

Exporting at a discount: collusive dumping or oligopolistic competition?

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In a number of recent investigations by the Competition Commission (CC), the existence within an industry of export sales at margins lower than those achieved on domestic sales has been viewed with suspicion. Indeed, in some cases it appears to have been viewed as *prima facie* evidence of the existence of tacit or explicit collusion between domestic suppliers. For example, export sales allegedly made at lower margins than those of domestic sales was explored in the CC investigation into the supply of fertiliser, formed part of the evidential basis for enquiries made by the CC in the mining industry, and was a central feature of the famous Mittal case.

The underlying logic of the concern with an observed divergence between domestic and export margins is summarised by Roberts (2008), who states that:¹

“...the net price for steel sold to local customers at the import parity level is substantially above that received for steel that is sold to export customers. A competing rival in such a situation would attempt to win the more lucrative customers in the local market by offering the hitherto exported product, bidding prices down to net export levels.” (emphasis added)

Such a concern assumes that if domestic suppliers are in effective competition with each other, they should “compete away” any price difference between domestic margins and export margins. Specifically, if the domestic margin is higher than the export margin, domestic suppliers should have an incentive to take a unit currently sold on the export market and sell it on the domestic market. Moreover, this process should continue until domestic and export margins are equalised. Thus, so this logic continues, if one observes domestic margins that exceed export margins it can be inferred that domestic suppliers are not in effective competition with each other, but must instead be engaged in tacit or explicit collusion. Or, put differently, rather than each firm acting individually, rationally, and independently of its competitors, which would lead them to divert export sales to the domestic market so as to benefit from the higher margins available on domestic sales, firms instead coordinate their behaviour to maintain higher domestic prices than would otherwise prevail.

In effect, such an approach assumes that firms will keep adding output to the domestic market until prices are equalised with their next best alternative (i.e. the export market). However, this line of reasoning overlooks the fact that each firm, acting individually, rationally, and independently, will nevertheless take into account the effect that its own decisions as to how much product to sell in the domestic market will have on the domestic price. In particular, since selling an extra unit of output will have the effect of reducing prices across all of a firm’s existing domestic volumes, firms will independently trade-off the benefit of additional higher margin domestic sales against the fall in the margin earned on their existing domestic sales. This effect implies that firms may well choose not to keep substituting export sales for domestic sales until margins are equalised across the two.

¹ Roberts, S. (2008). “Assessing Excessive Pricing: The Case of Flat Steel in South Africa”, *Journal of Competition Law and Economics*, 4(3), pp. 871-891.

In this paper, we present a simple model to show to show that domestic prices that exceed export prices can be consistent with competitive behaviour between domestic producers, without any coordination between them. We do so using a model that assumes that competition in the domestic market is characterised by Cournot competition but that domestic producers are price takers in the export market. Each producer chooses the level of output it places on the domestic and export markets, respectively. We show that a competitive equilibrium can sustain a large range of price outcomes where domestic prices and export prices are not equalised.

Since domestic margins that exceed export margins are entirely consistent with non-cooperative (i.e. competitive) oligopoly outcomes, such a finding cannot be used to infer the existence of tacit or explicit coordination in the domestic market. While the existence of higher margins on domestic sales than on export sales indicates that the domestic market is not perfectly competitive, it does not indicate that the market is not as competitive as it can be given the nature of its cost structures, nor does it indicate that it is a market any more worthy of investigation than a domestic oligopoly which is not engaged in exportation. It therefore has little to commend it even as a filter for identifying markets for further investigation. Moreover, if the existence of divergent domestic and export margins were to be used as such a filter, the mere existence of divergent domestic and export margins certainly does not obviate the need for a thorough and evidenced assessment of whether coordination is occurring.

The model: domestic Cournot competition between export price-takers

In order to assess the different incentives of suppliers to engage in domestic and export sales, we use a standard Cournot oligopoly model, where each firm sets the quantity it supplies (of a homogeneous good), and price is determined by the market, at the intersection of supply and demand.

However, we adapt the model so that, instead of choosing one output level, we assume that all firms choose to supply in two markets, the domestic market and the export market. We simplify the model by assuming that domestic firms are price takers in the export market; namely that, domestic exporters compete with a large number of foreign companies in the export market, with the effect that no one domestic supplier supplies a sufficiently high volume of exports to have an effect on the export price. We also assume that there are no imports in the domestic market and that firms choose domestic and export output levels to maximise profits. The profit function for each firm i is then:

$$\pi_i = (p^d - c^d)q_i^d + (p^e - c^e)q_i^e - F$$

where p^d is the domestic price while c^d is the marginal cost in supplying the domestic market; p^e and c^e are the respective prices and costs of exports. The quantities supplied by firm i in the domestic market (q_i^d) and in the export market (q_i^e) are assumed to sum to the total capacity of firm i (\bar{q}_i).² F is the fixed cost to each firm.

We make the standard assumption that in the domestic market, the price (p^d) linearly decreases with total industry output. As a result, the demand takes the form $p^d = A^d - Q^d$, where Q^d is the sum of all domestic industry output, $Q^d = \sum_i^n q_i^d$. However, as we assume all domestic firms to be price takers in

² In what follows, it is assumed that for each firm, capacity exceeds the equilibrium domestic quantity.

the export market, the price in the export market is determined exogenously by the balance of supply and demand in the export market, and is given by \bar{p}^e .

We further make the standard simplifying assumption that in the domestic market, all firms are identical and have the same cost structure. This leads to symmetric solutions (with each firm producing the same output level). The number of firms in the domestic market is given by N^d .

This gives the following solution for equilibrium domestic output:

$$q^{*d} = \frac{A^d - c^d - (\bar{p}^e - c^e)}{(N^d + 1)}$$

It should be noted that the standard formula for a Cournot n-firm oligopoly with no export market (as shown below) is effectively the same equation without the export price and cost terms \bar{p}^e and c^e .

$$q^{*d} = \frac{A^d - c^d}{(N^d + 1)}$$

A comparison between the two expressions provides an intuitive explanation of the effect of the existence of an export market on domestic quantity setting. Domestic quantity sold decreases with the margin to be earned on the export market ($\bar{p}^e - c^e$): the higher is the margin producers can earn on the export market, the greater is the opportunity cost of supplying to the domestic rather than the export market. As a result, as the export margin increases, the incentive for firms to place quantity on the domestic market, rather than on the export market, weakens.

However, as the model shows, firms do not have an incentive to continue to substitute output from the export market into the domestic market until the prices are equalised.

Specifically, the equilibrium domestic price is given by:

$$p^{*d} = A^d - \frac{N^d (A^d - c^d - (\bar{p}^e - c^e))}{(N^d + 1)}$$

If we assume that the marginal costs of production for the domestic and export markets are equal to each other (i.e. $c^d = c^e$), we can simplify the equilibrium price equation to:

$$p^{*d} = \frac{N^d \bar{p}^e + A^d}{(N^d + 1)}$$

The domestic price is then given by the number of firms operating domestically, the price available on the export market, and the demand in the domestic market.

This result clearly highlights that, given the assumptions of the model, generally, the domestic price will be higher than the export price. Indeed, when costs of domestic and export supply are assumed to be equivalent, it is evident that unless the domestic market is perfectly competitive (i.e. N^d is infinite) the

domestic price will be higher than the export price in all cases.³ For any market structure other than perfect competition, there is no outcome with firms selling in the domestic market where domestic and export prices are equalised. However, the domestic price (and the difference between the domestic and export price) falls as the number of domestic producers increases.⁴ In other words, the closer the domestic industry moves to perfect competition, prices in the domestic will converge to those in the export market (assuming equal costs).

The intuition driving this result is that, even acting unilaterally, each supplier will take into account the fact that increasing its output in the domestic market by diverting sales from exports will have the effect of lowering domestic prices, and hence the margin that it earns on existing domestic sales. This effect does not exist in the export market, where domestic exporters are (by assumption) unable to influence price.

In effect, firms will equalise the profit of an additional unit of sales on both the domestic and export markets. This can be seen from the firms' first order conditions:

$$\frac{\partial \pi_i}{\partial q_i^d} = (p^d - c^d) + q_i^d \frac{\partial p^d}{\partial q_i^d} - q_i^d \frac{\partial c^d}{\partial q_i^d} = 0$$

$$\frac{\partial \pi_i}{\partial q_i^e} = (p^e - c^e) + q_i^e \frac{\partial p^e}{\partial q_i^e} - q_i^e \frac{\partial c^e}{\partial q_i^e} = 0$$

Since in the export market, firms are price takers, $\frac{\partial p^e}{\partial q_i^e} = 0$ and assuming that costs are constant across output levels such that $\frac{\partial c^d}{\partial q_i^d} = \frac{\partial c^e}{\partial q_i^e} = 0$ then:

$$(p^d - c^d) + q_i^d \frac{\partial p^d}{\partial q_i^d} = (p^e - c^e)$$

Or, with c^d equal to c^e ,

$$p^d = p^e - q_i^d \frac{\partial p^d}{\partial q_i^d}$$

Noting that because $\frac{\partial p^d}{\partial q_i^d}$ is negative (domestic demand curve is downward sloping), $p^d > p^e$.

³ Subtracting \bar{p}^e from both sides of equation $p^{*d} = \frac{N^d \bar{p}^e + A^d}{(N^d + 1)}$ and rearranging gives $p^{*d} - \bar{p}^e = \frac{A^d - \bar{p}^e}{(N^d + 1)}$. But $\frac{A^d - \bar{p}^e}{(N^d + 1)} = q^{*d}$. Hence $p^{*d} = \bar{p}^e$ only if $q^{*d} = 0$.

⁴ Subtracting \bar{p}^e from both sides of equation $p^{*d} = \frac{N^d \bar{p}^e + A^d}{(N^d + 1)}$ and rearranging gives $p^{*d} - \bar{p}^e = \frac{A^d - \bar{p}^e}{(N^d + 1)}$. It is now clear that the difference between domestic and export prices falls as N^d increases.

This implies that because in the domestic market, a firm faces a price penalty of increasing supply that is not faced in the export market, a firm will not substitute exports for domestic sales until prices in the two markets are equalised.⁵

Illustrative examples

The modelling results can be illustrated graphically by plotting different values of p^{*d} for various values of A^d , N^d and \bar{p}^e .

In Figure 1 below, the top panel shows the domestic price as a function of the export price, assuming a **duopoly** in the domestic market ($N^d = 2$), and A^d equal to 30. The horizontal axis shows the export prices (\bar{p}^e), given exogenously for values from 0 to 30. The vertical axis shows both the exported and domestic price that correspond to this export price: the export price line (marked in red) is simply on a 45° angle, taking the same values on the horizontal and vertical axes, while the domestic price p^{*d} line, shown in blue, is calculated using the equilibrium condition shown above, $p^{*d} = \frac{N^d \bar{p}^e + A^d}{(N^d + 1)}$. The lower panel plots the domestic and export equilibrium quantities for any one firm (q_i^{*d} and q_i^{*e}), associated with the same set of domestic and export prices. We assume for each firm the total capacity (\bar{q}_i) is equal to 60.

⁵ However, the general finding that domestic and export prices need not be equalised may be expected to hold even in the more general case in which domestic firms are not price takers in the export market. From the above first order conditions, with equal (and constant) domestic and export costs, it is clear that the domestic and export prices might not equate if the marginal impact of quantity on price differs in the domestic and export markets.

Figure 1: Domestic and export price and quantity, $A^d=30, N^d=2$

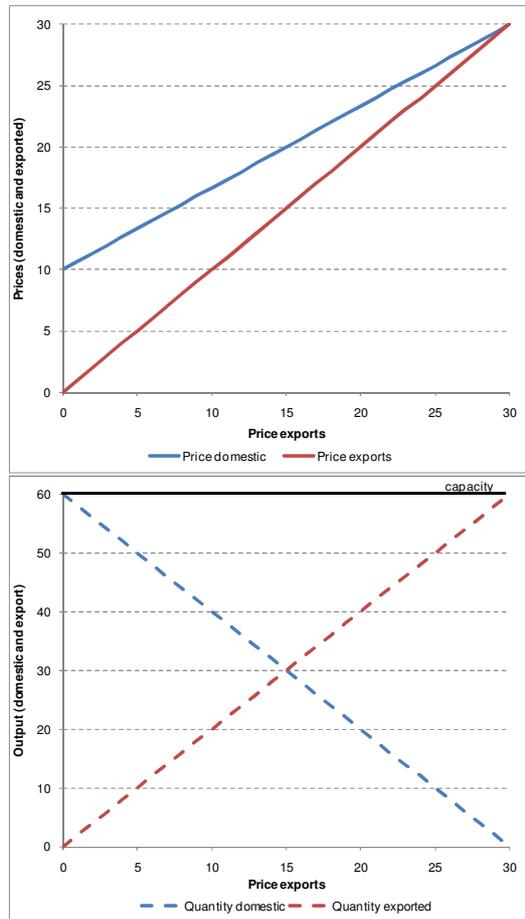
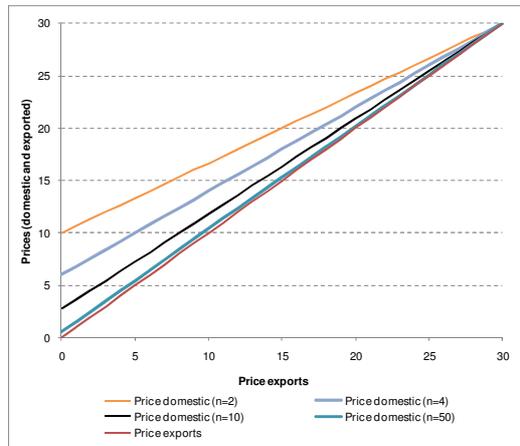


Figure 1 highlights that the domestic price is higher than the export price for all positive values of domestic output: at the price of 30 (equal to A^d), domestic and export prices equalise while all sales are diverted from the domestic market to exports.

With a duopoly in the domestic market, price differences between export and domestic markets can be substantial, particularly with low prices in the export market. When there are more domestic competitors, all else being equal, the difference in domestic and export prices will be less. This is shown in Figure 2, which replicates the top panel of Figure 1 above, but also shows domestic prices for a number of different industry configurations in the domestic market (i.e. assuming 4, 10 or 50 domestic firms). The orange line represents a duopoly as in Figure 1 above: however, as the number of firms in the domestic market increases, the slope of the domestic price function becomes closer to the export price function. In other words, the more similar will the prices in the domestic and export market become – assuming that the costs of production for the domestic and export markets are the same.

Figure 2: Domestic and export price

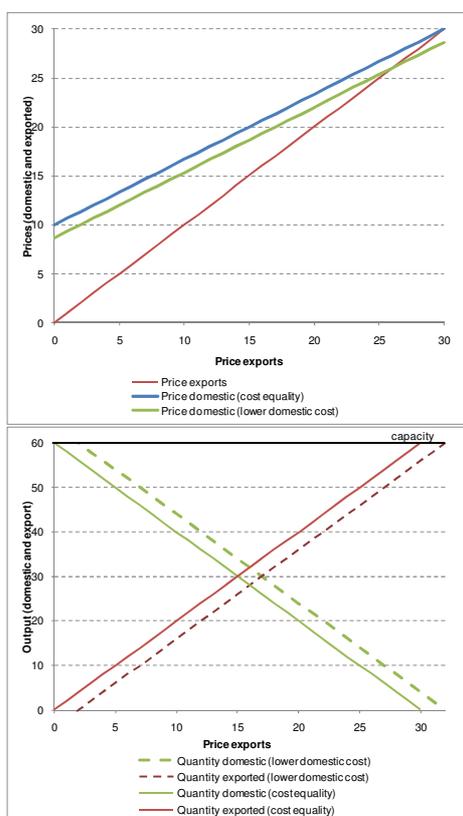
$$A^d = 30, N^d = 2, 4, 10, 50$$



Of course, if there are cost differences between domestic and export markets, these will reduce or exacerbate the differences in prices between the domestic and export markets. *Ceteris paribus*, the lower are the domestic costs relative to export costs, for a given level of export prices, the lower will be the price differential between export and domestic prices.

For instance, Figure 3 replicates Figure 1, but now assumes that the marginal cost of domestic production is 2 units lower than the export costs, reflecting, for instance, higher transport costs associated with exports. Figure 3 shows that, for a given level of export prices, domestic prices are shifted down by the level of the cost differential between domestic and export markets, while domestic sales increase and exports fall.

Figure 3: Domestic and export price and quantity, $A^d=30, N^d=2, c^d=2, c^e=4$



Effects of a “single price” remedy

It should also be noted that an imposition of a requirement for firms to equalise prices across the export and domestic markets is not necessarily beneficial for domestic consumers.

If such a remedy were imposed in a market where firms are price takers on the export market, domestic firms (since they cannot affect prices in the export market) would need to choose between setting domestic prices at a price equal to the export parity, or ceasing exportation altogether. However, neither of these options may be consistent with fixed cost recovery for all domestic firms.

Indeed, in the presence of notable fixed costs and very low export margins, pricing at export parity could lead to no domestic firms being able to cover their fixed costs by setting their domestic price at export parity, with the result that such a price would not be a sustainable equilibrium.

Our simple model would suggest that, if the firms ceased to export, the domestic price could be expected to fall, since the margin earned on exports is effectively an “opportunity cost” of domestic supply, with the effect that domestic quantity produced falls with the level of the export margin. Note that the quantity sold by each firm domestically in a market in which suppliers export is given by:

$$q^{*d} = \frac{A^d - c^d - (\bar{p}^e - c^e)}{(N^d + 1)}$$

while the quantity sold by each firm absent any exports is:

$$q^{*d} = \frac{A^d - c^d}{(N^d + 1)}$$

If the margin earned by domestic firms on exports is positive, ceasing exports may place some downward pressure on price.

However, this model assumes constant marginal costs of production. On the other hand, if marginal costs are decreasing with output, then not exporting could give rise to higher domestic prices, since it would bring about a reduction in total output and hence an increase in the marginal cost of domestic production.

Moreover, in any industry where exports add to fixed cost recovery, a disincentive to export may indirectly lead to higher domestic prices, by limiting the ability of firms to cover their fixed costs. In this situation, an imposition of pricing parities may lead to an adjustment in the long run industry structure (for example, through exit of some suppliers) to allow fixed cost recovery by the remaining market participants. This, in turn, may lead to less competitive market structures. Such risks must be weighed against any short term consumer benefits that lower domestic prices may bring about.

Implications for competition policy

The simple economic model developed in this paper demonstrates that price divergence between domestic prices and exports can arise from independent pricing conduct on the part of each supplier, and cannot be assumed to arise only through tacit or explicit coordination between domestic suppliers. Rather, each supplier acting independently will take into account that increasing its output in the domestic market by diverting sales from exports will have the effect of lowering domestic prices, and hence the margin that it earns on its existing domestic sales.

While, for simplicity, our model considers domestic producers that act as price takers in the export market, this intuition is more general. Firms acting non-cooperatively (i.e. competitively) will take into account the effect on price of additional sales they place on the (domestic) market. The fact that firms also export a proportion of their production does not affect these fundamentals. As a result, generally we would not expect domestic suppliers to switch supply between domestic and export markets to the extent that prices in the two markets are equalised, unless the cost and demand conditions in the two markets, and the number of firms operating in each market, are identical.

The implications of these results for competition policy are threefold.

First, since it is possible for the competitive domestic price to exceed the export price with no coordination between domestic suppliers, the export price cannot be used as a “competitive” benchmark against which domestic prices can be assessed. Put simply, domestic prices in excess of export prices do not constitute a sufficient condition for identifying coordination. As a result, the finding that a domestic price is above the export price does not provide a reliable filter for investigating coordination.

Second, were the Commission to attempt to use an analysis of pricing to determine whether domestic firms were engaging in coordination, it would require a detailed structural analysis of the domestic market to determine what the “competitive” domestic benchmark price against which observed prices are to be assessed might be. Economic models for so doing are available in the economist toolkit.⁶ However they tend to be very data intensive and require assumptions on both supply and demand to properly identify the competitive price. Indeed, it is arguable that the lack of “excessive pricing” cases in the EU and US is precisely due to the difficulties of reliably determining the appropriate competitive benchmark against which to compare observed industry prices.

Finally, if one is to use the export price test as a screen for cases worthy of investigation, one should at the very least go on to conduct a thorough assessment of whether coordination is likely to be feasible in the industry at hand, given its characteristics and the available evidence on the ability of firms to reach and maintain a coordinating agreement. The necessary conditions for coordination are well established by the European Court of First Instance judgement in *Airtours* (2002). Our preferred approach would be not to rely on an export parity screen even in the first instance.

⁶ Porter’s 1983 model on the study of cartel activity is one such example.