

CRA Competition Memo



Mergers with Durable Goods

Merger analysis requires an assessment of the extent to which the merged firm's ability to raise prices will be constrained after the merger. In durable good industries, an important factor can be the potential for the existing stock of used machines to act as a constraint on the behaviour of new equipment manufacturers. Should we worry less about a merger when the product is "durable" – that is, when it has a long useful life?

Why durable goods are different

Durable products stay around a long time. Much machinery and industrial equipment is designed to last, and its useful life can often be stretched through increased maintenance. Many products have a lively second-hand market. What would happen if manufacturers of durable new equipment were to raise prices following a merger?

The key characteristic of durable goods is that they provide a *stream of services* over an extended period of time, often long after the sale. It is these services which their buyers ultimately value – a machine allows a flow of production services over time; a vehicle gives a flow of transport services, etc. Once a durable good has been sold, the supplier has very limited control over the services which that good produces (essentially only through its spare parts policy). In future years, these services will effectively provide competition to the sales of new durable goods – future buyers can decide whether to purchase a new machine, or whether to achieve the same (or similar) effect by making use of an existing machine which is already in the market (at least if there is no major technical change).

If the price of the new good rises, customers may be able to use their existing equipment more intensively, or to extend its life, perhaps by spending more on maintenance. Customers who would previously have considered buying a new good might instead buy a slightly less new, second-hand one. The existence of a stock of used goods – whether in operation or sitting on dealers' lots – can thus increase the elasticity of the demand facing new equipment manufacturers, and reduce the attraction of post-merger price increases. This has the potential to reduce the market power enjoyed by durable goods suppliers, and hence may affect the merger analysis.¹

The case of agricultural equipment

The recent *New Holland/Case* merger (Case No. IV/M. 1571) between producers of agricultural equipment is an example of a market where the constraining effects of an existing stock of goods were highly plausible, although the European Commission's Merger Task Force cleared the merger on more conventional grounds (it concluded that the market share distribution in the supply of new

equipment was not likely to sustain collective dominance).²

The market for tractors provides a good illustration of the significance of durability. First, the rate of depreciation is relatively low for tractors: our econometric estimates based on new and used equipment prices suggested an average depreciation rate of only about 8% in Europe. Second, data used to forecast the sale of used tractor parts indicated that more than 50% of tractors sold in a given year remain active more than 20 years later. Third, the demand for new tractors has been in long-term decline (tractor sales in the EU have declined from over 300,000 units per year in the late 1970s to around 175,000 in 1998). The long-term decline in the demand for new tractors is expected to continue, suggesting there will be ample availability of used equipment.

Against this background, we estimated that the value of the stock of used equipment in service is large relative to new equipment, even when such calculations are based on the depreciated value of used equipment (not simply the number of pieces of equipment in service). Taking into account age and depreciation rate, we found that the depreciated value of the stock of used tractors in Europe is a large multiple (as much as 11 times) that of new tractor sales. This large stock of available used equipment suggests that attempts to increase the price of new tractors would require a very large reduction in sales – basically, because new tractor sales account for only a small proportion of the total "stream of services" derived from tractor use each year. The greater the required output restriction in order to achieve a given price rise, the less likely the price rise is to be profitable.

Further, tractors are not used very intensively in Europe: the average annual usage is 750 hours, which suggests considerable scope for more intensive use. There is also clear evidence that demand is very sensitive to farm income, which suggests that the timing of purchases is not driven purely by the age of the equipment, but rather that farmers have considerable discretion in choosing when to buy a new tractor (our estimates suggest that a 1% decline in real net income per farm is associated with a 2.5% decline in sales of new equipment).

Markets for second-hand tractors are well developed, and sales of second-hand tractors in each year are between 2 and 3 times sales of new tractors. Moreover, there are relatively few customers in this market with strong preferences for new goods. Information on a sample of the sales of new and used tractors between 1996-98 for which financing was obtained, suggest that relatively few farmers exclusively purchase new equipment. Among farmers who purchased multiple tractors between 1996-98, including at least one new tractor, nearly 60% also purchased a used tractor. Significantly, the price of new and used tractors were also highly correlated, suggesting that they compete in the same market.

¹ The pricing of durable goods in general – whether by a monopolist or by competing suppliers – has been extensively analysed in the economic literature (much of it focusing on suppliers' and customers' incentives for making a sale/purchase today, as opposed to waiting).

² New Holland and Case ranked respectively in first and fourth place in the sale of tractors in Europe.

The need for pragmatism

However it would be wrong to infer from this example that the stock of durable goods will always be able to constrain new good prices. There are circumstances in which the used stock clearly is not equivalent to a competitive supply. Sometimes the stock is almost completely utilised and the ability to extend its life or use it more intensively is limited. Under these circumstances, the supply elasticity of the used stock may be close to zero – i.e. if the merged parties were to raise prices, the extent to which the output extracted from existing stock could be increased would be very limited. And if in addition entry is unlikely to occur, and demand is growing fast, then durability cannot prevent the exercise of market power.

Whether the existence of a used stock has any effect on the market power of new equipment suppliers is entirely an empirical question, determined by the facts of the particular case. It is important for policy to be able to identify in practice the circumstances under which durability can or cannot constrain the prices charged by new goods suppliers. As a first step towards this, a simple checklist can be applied at least to screen cases where the constraining effect of used equipment is plausible from cases where it is not.

A simple checklist

Used equipment will be more likely to provide a constraint on post-merger incentives to increase price if:

- (a) *it is economical to use the stock more intensively and/or the useful life of the equipment can be extended if the price of the new good rises*, thereby reducing the demand for new equipment;
- (b) *there is no substantial fraction of consumers with a strong preference for new goods* (especially if manufacturers can price-discriminate between those who do and those who do not value newness);
- (c) *goods do not depreciate rapidly*, and technical change is not too fast, so existing products are reasonable substitutes for new products;
- (d) *demand growth is slow*, so it is more likely that customers can meet their demand by using the stock of existing equipment;
- (e) *sales of new equipment are not high relative to the existing stock*, so new goods suppliers would have to decrease their sales substantially to have any appreciable upward effect on prices;
- (f) *manufacturers do not control the maintenance of the stock*, so owners should have no problem obtaining parts and service and manufacturers cannot accelerate its obsolescence;
- (g) *goods are sold rather than leased*, so that the remaining “stream of services” embodied in the existing stock of equipment is controlled by *customers* (or second hand re-sellers), and not by the new goods suppliers.³

The more of these conditions are satisfied, the more plausible it is that durable goods will constrain the ability of new equipment manufacturers to raise price following a merger. Furthermore, the durable nature of goods makes oligopolistic coordination (‘collective dominance’) significantly more difficult to achieve.

³ These factors are outlined in Carlton and Gertner, ‘Market Power and Mergers in Durable Good Industries’, *Journal of Law and Economics* (October 1989). Professors Carlton and Gertner of the University of Chicago are respectively President and Associate of Lexecon Inc.

A contrast: commercial aircraft

It is instructive to compare the case of agricultural equipment with the 1997 *Boeing/McDonnell Douglas* merger in commercial aircraft. The durable good argument was advanced at the time by the merging parties, but in our view a close empirical analysis showed that the conditions under which the stock of a durable good can constrain the price of a new good were not met.⁴

For example, the supply elasticity of used aircraft was found to be virtually zero: only a small fraction of the stock of surplus used (parked) aircraft could economically be returned to service (only 180 estimated units world-wide, against new demand for 16,000 new aircraft required over the following 20 years). This was unlikely to constrain the price of new aircraft given also the high average age of the world-wide fleet and rapid anticipated demand growth (the fleet of 9,000 was to be almost entirely replaced, and its size almost doubled, over the same period). Bringing the parked aircraft into service could have deferred at most 30% of the first year’s expected purchases of new aircraft.

Further, airlines work their equipment hard and have only limited ability to use their existing stock of aircraft more intensively to obviate the need for a new plane. The ability to defer retirement of existing aircraft was also limited, and even if retirement of existing aircraft could have been reduced by 5-10% this would have resulted in an increase in the aircraft stock of only 20-40 units in each year.

Unlike agricultural equipment, there were no third party suppliers of parts and services. It was plausible that Boeing could have been able to render the stock of McDonnell Douglas or older Boeing aircraft obsolete and thereby make it more difficult for airlines to extend the useful life of the stock.

These factors suggested that the durable nature of aircraft could at most increase slightly the elasticity of industry demand for new aircraft, but not make it large. Hence durability was unlikely to eliminate any anti-competitive impact of the merger.

Conclusions

Enforcement agencies have been traditionally resistant to durable goods arguments because of the potentially far-reaching implications for the analysis of mergers. However there are good economic reasons why durability can constrain future price increases for new equipment.

The effectiveness of this constraint will of course depend on the specific industry circumstances. Certainly the likelihood that used tractors constrain the price of new tractors does not extend automatically to other durable goods. For example, the rate of depreciation of tractors is low relative to durable goods such as cars and trucks (which typically have much shorter lifetimes). Used goods in these industries would therefore be less effective in constraining the price of new equipment. Similarly, rapid technological changes in durable goods such as computer and telecommunications equipment make these types of used goods less effective in constraining the price of new equipment. Only an extensive empirical assessment can establish whether the existing stock of used equipment can indeed provide a credible competitive constraint which will prevent prices from rising.

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⁴ Lexecon acted as economic advisers to Airbus Industrie.