects. One is based on a theoretical framework that characterizes market structure and which is then used to simulate outcomes from changing the extent of competition; the other is based on a household model simulated with the price effects from the estimates from the theoretical market structure model. The comparison relates to the “ideal” of a perfectly competitive benchmark; this “ideal” outcome may not happen in practice but it gives an indication of the extent to which the lack of competition is likely to matter compared to the case where these issues are ignored. The simulations from Porto *et al.* (2011) are insightful: (i) the effects on total utility, though they can still be significant—are relatively small compared to the distributional effects; this is important as the concerns with food security relate not to net outcomes *per se* but the impact on producers and consumers; (ii) the outcomes can vary across markets and countries depending on specific features of the structure of food and agricultural markets. For example, the lack of competition in the Zambian cotton marketing chain indicates producer welfare to be around 13 percent lower than the case if markets were

competitive; estimates from the household model show even greater effects of around 19 percent. These are large effects and, with only a few exceptions, are typical of the estimates across all sub-Saharan countries and the four marketing chains covered in their study.

In a study of food markets in Mexico, Urzúa (2008) takes an interesting perspective on estimating the impact of market power by separating urban from rural areas and highlighting the impact on different income groups. The consumer losses in urban areas amount to 36 percent of expenditure but rise to 42 percent in rural areas. He also shows that competition has a strong regressive effect as it impacts on the poorest groups most (not surprisingly since they spend a higher proportion of their income on food). This is true in both urban and rural areas with the losses due to market power being 39 percent and 46 percent respectively. This regressive effect also arises in the household models of Porto *et al.* (2011) where the impact of the lack of competition impacts more on poorer households.

Market structure and the intensity of competition is not a static concept but can change over time and governments can apply anti-trust policy (and other policies such as restrictions on the entry of foreign firms) to address potential concerns that may arise. For example, mergers and acquisitions reduce the number of competing firms while the entry of competing firms, depending on how this occurs, can increase competition in the market. The changing structure of the food sector has been of increasing concern in developed countries while recent commentaries have also highlighted the increasing role of supermarkets across developing countries (Reardon *et al.*, 2003).

Assessing the impact of these changes on the extent of competition is a challenge. One way to do this is to work with simulation models and artificially change the number of competing firms. This approach has been pursued by Porto *et al.* (2011) who assess the welfare effects if the leading firms were to merge. As expected, this would reduce farm prices and the quantities procured as the reduction in firm numbers increases buyer power. In the Zambian cotton industry, for example, producer welfare would be reduced by more than 3 percent over and above the lower levels of welfare pre-merger.

With respect to changes in the supermarket sector, Atkin *et al.* (2015) assess the impact of new entry from foreign multinationals into the retail food chain in Mexico. Their estimates show that the effect on household welfare can be substantial with an estimated welfare increase of around 7.5 percent. To benchmark this estimate, the increase in welfare is greater than what we may expect from the gains from trade that has been the subject of much research. Notable from their analysis is that the effect on households is regressive; poorer households gain but less than richer households which may reflect differences in expenditure patterns across income groups.

### *Competition and the effectiveness of government policies*

The above discussion gives some idea of how harmful the lack of competition in a specific market can be; but the lack of competition can also impact on the effectiveness of other government policies. For example, policies targeted towards farmers or consumers, or via the use of trade policy will depend on the extent of competition throughout the supply chain in the relevant market. This is a fundamental point but one which is largely ignored and has an important bearing in addressing food security outcomes.

Sexton *et al.* (2007) have explored this issue in the context of trade reform where developing country farmers supply output into a vertical chain but where there is market power throughout the chain. Corresponding to the outline in Box 1, they consider single stage effects with combinations of seller and buyer power (the left hand figure) and where market power may persist throughout and between stages in the value chain (the right hand figure). The emphasis is on the impact of successive buyer (oligopsony) power at all stages in the vertical chain. They consider the effects of trade reform and the impact this would have on consumers and producers.

What would one expect if we assumed markets functioned well and were competitive?<sup>5</sup> Trade reform would increase consumer welfare due to lower prices

while the ability to supply more would increase farmers' welfare. Sexton *et al.* (2007) confirm this to be the case but show that the potential benefits of trade reform for consumers and producers are substantially diminished with market power throughout the food chain.

Specifically, the results show producers benefit from trade reform as expected with the gains being highest in the competitive case. But, as market power increases, the gains that farmers would expect from trade reform falls. In the single stage with only seller power, the gains to producers with monopoly power amount to only half of the gains that would accrue if markets were competitive. For alternative characterizations of competition in the food chain, the gains for producers from trade reform fall substantially. The gains to farmers are lowest when we have the combination of power in a multi-stage food and agricultural sector with seller and buyer power. So, trade reform brings gains to producers but not as much as we suppose if markets are not competitive.

If producers' and consumers' gains are reduced, where does the leakage in the possible gains from trade reform go? In the case, we have successive oligopoly and the stage immediate downstream from agriculture can exert market power vis-à-vis farmers, with trade reform the gains from trade reform accrue to the few firms that dominate the food chain. The main message here is that ignoring competition issues results in overstating the potential benefits to consumers and farmers from policy reform and the other parties who are likely to benefit from this reform process.

In the context of recent concerns over export bans, McCorrison and MacLaren (2012) explored how the impact of an export ban on domestic consumers and producers could be dependent on the extent of competition in the domestic market. They address concerns about competition in the Indian onion market and, on the assumption that the export ban imposed was to improve domestic food security, how domestic consumer and producer prices would change when the domestic market is more or less competitive.<sup>6</sup> They show that, if the domestic market is competitive, consumer and producer prices fall with the imposition of the export ban, by around 7 and 14 percent respectively. However, if the market

<sup>5</sup> In this study, the tariff acts as a barrier in the upstream stages of the food chain. If the tariff is removed, exports from the producing country increases, resulting in an expected rise in consumer welfare in the importing country and producer welfare in the exporting country.

<sup>6</sup> Concerns about competition in the Indian onion market related to the spike in onion prices in 2011.

## Competition and food security

---

is less competitive, consumer prices would fall by only 3 percent but producer prices fall by 17 percent. These results serve to highlight two points; one is that the domestic food security impact of an export ban depends on the underlying extent of competition in the market; second, the implications regarding the extent of the effects on prices differs across producers and consumers. This latter dimension of competition and the focus of food security concerns as it relates to the differential impact on consumers and producers is taken up again below.

Clearly, while the above examples relate to trade reform, the insights extend to any reform package that a government may introduce. Policy reforms result in distributional effects but when markets are not competitive, the gains to consumers and producers (presumably the key focus of food security concerns) are not as great as the government or other stakeholders would suppose and may result in different outcomes across these two groups. In short, paying insufficient attention to competition in food and agriculture markets may weaken policy reforms targeted at food security outcomes.

## Competition and price shocks and volatility

---

Competition in food and agricultural markets affects access and availability which are largely captured in the discussion presented above; but part of the focus on food security also relates to the impact of price shocks and price volatility. McCorrison and MacLaren (2015) have recently addressed these issues in the context where a government may directly manipulate market structure through the use of a parastatal and compare this to a private firm market where, when the number of firms is small, they have the ability to exert both buyer and seller market power. The key insight from their analysis is that the characterization of the market, together with the government bias towards consumers reflecting food security concerns, has a major influence on how price shocks emanating from world markets impact on consumers and producers and the extent of price volatility that may arise in alternative characterizations of the market.

Specifically, they outline a framework that relates to commodity importing developing countries where there are two potential sources of supply (and hence two potential shocks): domestic farm output and imports from the world market. The firms (or parastatal) can make decisions about how much to procure from these alternative sources before distributing food to consumers. If there is a supply shock originating from, say, the domestic market, this will impact on prices domestically, both at the farm-gate and at the consumer level. McCorrison and MacLaren (2015) show that the effects on farm-gate and consumer prices differ, with the rise in farm-gate prices being greater than the commensurate rise in consumer prices. This is an important insight: unlike the impact of the

lack of competition above where firms with market power both procured and sold less (i.e. the static effect), such that the food security concerns relating to consumers and farmers were the same, in the case of price transmission, the impact on farmers and consumers now differ.

Specifically, McCorrison and MacLaren (2015) consider different permutations of market structure that may characterize a developing country: (i) an inefficient parastatal that dominates the market; (ii) a parastatal that co-exists with private firms and where the parastatal is responsible for imports only; (iii) the private firms compete with the parastatal in the market; and (iv) a (small number) of private firms only.

There are two key insights from their results. First, how the market is structured can have an important bearing on the impact of price shocks. Note that the reason why these outcomes can differ is not only that the mean price is different in each case (which benchmarks the extent of the shock) but also that the parastatal and/or private firms can procure from world markets which provides a buffer against the supply shocks. Second, the impact of supply shocks is much weaker on consumers. The same insights come through-though the extent of the impact varies-when price shocks sourced from world markets impact on the domestic food market.

McCorrison and MacLaren (2015) also show that competition has an important impact on the extent of price volatility (as opposed to one-time shocks discussed above) that applies at the farm and consumer levels.

Again, the interests of consumers and farmers differ, but the trade-off is complex. For consumers, less competition may mean higher prices but more stable

prices. For farmers, as more competitive markets are likely to increase farm-gate prices, it also increases the volatility of prices at the farm-gate.

## Conclusion

---

Competition is essentially about how markets function and therefore has a direct bearing on food security issues. Yet, it is an issue that is often ignored in policy discussions on promoting food security outcomes. This note has highlighted the ways in which the lack of competition can impact on consumers and farmers. The main insights can be summarized as follows:

- Competition in food and agricultural markets is of increasing concern worldwide and these concerns also apply to developing countries;
- Addressing competition in food and agricultural markets is complex and can affect the functioning of these markets in a variety of ways;
- Consumers and farmers are impacted directly by a lack of competition that, by extension, impacts on food security outcomes including access, availability, price transmission and price volatility;
- When markets are characterized by a lack of competition, the outcome of government policies aimed at promoting food security may not result in the anticipated effects;
- The impact on consumers and producers can vary and may depend on the food security metric. More competitive markets may reduce (increase) consumer (farm-gate) prices but promote less (more) stable prices. Depending on the changes in market structure that apply, the impact may be regressive; the poorer segments of society may not benefit by as much, or be hurt more, by the changes that occur;
- These food security impacts can be substantive and being aware of the importance of competition in agricultural and food markets should be a key issue in addressing food security concerns.

## References

- Atkin, D., Faber, B. & Gonzalez-Navarro, M. 2015. *Retail globalization and household welfare: evidence from Mexico*. NBER Working Paper 21176. Cambridge, USA, National Bureau of Economic Research.
- Evenett, S. & Jenny, F. 2004. Anticompetitive practices in sub-Saharan Africa: myth, reality and perspectives. Paper presented at the 3rd International Conference: Pro-poor regulation and competition: issues, policies and practices, 7–9 September, Cape Town, South Africa.
- Evenett, S. & Jenny, F. 2006. An inventory of allegations of anti-competitive practices in sub-Saharan Africa. Mimeo. Universität St Gallen, Switzerland.
- McCorrison, S. 2002. Why should imperfect competition matter to agricultural economists? *European Review of Agricultural Economics*, 29: 348–371.
- McCorrison, S. & MacLaren, D. 2012. *Competition, supply chain inefficiency and export bans: a framework for analysing issues in the Indian onion market*. Universities of Exeter and Melbourne.
- McCorrison, S. & MacLaren, D. 2015. *Food security, welfare and partial de-regulation of parastatals*. Universities of Exeter and Melbourne.
- Porto, G., N.D. Chauvin & M. Olarreaga 2011 *Supply Chains in Export Agriculture, Competition, and Poverty in Sub-Saharan Africa*. World Bank, Washington.
- Rashid, S., Gulati, A. & Cumming, R. Jnr. 2008. *From parastatals to private trade*. New York, USA, Johns Hopkins University Press.
- Reardon, T., Timmer, C.P., Barrett, C.B. & Berdegue, J. 2003. The rise of supermarkets in Africa, Asia, and Latin America. *American Journal of Agricultural Economics*, 85: 1140–1146
- High Level Committee on restructuring of Food Corporation of India. 2015. *Report of the High Level Committee on reorientating the role and restructuring of the Food Corporation of India*. New Delhi.
- Sexton, R. & Lavoie, N. 2001. Food processing and distribution: an industrial organisation approach. In B.L. Gardner & G.C. Rausser, eds. *Handbook of Agricultural Economics*. Amsterdam, North-Holland.
- Sexton, R., Sheldon, I. McCorrison, S. & Wang, H. 2007. Agricultural trade liberalization and economic development: the role of downstream market power. *Agricultural Economics*, 36: 253–270.
- Urzúa, C.M. 2008. Evaluación de los efectos distributivos y espaciales de las empresas con poder de mercado en México. Available at <http://www.oecd.org/daf/competition/45047597.pdf>.