Undefining Market Power

Trinity Economic Paper Series

Paper No. 2000/ 4

JEL Classification: D40, K21, L40

John Fingleton

Department of Economics, Trinity College Dublin,

Visiting Scholar, University of Chicago,

and Visiting Professor, National Economic Research Associates.

Acknowledgements

This paper has benefited from discussion with or comments from Giulliano Amato, Dennis Carlton, Eleanor Fox, Massimo Motta, Amil Petrin, Chetan Sanghvi, Michael Raith, and Ciara Whelan. My gratitude is also due to the Graduate School of Business at the University of Chicago for hospitality and support. I remain responsible for any errors and welcome corrections or comments to John.Fingleton@tcd.ie.

Table of Contents

I. Introduction

Market power occupies a pivotal role in competition policy. It is of direct and central relevance to the definition and identification of monopoly and to the analysis of cartels and collusion; it is used prescriptively in the regulation of mergers; and it is increasingly seen as an important criterion in deciding whether vertical restraints and other agreements such as tying are anti-competitive. Some have argued that market power should be the fundamental litmus test in antitrust policy in the sense that no conduct should be considered anticompetitive unless a firm has or would acquire market power.[1]

The great search for a clear and simple definition of market power may be inappropriate.[2] Simple definitions tend either to be incorrect or, if they are correct, to conceal the inherent complexity beneath a superficial facade. A further complication is that market power has two distinct meanings: in economics, it is downward sloping demand; in legal practice, it is as a criterion for policy intervention. I show how each can exist without the other.

I eschew yet another definition and argue instead for an increased focus on the causes of market power. Economic theory suggests that barriers to mobility (especially entry) are the fundamental source of market power. Barriers to entry should be the first point of reference for any analysis of competition and market power. At present, this role goes to market definition and concentration, and barriers to entry are considered only if concentration is high. However, theory suggests that market power could exist with lower concentration figures if there are barriers to entry and barriers to mobility within the market. Conversely,

[1] For example, Easterbrook (1984).

[2] The theme is old. Landes and Posner (1981) argued for a more economic approach to market power, but Schmalensee (1982) and others criticised the simplicity of their approach. In a similar vein, Hay (1992) unravels the complexity of market power and the difficulty of defining it.

without barriers to entry or mobility, high concentration is not informative about market power.

Although the theory that ordained concentration the high priest of market power has long been discredited, concentration continues to exercise a gratuitous, subtle and possibly even malign effect on the analysis of competition. This persistence is traced to a combination of institutional rigidity, intellectual laziness and the ease with which concentration can be measured. It has lead to excessively narrow market definitions (such as that in Kodak) with implications for the consistency of overall policy, and particularly for mergers.

The paper integrates the above points into a general overview of the literature on market power in economics. To this end, it provides a non-technical primer in the economic theory needed to understand market power and of the empirical research that has developed new techniques for analysing competition and market power. The last two decades have witnessed an explosion of such theoretical and empirical research. These frequently feed off each other, and rely on advances in game theory and technological developments that have simultaneously yielded large data sets and the computing power to undertake increasingly complex analysis. Although this work is increasingly known within economics, much of it has not been widely disseminated in the antitrust or policy field. More complete and better informed surveys of most topics exist: the comparative advantage of this paper is a concise, non-technical and up-to-date treatment.

Although this paper is primarily an economics study, legal examples are used throughout. The focus is on the law and policy in the United States and

Europe where the law is most advanced. These are representative in that other countries often adopt the law of these jurisdictions, including even the case law.[3]

The structure of the paper is somewhat constrained by the need to accomplish the twin objectives of providing an economics primer and exploring the main issues. Section II starts with an overview of the economics of market power. This establishes some basic results on how a firm with market power behaves and on the welfare effects that provide the underpinnings for competition policy today (if not its original motivation). It examines the causes of market power, outlines a taxonomy of barriers to entry, reviews different models of market supply, examines when market demand may be elastic, and concludes with a discussion of what should be the criterion for policy intervention.

Section III turns to the definitions of market power that are commonly used and illustrates that deeper complexity underlies the very simple definitions that abound. It examines how the legal statutes deal with market power and monopoly and how courts have defined market power. Although the US and EU have vague and differently worded statutes, the interpretation of market power is surprisingly similar in both.

Section IV returns to the empirical side of the economics primer and briefly outlines some econometric approaches to measuring market power that are increasingly used in court cases.

Section V applies the above discussion to the identification and measurement of market power in practice. Concentration still plays a central role in the analysis of competition, both via thresholds that are used to exclude or

[3] Central and Eastern European countries are required to adopt the case law of the EC before being eligible for membership. More generally, Fingleton, Fox, Neven and Seabright (1996) show how, in copying EC law, these countries have often exaggerated bad standards. For example, concentration and firm size may be seen as directly indicative of market power.

allow the possibility of market power, and via the presumption of market power that goes with a high market share.

Finally, Section VI brings together these issues in a discussion of single brand markets, particularly in the context of Staples (1997) and Kodak (1992) in which the US courts found very narrow market definitions. There is reason to believe that the courts tailored the market definition narrowly to obtain the high concentration figures that they believed they needed to justify a finding of market power. Such an approach can have very damaging repercussions in terms of obscuring the basis of the decision (the analysis of market power) and creating precedents that lead to bad policy subsequently. I also use the approach to market power in both the cases to illustrate some of the principles and approaches laid out in the earlier part of the paper.

II. The Economics of Market Power

Behaviour with Market Power

The behaviour of a firm with market power provides a basic understanding of market power and underpins the welfare rationale for policy.[4] In economics, market power exists when a firm faces downward sloping demand for its own output. Even when firms only have a very small degree of market power, the qualitative features of their behaviour are the same as monopoly. Thus monopoly can be used to illustrate the general results.[5]

[4] A reader interested in a fuller treatment of this (and other basic topics) is referred to any basic textbook in Industrial Organisation. Excellent examples are Carlton and Perloff (1999), Scherer and Ross (1992) and, with a more European emphasis, Martin (1994). Tirole (1989) provides a more technical treatment of most of the issues.
[5] Monopsony, market power on the buying side, is generally omitted as being analogous.

Price exceeds marginal revenue

Figure 1 illustrates a downward sloping demand curve with quantity on the horizontal axis and price on the vertical. The downward sloping demand indicates that larger quantities are purchased in the market as the price falls. One consumer is willing to pay €11, a second €10, a third €9 etc. Thus four units are sold at €8.

Marginal revenue is the extra revenue from increasing output by one unit. Comparing 2 units at €10 and 3 units at €9 gives a marginal revenue of €7 (revenue increases from €20 to €27), which is less than price of €9. This is because selling the extra unit pushes down the price on existing units. Thus marginal revenue is always less than the price.[6]

Price exceeds marginal cost

A profit maximising firm sets output at marginal revenue equals marginal cost. As price exceeds marginal revenue, it must exceed marginal cost. This is known as allocative inefficiency: prices do not reflect costs and resources are allocated incorrectly. It is illustrated on Figure 2 where marginal cost is drawn as a flat line (assuming constant returns to scale). Monopoly production is illustrated by Q_m and P_m. The difference between price and cost is sometimes measured by the Lerner index, the ratio of price minus marginal cost to price.

[6] This property is true for all demand functions. Total revenue is $TR=P.Q$ and marginal revenue is the derivative of this where $P(Q)$ depends on Q, giving $MR = P + Q\frac{dP}{dQ}$. The first part P is the revenue from the extra unit and the second is the loss of dP/dQ, the amount by which price is forced down, on the existing Q units of output. If $dP/dQ<0$ (this defines market power) it must be the case that $MR<P$. Notice that the gap between marginal revenue and price is higher the greater is Q.

Pricing occurs on the elastic (>1) part of demand

This follows from a general feature of all marginal revenue functions, namely that marginal revenue is positive if and only if demand is elastic.[7] For positive marginal costs (which is generally the case), marginal revenue is positive. In the example above, this is illustrated by the fact that the elasticity is 5 when the price is 10.[8]

In some conditions, price discrimination is possible

If the seller can identify buyers with different demands and prevent resale among them, then it may charge them different prices. The extreme example is perfect price discrimination where the seller knows each buyer's willingness to pay. For our example, the first pays €11, the second €10 etc so. Marginal revenue equals price because selling an extra unit does not reduce the price of for others and this gives price equals marginal cost (allocative efficiency). The monopoly's revenue equals the entire area under the demand above marginal cost.

Perfect price discrimination is unlikely, as it requires the monopolist has excellent information and has no competition. Two other types of price discrimination are more generally practiced and are consistent with even a small degree of market power.[9] Although profits tend to be higher, the market output may he higher or lower depending on the particular features of the model.

---

[7] Starting from footnote 6, the derivation is $MR = P\left(1+\frac{Q}{P}\frac{dP}{dQ}\right) = P\left(1-\frac{1}{e_d}\right)$. The elasticity of demand is the inverse of *(Q/P)(dP/dQ)*. Again, the result makes no assumption about the form of demand other than its negative slope.

[8] The percentage change in quantity is ½and that in price is $^1/_{10}$ so the elasticity is the ratio of these, that is $^1/_2 \div {}^1/_{10} = 5$.

[9] Second degree price discrimination occurs when a firm allows consumers to choose between different combinations of price and quantity. Quantity discounts, menus of prices, and two-part tariffs (a fixed fee plus a unit charge) are common examples. It is well-illustrated in the pricing of mobile phones. Third degree occurs

The discussion so far has focussed on static market power, namely the extraction of maximum profit for a given demand. I now turn to some dynamic issues.

Costs are not minimised

Competition encourages firms to minimise cost (productive efficiency). I separate productive efficiency into scale efficiency and cost efficiency.

Efficient scale is the output that minimises average cost. Only by coincidence would the point where marginal revenue intersects marginal cost be where average cost is minimised. Hence efficient scale is unlikely.

Cost efficiency is the lowest possible average cost curve: inputs are used efficiently. In general, a monopoly will not be productively efficient in either sense. Cost efficiency is unlikely either because firms have less incentive to reduce costs or because of competition to obtain or maintain monopoly. The former is generally known as X-inefficiency.[10] A firm with market power is not in danger of being driven from the market by inefficiency, and suppliers of inputs can obtain higher prices. Examples include managerial inefficiency and union power. The second source of cost inefficiency is rent-seeking to obtain or maintain the monopoly profit. The monopoly profit may be viewed a rent (or prize) worth fighting for and resources expended may be wasted. Examples include government lobbying and litigation.[11]

---

when a firm offers different prices to different groups based on observable characteristics, such as age, gender, etc that identifies those with less elastic demand. Student discounts and airline tickets are examples.

[10] John Hicks first observed that the best of all monopoly profits is the quiet life and Leibenstein (1966) formalised the concept as X-inefficiency. Stigler (1968b) showed that an industry that could collude on price would exhaust the monopoly profit competing on some other variable such as advertising. More recently, Sutton (1991) outlines how endogenous sunk costs may rise as the market expands.

[11] The original theory is due to Tullock (1967) and is developed by Posner (1975).

A firm with market power may not always behave inefficiently. I give three short examples and refer the reader to more detailed treatments. The first is natural monopoly where scale efficiency can only be attained within a single firm.[12] Second, market power may foster innovation. Ex post market power (as granted by patent or copyright) creates an incentive to engage in R&D and the issues here revolve around the details (breadth, duration etc.) of the protection. More controversial is the role of ex ante monopoly.[13] The third possible efficiency from monopoly arises if there are externalities. An example is a network effect where the value of a good increases in the number of users. A monopoly, by imposing a common standard, may enhance value. The possibility that firms with static market power generate offsetting benefits over time or across markets or by coordinating activity is increasingly relevant to antitrust and is at the heart of analysis in high-technology industries where innovation and network effects exist.[14]

Profits are positive or zero in the long run

Only marginal costs have been considered so far. Profits depend on fixed costs which must be less than or equal to area B in Figure 2 if a firm is to stay in business. In the short run, losses can occur only if there are sunk costs. In the long run only positive or zero profit are consistent with monopoly. Cost inefficiency (rent-seeking and X-inefficiency) mean that fixed and variable costs may expand to equal B so that zero long-run profit may be the norm for monopoly.

[12] Viscusi, Vernon and Harrington (1995) provide an excellent and relatively non-technical account of natural monopoly and Armstrong, Cowan and Vickers (1995) survey the large literature in detail.
[13] A body of literature (see Tirole, *op. cit.*, Chapter 10) has grown from the debate between Schumpeter, who argued that only monopolist could invest in risky R&D, and Arrow who pointed out that a new product damages the monopolist's existing profit (the replacement effect) so that an entrant has a greater incentive to innovate.
[14] See Shapiro and Varian (1999).

Other long term behaviour

Long-run market power, the ability to maintain market power over time, generally requires that the firm can exclude entrants, even when these are equally or more efficient. Effort by a firm to retain market power is termed strategic entry deterrence. This heading embraces a wide variety of conduct such as predatory pricing, customer loyalty schemes, tying, vertical restraints, price discrimination, and refusals to supply. In general, any conduct that could be exclusionary has a pro-competitive rationale in that it might also be practised by a competitive firm. For this reason, it is difficult to infer anything from conduct alone. A possible exception is conduct that clearly reveals productive inefficiency (such as rent-seeking). However, even if conduct indicates market power, it may not be informative about its level in which we are most interested.

Welfare and the Social Cost of Market Power

Competition policy is based on the welfare analysis of monopoly. Welfare is the total gain from trade and is defined as consumer surplus (the gain to the buyers) plus profit (the gain to the sellers).[15] It is maximised (known as first best) when the price equals marginal cost and when costs are minimised (i.e., both allocative and productive efficiency are required). At this level, nobody in the economy could be made better off without imposing a higher cost on somebody else. It is indicated as point X in Figure 2.

[15] Consumer surplus is measured as the (triangular) area between the demand curve and the price. At a price of €8 (see Figure 1), the consumer surplus of €6 is made up of €3 (for the consumer at €11), €2 (for the consumer at €10), €1 (for the consumer at €9), and €0 (for the marginal consumer at €8). At a price of €7, consumer surplus would be €10 (as four consumers are made better off by €1). Thus consumer surplus increases as the price falls (or output rises).

Market power (point Y) has two effects. First, some consumers exit the market giving a loss in consumer surplus indicated by the triangle A.[16] Second, those consumers who remain pay the higher price of P_m and their surplus falls by rectangle B. The reduction in consumer surplus is A+B, but profit increases by B so A measures the net welfare loss. Net welfare is not affected by the pure transfer from consumers to producers. Harberger (1954) measured A (the smaller of the two effects) and found the monopoly loss in the US manufacturing sector was just 0.1% of GNP.

If monopoly profit is eroded in higher costs (X-inefficiency or rent seeking) and this erosion is wasteful, the profit (Area B) becomes social loss. Posner (1975) shows that if there are constant costs associated with rent-seeking and these costs do not yield socially valuable bye-products, then all of the monopoly profit may be social loss. Including the larger monopoly profit in the welfare loss dramatically increases it. An extreme illustration is perfect price discrimination. Here the deadweight loss disappears and B equals the entire consumer surplus. There is no welfare loss using A alone, and a huge loss if A+B is counted.

Cowling and Mueller (1978) repeated Harberger's analysis for the same industries and showed how Harberger's assumptions explained the low figure: they found that different assumptions about elasticity gave 4% and the inclusion of area B gave 13%. Similarly, Posner (1975) who examined (mostly regulated) industries included area B and found examples of regulated industries where the loss exceeded 50% of revenue.[17]

[16] It is also known as the Harberger triangle or deadweight loss. If marginal cost is increasing, there is a corresponding triangular loss on the supply side.

[17] Littlechild (1981) outlines methodological problems with these approaches. Kay (1984) shows how the partial equilibrium assumption biases the findings upwards.

Another reason for treating profit differently might be that it redistributes regressively (from poor to rich).[18] The point was argued by Comanor and Smiley (1975). Some economic approaches (e.g., regulatory theory) attach a lower weight to monopoly profit for distributive reasons.[19] However, it is not clear that the beneficiaries of monopoly profit are disproportionately richer than consumers. First, if profit is dissipated, it diffuses widely to the workers and managers of the firm and to the suppliers of rent-seeking services. This makes it difficult to trace, and less likely that it benefits a particular wealth class disproportionately. Second, if profits do go to shareholders, the distribution depends on whether the poor are better represented in shareholding (pension funds and other savings instruments) or purchasing power.

The policy implications are varied. First, the literature provides support for both opponents and proponents of vigorous antitrust policy depending on how welfare losses are measured. Second, the deadweight loss is based on a competitive counter-factual, namely that marginal cost pricing could obtain without monopoly. If the appropriate counterfactual is some higher second-best price, this reduces the potential gains from policy. Some would argue that the prevailing price is always the appropriate counterfactual so that there is little role for antitrust policy. Third, it has repercussions for the direction of policy. Whereas Cowling and Mueller focussed on manufacturing where market power is due to private action, Posner focused on industries where regulation was the source. Thus Posner advocates vigorous deregulation rather than antitrust. Fourth, policy has come to emphasise consumer surplus rather than net welfare, indicating that monopoly profit is seen as social loss. Evidence for this is found in

[18] In fact, the wealth of the owners of contemporaneous trusts rather than deadweight loss provided the impetus for the Sherman Act. See Handler, Pitofsky, Goldschmid and Wood (1997) Chapter 1.
[19] This is particularly the case in the regulation of natural monopoly. See Armstrong *et al.* (1994).

the requirement to show consumer injury in the US generally, and in difficulty in defending a merger on efficiency grounds in either the EU or the US.

The Causes of Market Power

Barriers to Entry

The importance of barriers to entry to market power was first raised by Bain's (1956, Chapter 3) work. Bain's definition identified high entry costs as barriers to entry and thus included a wide range of factors such as R&D and product differentiation. In contrast, Stigler (1968a, page 67) defined a barrier to entry much more narrowly as:

> "a cost of producing (at some or every rate of output) which must be borne by a firm which seeks to enter an industry but which is not borne by firms already in the industry."[20]

Stigler, by defining a barrier to entry in terms of the asymmetry between incumbent and entrant, broke the link between the size of fixed costs and a barrier to entry. Thus, although entry might be expensive, there is no barrier unless the incumbent has (or had) an advantage relative to the entrant.

Stigler's definition is widely accepted as a minimum statement, especially as subsequent game theoretical models have shown that first mover advantage combined with commitment (e.g., sunk costs) can create a barrier to entry even if the incumbent has no fundamental cost advantage. Ultimately, much of the debate is about characterisation as many types of barrier to entry can either be squeezed under the narrow Stigler definition or can be taken out into a separate category of

[20] This relatively narrow definition countered the definition of Bain (1956) which included economies of scale, productive differentiation and other factors.

strategic entry barriers that is additional to Stigler's definition.[21] In the latter approach, advertising and R&D may act as a credible barrier to entry as Bain argued, but not for his reason but rather because they are sunk costs that enable commitment to the market.

Rather than try to enter the debate about what is a barrier to entry, I offer a taxonomy of different possible barriers to entry and illustrate how they relate to the Stigler definition and leave the reader free to juggle the different characterisations. A central issue is whether an incumbent firm can prevent entry by a more efficient competitor.

1. The incumbent has an absolute cost advantage over any entrant. An example is preferential access to an (essential) input which enables the firm to price above its own cost but below the cost of its rivals. It clearly falls within Stigler's definition.

2. Government regulation restricts entry to, or competition within, the market. Taxis provide a universal and seriously frustrating example (to which I will return). Other examples are copyrights and patents. These are clearly within Stigler's definition because the incumbent has a (legal) advantage. More ambiguity arises if the government restrict entry but allows licences to be traded; then a licence is an opportunity cost for the incumbent so it has no cost advantage (no Stigler barrier). However, the market supply could well be below the optimum (again taxis illustrate).

[21] The different approaches are illustrated by Carlton and Perloff (1999, Chapter 3) who incline towards the former and Scherer and Ross (1990, Chapter 10) and Geroski and Jacquemin (1984). Gilbert (1989) provides a detailed survey of the literature on strategic barriers to entry: both he and Waterson (1981) discuss the difficult conceptual issues associated with defining a barrier to entry.

3. Economies of scale or scope in supply that give natural monopoly.[22] Stigler (1968a) saw economies of scale as due to the size of fixed costs and therefore not a barrier to entry. Even without any fundamental asymmetry between the firms, some might consider this a cost advantage in the sense that an entrant would have a higher cost at the scale it would enter.

4. An externality in demand means that one consumer's purchase affects the value of another purchase to himself (e.g., a switching cost) or to another consumer (e.g., a network effect). For example, if one firm's software product is established first, another product may not attract consumers even if it is more efficient. Thus even an entrant with lower cost might not be able to enter.[23]

5. First mover advantage with strategic commitment such as an investment that is specific to the market and is sunk in the sense that it cannot be recovered except by operating in the market.

While most authors would agree that barriers to entry are the fundamental source of market power, the conceptual difficulty of defining a barrier to entry, and the resultant difficulty of measurement are perhaps the main obstacles to a practical approach to market power based primarily on barriers to entry.

Models of Market Supply

Models of supply range between the extremes of monopoly and perfect competition and divide into two categories according to whether entry is possible. Monopolistic competition assumes free entry and is close to perfect competition whereas oligopoly assumes an entry barrier (models have a fixed (and usually

[22] An economy of scope occurs if it is cheaper to produce two product lines in the same firm than separately. It arises when fixed or variable costs can be shared across product lines.
[23] Shapiro and Varian (1999) give an up-to-date account of the literature on the effects of networks on competition.

small) number of competitors) and is closer to monopoly.[24] Monopoly has already been described.

Perfect competition assumes free entry and homogenous output. Homogeneity implies that firms produce perfect substitutes and, as price-takers, produce up to where price equals marginal cost (allocative efficiency). Free entry ensures productive efficiency and zero profit: in turn, profit and the opportunity to reduce cost both encourage entry. With both productive and allocative efficiency, welfare is maximised (first best).

Monopolistic competition is similar to perfect competition in that entry is free but firms produce close rather than perfect substitutes (e.g., product differentiation).[25] Entry reduces the demand facing existing firms and makes demand more elastic as the entrant will target the most "overcharged" consumers. The equilibrium (long run zero profit state) of the model has the feature that each firm has a small amount of market power because demand is not totally flat. There is some allocative and productive inefficiency, but no rationale for policy intervention.

Models of oligopoly focus on how a small number of firms (often duopoly) interact where there is a barrier to entry. These models make clear that a barrier to entry is not sufficient for market power. In other words, rivalry within the market may result in a competitive outcome, even with a barrier to entry. A standard example is Bertrand price rivalry between two firms producing a homogenous

[24] A common but mistaken distinction is that oligopoly has fewer firms. Sutton's (1991) example of how a small number of firms in a stable market can result with free entry where sunk costs are endogenous blurs the distinction somewhat.

[25] The theory of monopolistic competition originated with Chamberlain (1933) and Robinson (1934) and has been extended and built up by many authors. See Carlton and Perloff (1994) or Shapiro (1989) for an overview of both models of supply. The term monopolistic competition (also known as imperfect competition) may be confusing because it is "closer" to perfect competition than to monopoly.

good under constant returns where productive and allocative efficiency obtain.[26] Similarly, price discrimination by oligopolists may be intensely competitive.[27] More generally, other assumptions lead to oligopoly results with market power. In particular barriers to mobility (expansion), weak price rivalry and repeated interaction may lead to a price close to the monopoly level. A central methodological difficulty is whether this should be described as the "competitive level".

A barrier to mobility whereby competitors may not easily expand or re-position their products acts much like a barrier to entry.[28] If its competitors cannot expand, a firm suffers little by increasing its price but, if they have constant returns and can expand rapidly, the high price firm will face a more elastic demand. A widely used model that illustrates the importance of barriers to mobility is the dominant firm with a competitive fringe.[29] The (elasticity of the) residual demand facing the dominant firm depends on the ability of the fringe to expand. If the ability of the fringe firms to expand is proportional to market share, then the dominant firm has market power. Thus barriers to mobility within an oligopoly can create market power in the same way that barriers to entry do generally.

---

[26] If the barrier entry is a sunk cost, Sutton (1991) argues that just one firm would enter. For this reason, the reader should assume that the barrier to entry is regulatory. With fixed costs, price discrimination may be the equilibrium competitive pricing paradigm.

[27] Borenstein and Rose (1994) show that price discrimination in airline ticket pricing may actually reflect competitive rather than monopoly pricing. A similar result is obtained by Walsh and Whelan (1999) for supermarket pricing. In both cases, price discrimination enables the firms to recover fixed costs from those consumers with high willingness to pay, with close to (or perhaps below) marginal cost pricing for other consumers.

[28] Decreasing returns to scale (increasing average cost) form such a barrier: the extreme example is a capacity constraint where average cost becomes vertical. With product differentiation, the sunk costs of current brands become a barrier to mobility.

[29] The original model was developed by Stigler (1964) and is outlined by Carlton and Perloff (1999, Chapter 4) and was extended to deal with several dominant firms by Ordover, Sykes and Willig (1982). It is influential in court cases, see footnote 64 below.

Other oligopoly models focus on price rivalry and the fact that repeated interaction may lead to collusion, especially in if static price competition is intense (as this increases the incentive to collude and the ability to punish defectors).[30] If price rivalry is weak, market power may exist in a static sense and, if it is strong, collusion is more likely. Thus oligopoly theory provides ample support for the policy focus on both unilateral market power and joint market power.

Market Structure and Welfare

Bain (1951) showed a correlation between concentration and performance. He divided a group of industries into more and less concentrated and showed that the profit rate was higher in the more concentrated industries. Bain's work started the structure-conduct-performance (SCP) paradigm, which postulated a one-way causal link from market structure through conduct to performance. In particular, the smaller the number of firms (concentration), the less intense is price rivalry (conduct), and the greater is the price-cost margin (performance). The SCP idea that barriers to entry cause high concentration, which in turn causes market power and poor performance, was hugely influential. One of its main effects was that concentration measures such as market share, concentration ratio, or the Herfindahl-Hirschman Index (HHI) became central to the analysis of markets, in both academic research and competition policy.[31]

SCP had some merit in the context of theory at that time: monopoly and oligopoly were generally associated with a small number of firms whereas perfect and monopolistic competition typically involved lower concentration. However, it

[30] Shapiro (1989) refers to the topsy turvey feature of oligopoly: factors that increase competition in static games increase the likelihood of collusion in dynamic ones.

[31] The 4-firm concentration ratio is the combined market share of the largest 4 firms in a market: it varies between 0 and 100. The HHI is the sum of the square of the market shares of all firms in the market and varies between 0 and 10,000.

is now largely discredited and is considered to have little or no predictive power. Three insights have been particularly important it its decline and fall.

First, Demsetz (1972, 1973) pointed out that a correlation between profit and concentration can be explained equally well by an efficient firm that can earn higher profit and have a higher market share. This explanation ultimately relies on a long-run barrier to entry that explains both concentration and performance jointly. Demsetz's work was just one example of the Chicago School counter-attack which argued that concentration in itself was not bad.[32]

Second, Baumol (1982) and Baumol, Panzar and Willig (1982) developed the idea of a contestable market as one in which the threat of entry would be sufficient to make monopolist behave competitively. Although a contestable market is very rare, the theory is conceptually important in highlighting the role of potential competitors and in explaining why high concentration can be consistent with competitive performance.[33]

The third nail in the SCP theory is Sutton's theory of the endogeneity of market structure.[34] Intense price rivalry reduces price cost margins which in turn is a disincentive to entry. As a result, the most rivalrous markets are likely to be more concentrated. Conversely, a market with weak price rivalry may support a large number of firms. Sutton's work turns the SCP idea of causality on its head so that concentration and performance may not even be correlated.

---

[32] See Shughart (1995) on the Chicago School approach to antitrust.

[33] Contestability depends on two very specific assumptions (that there are no sunk costs and that the incumbent cannot quickly change prices). The theory highlights the role of sunk costs as a barrier to exit.

[34] Earlier authors (Weiss, 1974 and Dasgupta and Stiglitz, 1980) had similar insights, but Sutton (1991) develops a unified theory and emphasises the endogeneity explicitly. He also introduced a distinction between endogenous and exogenous sunk costs that explains differences in concentration across industries and countries. Sutton (1998) develops the "bounds approach" further to incorporate the possible presence of sub-markets within a more broadly defined product market, and how this affects overall concentration in markets with non-price competition involving endogenous sunk cost outlays.

These new theories are all consistent with the idea that barriers to entry are the fundamental source of market power, even if this is not their primary emphasis. Concentration tells us little in a positive or negative sense. High concentration may be consistent with intense rivalry and low concentration with market power. However, as we see below, policy has been slow to wean itself from its original dependence on SCP.

Market Demand and Market Power

The Bertrand model (see page 16) is an example where there is a barrier to entry but no market power. More generally, market power may not exist for a monopolist if the market demand is very elastic. For this reason, defendants frequently resort to arguing that the market demand is elastic, generally with one of the following rationales.

First, Coase (1962) argued that the demand for a durable good should be perfectly elastic, unless it can be made less durable by leasing or the monopolist can commit not to reduce the price in the future (by a buy-back policy). This insight has spawned a huge literature in economics on the precise assumptions under which it holds.[35]

Second, a secondary market may constrain the ability to charge the monopoly price. Examples here include a stock of used products (Alcoa unsuccessfully claimed that recycled aluminium constrained its market power) or the ability of consumers to make good quality home copies (Microsoft and music publishers point out that higher prices encourage copying so that the demand is relatively elastic).

[35] A nice example of the derivative literature that also links with the second point below is Waldman (1997) who shows how long-term leases may be used to eliminate second-hand markets.

Third, there may be a complementary market that checks market power. An example is the after-market for a durable good in which the original manufacturer competes with independent service organisations (ISOs).[36] If the manufacturer has market power in the aftermarket (for parts or service) but faces intense competition in the fore-market for the durable good, the latter should prevent exploitation of the former: steep demand in the aftermarket is checked by flat demand in the fore-market. The argument depends on consumers being able to anticipate fully the aftermarket prices and base their fore-market decision on this and was a central issue in the Kodak case, reviewed in detail below.[37]

Market power might not exist for many other reasons such as countervailing buyer power or because the product has a homemade substitute: what is important is that we recognise the possibility that a barrier to entry does not imply market power.

A Criterion for Policy Intervention

What should be the criterion for policy intervention? Welfare analysis suggests situations where a price substantially above cost can be maintained for a long period, and with productive efficiency. I propose the term welfare-reducing market power (WRMP) to describe this type of market power. Market power in economics is defined in terms of downward sloping demand. The two concepts are not equivalent and each can exist without the other.

[36] Another example is that of supermarket pricing where competition may be focussed on goods whose prices are known by consumers (see Walsh and Whelan, 1999). Cross-subsidisation is implicit in these models and the central issue the price for the "package" of compliments rather than whether there is competition in each of them.
[37] The issue has not arisen directly in an EU case, but was raised in the undertaking given to the European Commission by Digital Equipment Corporation in 1997 (Commission press release, Oct 10, 1997 IP/97/868 and Dolmans and Pickering, 1998).

Market power without WRMP is illustrated by monopolistic competition. Each firm has market power in the sense of downward sloping demand. However, because it is very elastic (flat), welfare losses are minor. Policy intervention to rectify this minor loss either does not exist or is not clear, so that there is no WRMP. This inconsistency has long been recognised (see Hay's (1992) example of a restaurant with market power and free entry) and is usually addressed by requiring a high degree (steeper slope) of market power for policy intervention.

WRMP without market power is not so widely recognised, but is illustrated by the textbook example of perfect competition with a barrier to entry. A hypothetical taxi market in which entry is regulated (but price is not) and each licensee faces decreasing returns illustrates. If price rivalry is intense, each firm faces flat demand and prices at marginal cost. However, with too few firms, high demand increases output per firm and, with decreasing returns, this pushes marginal costs up. Consequently, the market price may be substantially above minimum average cost but not above marginal cost.[38] The example shows how the slope of the demand of individual firms could be zero, but there could be a large welfare loss. Although this may be a short-run scenario (as it is depicted in textbooks), or only arise in the long term with regulation, it illustrates that testing for market power by looking at firm demand is not sufficient.

These two examples demonstrate that the barrier to entry is the fundamental source of the problem and that this is true regardless of whether the demand of firms is elastic or inelastic or of whether the market is concentrated or not.

[38] There may be other costs and in extreme cases the industry marginal cost may not intersect the demand. Fingleton, Evans and Hogan (1998) document queues of several hours that would support the latter. Price rivalry is generally more intense in the market for booking by telephone than that for on-street bookings.

However, it is possible to construct (a somewhat rarefied) example in which market power can exist without a barrier to entry. I use the taxi market, but with different assumptions. Suppose now that fares are regulated close to the monopoly price but that entry is not. The high price will attract entry until taxis are idle enough to make further entry unprofitable. Both productive and allocative efficiency are adversely affected so welfare is likely to be much reduced. Profits are social loss (because they are eroded by productive inefficiency), except for the value of reduced waiting times. Here each firm has WRMP, but there is no barrier to entry. A regulated price is an extreme example of weak price rivalry, but the effect could be produced by consumer switching costs, search costs, or barriers to mobility, and is one of the insights of Sutton (see page 19 above). Antitrust either ignores such markets or, if it sees a genuine concern, may resort to excessively narrow single brand markets as discussed in Section 6.

In summary, although a barrier to entry is the fundamental source of market power, it is neither sufficient nor necessary. A barrier to entry may exist without market power and market power may exist without a barrier to entry. However, as the latter is likely to be rare and can be re-characterised by narrow market definition, I would emphasise that barriers to entry are almost always necessary for market power. As a result, I conclude that any test for market power should ideally start with an investigation of whether there are barriers to entry in the market. The analysis should then proceed with an examination of those factors that affect price rivalry and the mobility of firms in the market.

III. Defining Market Power

Existing Definitions

It is common practice to define market power using very simple definitions. Almost all definitions focus on long-term market power: I abstract from the differences and difficulties in deciding on the time frame.[39] Otherwise, almost all definitions fall into one of two categories.

Downward sloping demand, also expressed as an ability to raise price by reducing output.[40] Most emphasise the point made above that there must be a high degree of market power.

The second is an ability to maintain prices above competitive levels (or cost).[41]

Many authors distinguish monopoly power from market power; usually by saying monopoly power is a high or significant degree of market power. Carlton and Perloff (1994) have proposed using market power for A and monopoly power for B.[42]

One characteristic that most definitions share is a simplicity that belies the underlying complexity. As a result, they either risk incorrect diagnosis (e.g., type A, because market power can exist with flat demand), or require further qualification (e.g., type B, because competitive levels must be defined).[43]

---

[39] While the sluggishness of enforcement imposes a minimum time limit, this may not be sufficient to please those who believe that the market will act to rid all monopoly in the long run. Salop (1986) argues that if entry cannot occur easily in a relatively short period, then it may constitute a long term barrier.

[40] Examples include Landes and Posner (1981) and Hay (1992).

[41] Examples include Gellhorn and Kovacic (1994, page 94), Areeda and Kaplow (1997, page 556) and the US Merger Guidelines.

[42] Although this attractive distinction may have been catching on, it is not repeated in their 1999 edition.

[43] Competitive levels should be measured as average (not marginal) costs at some (usually second best) level of cost efficiency. I emphasise cost efficiency (getting on to lower average cost for given output) rather than scale efficiency as including the latter would include imperfect competition which is not desired.

Rather than yet another definition of market power, I propose a procedure for identifying market power. The first or negative test would conclude that there is no market power if entry is easy and price rivalry exists. If this test fails, a second (positive test) would further analyse of price rivalry, barriers to mobility and the elasticity of market demand.[44] This procedure is not revolutionary in the sense that it would incorporate the same elements of existing analysis, but the order in which they are presented would place greater weight on barriers to mobility and rivalry within the market and less on concentration.

Definition in Practice

In law, different terminology that is used to describe market power. US law uses "monopoly" and "monopolisation" and EC law the term "dominant position".[45] Over time, the courts have had to grapple with the meanings of these terms and the consensus that has emerged has a number of interesting features.

First, the courts have moved close to a concept of welfare reducing market power (WRMP) as discussed above. Although the original statutes (particularly Sherman) are vague as to the welfare standard and were not motivated by a clear concept of economic welfare, the courts have focussed increasingly on economic welfare and, in some instances, solely on consumer welfare. This is especially clear in the US where the standard for illegality is based on consumer injury. The

[44] Kahai *et al.* (1996) adopt this approach for the long-distance telephone market where price is regulated. They estimate the elasticity (and market power) of AT&T indirectly by measuring elasticity of market demand, the elasticity of fringe supply, and combining this with market share in a dominant firm model.

[45] The core provision in the US is Section II of the Sherman Act (1890) which makes it illegal to "monopolize, or attempt to monopolize, or combine or conspire….to monopolize". Under Section 7 of the Clayton Act (1914) a merger is illegal if its effect may be "substantially to lessen competition or to tend to create a monopoly". This is repeated in the Robinson-Patman Act of 1936. For EC law, Article 82 (Article 86 before it was renumbered by the Amsterdam Treaty in June 1999) of the Treaty of Rome (1957) makes illegal the abuse of a dominant position and, unlike the Sherman Act, gives a list of exemplary abuses. The term dominance has recently crept into US law. In the *Toys 'R Us* (TRU) case, the FTC concluded that TRU was dominant on the market. Judge Posner, in *Trade Cases on Brand Name Prescriptions* [CCH 1997-2] makes a distinction between monopoly and dominance and says that a lower market share is required for dominance. *Fortner* and *Kodak* use "appreciable economic power".

merger regulations in both jurisdictions measure restricting competition in terms of consumer surplus.

Second, the US law tends to prevent more dynamic behaviour that maintains or increases market power rather than excessive pricing, although static market power must be present. The Supreme Court has stated in Grinnell

> "The offense of monopoly….has two elements: (1) the possession of monopoly power in the relevant market and (2) the wilful acquisition or maintenance of that power as distinguished from the growth or development of a superior product, business acumen, or historic accident."[46]

This reflects a view that the role of antitrust law should be to allow entry and other market forces to restrict such power, clearly stated in Standard Oil: "the individual right to contract when not unduly or improperly exercised was the efficient means for the prevention of monopoly". Otherwise, a finding of illegality would lead to a regulatory form of antitrust perhaps involving a tendency towards price controls. High pricing is illegal if it results from collusion because the conduct can be remedied. In contrast, pricing above competitive levels by a single firm, although it may be indicative of market power, is not in itself illegal. Rather strategic behaviour to prevent entry that enables such pricing to continue is illegal.

In EC law, charging a clearly excessive price is illegal, but practice emphasises long-run market power, and there have been almost no cases of direct abuse of dominance and the focus is instead on indirect abuse as in the US.[47]

[46] This echoes back to Learned Hand's famous remarks in *Alcoa* about superior skill and foresight, having monopoly thrust upon a firm, and those who do not seek and cannot avoid monopoly.

[47] Article 82 lists as an example of abuse "directly or indirectly imposing unfair purchase or selling prices or other unfair trading conditions" which clearly can capture pricing above competitive levels in the absence of entry

These two facts together produce a nice irony. Although the standard for illegality emphasises consumer welfare, the focus on dynamic rather than static market power means that it will usually be competitors and entrants that take private action, and not consumers.

Third, the US courts have always interpreted monopoly to mean market power in the sense of having power over price rather than as 100% of the market. At the same time, the courts have established a standard of a high degree of market power, and have thus eschewed a definition of market power based solely on downward sloping demand. Here again, dominance in EC law is similar.

Fourth, intent sometimes plays an important role in illegality. In the US, intent is important as a guide to determine effect, as in attempt to monopolise. Bolton et al. are critical of the US approach to predation and argue that the way intent is interpreted means that predation is almost impossible to prove in law despite compelling evidence that it works in practice. They propose that intent should be part of the rules for judging predation. In the EU, Article 82 does not mention intent (unlike Article 81 which says "object or effect"), but the court has been happy to look at instances where a practice could create or increase market power, even where none currently exists.[48]

Fifth, it is difficult to relate the term dominance in EC law to any single economic concept. The ECJ (the highest European court) defined dominance in Michelin as

---

deterrence. One case, *Leyland*, involved a firm charging for checking standards on cars that were generally new (and hence already meeting standards). In this case, a clear benchmark cost (zero) was available. In its 24th Report on Competition Policy, the Commission acknowledged that it does not look for direct abuse.

[48] This was evident from the ECJ's treatment of mergers under Article 86 prior to the merger regulation. See Goyder (1998).

> "A position of economic strength enjoyed by an undertaking which enables it to hinder the maintenance of effective competition on the relevant market by allowing it to behave to an appreciable extent independently of competitors and ultimately of consumers"

It has also determined that dominance is not illegal, only the abuse of dominance is.[49] As abuse of dominance includes both static (high pricing) and long-run (exclusionary) market power, it is not possible that dominance refers to the former. The court has stated that dominance can exist without abuse. This begs the question of why a firm that could behave independently of competitors would not do so? One possible resolution could be that dominance could exist without abuse if the market demand is inherently elastic, but there is no evidence to support this.[50]

Many of these issues are somewhat pedantic. The important point is that despite the vague and different wording of the statutes in both the US and the EU, the case law has converged substantially, and in general towards a concept of market power that is closer to that based on welfare economics than to one based on the original motivations for either statute.

I have concentrated on market power in single firm cases. Market power is clearly defined in the merger regulations of both jurisdictions in a way that is consistent with (and sometimes elucidates) its definition in single firm case law. In the US, market power has also entered cases taken under Section I of the Sherman Act: except in cases of per se illegality or where a collaboration clearly

[49] Dominance without abuse in EC law is illustrated by the failure of the excessive pricing claim in the *United Brands* case.

[50] In Ireland, the courts have often determined dominance without abuse (see Fingleton, 1998). Here it seems that judges strike for a middle ground (indicating fairness?) and find dominance but not abuse.

restricts competition and is not justified by efficiency, market power is necessary for Section 1 violation.

IV. Econometric Measurement of Market Power

Technical approaches to measuring market power focus mainly on market performance (some proxy for welfare) or the elasticity of demand facing a firm.[51] For more in depth treatments see Carlton and Perloff (1999, Chapter 8) and Scherer and Ross (1990, Chapter 10) for further detail.

Performance: Profit and Margins

From Bain (1951), economists used structural variables to explain and measure performance, measured by the price-cost margin or the profit rate. The theory that exogenous structural variables caused performance enabled regressions based on cross-industry data. A central finding is that price-cost margins are higher in more concentrated industries.

Several of the problems with this approach are already evident. In particular, Type I error (finding market power where there is none) can happen if the structural variables are not exogenous: concentration and high margins may be caused by entry barriers (Demsetz) or causality may be in the opposite direction (Sutton). Type II error (finding no market power where there is some) could happen if productive inefficiency means that measured costs exceed the competitive cost level. In addition, the measurement of cost is a constant problem. Average variable cost is generally measured as a proxy for marginal cost and is

[51] I do not include here a small literature on the measurement of barriers to entry directly (e.g., Bresnahan and Reiss (1995) who quantify barriers to entry in the dental profession). John Sutton's (1991 and 1998) books adopt a different approach to understanding and measuring barriers to entry on a case by case basis.

based on accounting rather than economic costs. For rate of return studies, the cost of capital was always a source of concern. With multi-product firms, there is the additional complexity of attributing costs to different product lines.

Later studies attempted to address various methodological problems and measurement errors as, for example, in exploiting cross-country differences in concentration where industry factors could be held constant. Schmalensee (1989) surveys and defends cross-sectional studies and develops a set of robust stylised facts. Bresnahan (1989) cautions that there may be a selection problem in terms of the industries that are studied.

Bresnahan, Porter and others undertook major innovations in the measurement of market power by estimating mark-ups without measuring cost.[52] Bresnahan exploited the fact that an industry's supply response to an external shock (to demand or to cost) depends on how competitive is conduct in the industry (measured by a parameter θ). For example, a demand shock that makes demand more inelastic will increase price if θ is positive: under perfect price rivalry ($\theta=0$), the long-run price is determined my minimum average cost alone and does not change. Porter's approach was to use the fact that a cartel price war creates two regimes, intense price rivalry and collusion. Assuming marginal cost pricing in a price war, the low price estimates the marginal cost (θ is zero). Given this benchmark, the level of θ for the collusive period can be estimated.

Both models have been used to test for market power in oligopoly. Bresnahan (1981) found evidence of market power in the US car market in the 1950s and Porter (1983) found modest levels of market power for a 1880s railroad

[52] Bresnahan (1989) provides a comprehensive, technical survey of his own and Porter's work. Pindyck and Rubinfield (1995) provide a less technical overview. Recent work has tested such methods for industries where costs are known and where the results from θ can be compared with actual costs.

cartel.[53] These studies enabled the measurement of market power using only demand side or industry level data provided an appropriate exogenous or regime shifts enables identification of market power.

Elasticities

Market power can also be measured by the elasticity of demand.[54] The most basic econometric estimation of demand involves writing down a demand equation for the product and using price and quantity data (at the firm level) to estimate the own-price elasticity. The long run (or residual) elasticity is measured after other explanatory variables have changed: this means that it includes both consumer responses and the reactions of competitors and entrants. For the purposes of measuring market power, it is important to measure the elasticity at the competitive price level. Otherwise, because a monopolist operates on the elastic part of demand, a high elasticity cannot distinguish high substitutability from market power.[55] This approach may be used to define the relevant market: an example is the SSNIP test in US merger guidelines. The process starts with asking whether one firm faces inelastic demand; if not, the closest substitute is added to see if jointly they face inelastic demand; once inelastic demand is found, the market is then defined.

A more sophisticated approach is to write down a full demand system for all the products that are interrelated (for example, all models of cars or brands of breakfast cereal). The main problem here is that data do not enable the accurate

[53] Ellison (1994) on the same data set found market power closer to the monopoly level.
[54] See Baker and Bresnahan (1988 and 1992), Froeb and Werden (1991), and Scheffman and Spiller (1987).
[55] This is called the "cellophane" fallacy because the US Supreme Court probably incorrectly inferred high substitutability on the basis of a high measured value in *du Pont*. It applies for monopoly cases where the question is whether market power exists, but not for mergers where the question is whether market power would be increased (further). High substitutability would prevent a merger, and this is appropriate if the products are close substitutes regardless of whether this is inherent or due to existing market power. Areeda and Kaplow (1997, page 561) provide a clear and simple example.

estimation of all the many elasticities so that restrictions on cross-price elasticities are necessary.[56] Different methods are distinguished by different restrictions. The Logit approach assumes, in effect, that elasticities are proportional to market shares, which is inappropriate for substitutability. In contrast, the almost ideal demand system (AIDS) involves a nested-choice model in which products are grouped together and so that only the cross-price elasticity within the groups needs to be estimated.[57] Technological advances have increased both the availability of (scanner) data and the power of econometric analysis so that considerable advances have been made in this area.

V. Market Power in Practice

The SCP paradigm has been hugely influential in the area of antitrust policy. It has created a systematic approach to the identification of market power as follows:

a) identify or define a relevant market;

b) measure concentration on that market by the Herfindahl or other market share statistic; and

c) identify if market power exists based on concentration, barriers to entry, and other factors.

This long-standing procedure has been modified only slightly over the decades. It is generally seen as an essential ingredient of a systematic and

[56] For example, with 20 products each product has one own-price and 19 cross-price elasticities. The total of 400 (20 own-price and 380 cross-price) is reduced because the matrix of cross-price elasticities should be symmetric and because there are summing up restrictions. Even still, 190 separate elasticities must be estimated. A 21st product would add a further 20 parameters to be estimated.

[57] Formally, it assumes multi-stage budgeting with fixed expenditures within a class of products. Market shares are then regressed on the price of each good to find the elasticities. Berry (1994) and Berry *et al.* (1995, 1997) develop pioneering new techniques in the estimation of demand for product differentiated industries.

consistent policy, and is increasingly formalised in the competition rules of different countries, as indicated by the adoption of new market definition guidelines in the EU in 1997.

Within the procedure, SCP has also influenced the standards that apply and, in particular, the predominant role played by concentration in the determination of market power and in the analysis of competition generally.

Concentration as High Priest

Concentration is used to identify market power in two ways: it may be inferred from a high market share, or a low market share can be used to exclude the possibility of market power. Thus concentration works through lower and upper thresholds.

The existence of a lower threshold that is exculpatory is seen directly in judgements. In Alcoa Judge Learned Hand commented that "it is doubtful whether sixty or sixty-four per cent would be enough [to be monopoly], and certainly thirty three per cent is not". Similarly, in Times-Picayune, the court found that 40% of the market did not constitute "dominance" and in Jefferson Parish, 30% was considered to be far too low. It is also implicit in the fact that courts have not found market power below a market share of about 50% in the US and 40% in the EU.[58] Such a lower threshold acts as a filter: it excludes cases of "minor importance". However, to the extent that there is no direct link between concentration and market power, then this procedure risks type II error (failing to find market power).

[58] The lowest level in EU case law is *United Brands* where 40-45% share coupled with strong vertical integration and control of inputs was found to be dominant. In the US, market share of 60-69% was considered, with other factors, to indicate dominance in *Syufy*. See Handler *et al.* (1997, page 219).

Early cases in both jurisdictions are suggestive of an upper threshold for market power in the region of 80 to 90 per cent. For example, in Alcoa the figure was 90% (over many years) and in Hoffman-la Roche it was 70-95% in a range of related markets and maintained over three years. However, while careless language in early cases may have resulted in direct inference of market power from market share alone, later cases are careful to state clearly that market share is but one factor that must be considered. Although this appears to downplay the role of concentration, it is clear from reading even contemporary judgements (see Staples in Section 6 below) that a higher market share alters the status quo in the sense that it leads to an "an overwhelming presumption of dominance".[59] In addition, some statements of the court may indicate a blurred distinction between presumption and conclusion.[60] The way in which remedies in mergers (such as divestitures) are frequently based on high market shares rather than on barriers to mobility in the market also illustrates the underlying preponderance of market share.[61]

One reason why the upper threshold is weaker (presumption instead of inference) is that the Chicago School attack on SCP was primarily on the type I error (finding market power when there was none) and much less on type II. Because it is difficult to find firms with close to 100% of a market that do not have market power, presumption may not differ much from direct inference.

[59] See Goyder (1998, page 321).
[60] In *Jefferson Parish* the court stated that the fact that a substantial majority [70%] of the parish's residents elect not to enter East Jefferson [hospital] means that the geographic data does (sic) not establish the kind of dominant market position that obviates the need for further inquiry into actual competitive conditions". In *Grinnell*, it said that "the existence of [monopoly] power ordinarily may be inferred from the predominant share of the market" and that "87% of the…business leaves no doubt that the congeries of these defendants have monopoly power…".
[61] Examples in the EU abound and include the Nestlé-Perrier and Hoechst-Rhône-Poulenc mergers. Generally, the market shares are defined on a country-by-country basis.

A belief that high concentration makes market power more likely alters the burden and proof and ceteris paribus increases the probability of determining market power.[62] Even if one can show that market power and concentration are correlated, this approach would be inappropriate if one could measure more precise indicators such as barriers to entry. Presumption rather than inference is the more ominous legacy of SCP because it is both subtle and pervasive.

It is not just in law that SCP lives on, despite lacking solid theoretical credibility. In the academic economics literature, concentration is still widely influential. Many textbooks teach the SCP paradigm with little substantive reference to the criticisms that have been made of it. Papers are still published in which market power is inferred directly from concentration.[63] Another example is the use of the dominant firm model which emphasises barriers to fringe expansion. Very often, authors just assume that mobility is proportional to market share, and thus see the model as justifying a market share approach to dominance, and pay little attention to the actual mobility of the fringe.[64]

The use of thresholds as a filter is formalised in the US merger guidelines where threshold levels of the HHI trigger a second stage investigation. Although EU merger regulation relies instead on turnover thresholds, the EU Green Paper on Vertical Restraints has proposed that market shares should act as a filter in a similar way.

---

[62] For example, Mueller (1996) proposes that a firm that maintains a high market share for a period of 35 years or more should be presumed to have done something illegal unless it can demonstrate otherwise. This could impose substantial costs on the most efficient firms.

[63] A representative example is Kovenock and Phillips (1997) who claim at page 771 that in a concentrated industry "the discipline of the market does not weed out nonoptimising firms" and cite Leibenstein (1966). Clearly the concentration could be due to the discipline of the market.

[64] The dominant firm model is used by Posner in *United States v Rockford Memorial Corp*, 898 F.2d 1278 (7th Cir), cert. Denied, 111 S. Ct. 295 (1990) as cited in and critiqued effectively by Hay (1992, p822). Another example is the fact that the observation of Scherer and Ross (1980) that 40% would be a sufficient market share for the model to apply is widely cited.

In both, the fundamental sources of market power, namely barriers to entry, mobility and price rivalry, are only examined if concentration is high. Again, type I error is well understood: the Merger Guidelines say that if rapid significant entry is easy, a merger will be permitted regardless of market concentration. However, there seems to be little acknowledgment of the possibility of type II error, and finding actual cases as examples is difficult because of their omission.[65] For this reason, attention usually focuses on the other type of error, finding market power where there is none.

Why does concentration continue to dominate legal practice when it is discredited as having any predictive power in theory?

One reason is clearly stare decisis and the power of precedent in law.[66] Even where they analyse other factors thoroughly, contemporary cases always cite these earlier cases in order to support the presumption of market power. Most books on competition law attribute clear authority to such precedents, encouraging an implicit association of concentration with market power, even if they highlight that concentration is but one factor in the determination of market power. However, stare decisis does not explain why enforcement bodies that are not bound by precedent as the courts are have recently developed guidelines that use market concentration as a filter for market power.

Another is intellectual lethargy and the slow communication of ideas from economics to law. Concentration can be summarised in a single market statistic

[65] An example of where market power could exist with a lower market share (although it is not interpreted in this way) is *Magill* where each of the upstream suppliers of television listings had 33% of the market. Each supplied listings for two television programmes services to a downstream magazine. Barriers to entry were self-evident (due to regulation), and they provide complements (seen from the magazine producer). If this market had been characterised by 10 firms, and not 3, each would still have had considerable (possibly the same) market power as a monopoly, yet it would have slipped through any concentration threshold.

[66] *Stare decisis* is a basic principle of law whereby a precedent based on one set of facts will be applied in cases which subsequently embody the same set of facts.

and, in an ocean of ambiguity and technical complexity, can become a compelling focal point. It is easier to measure concentration than to measure the cause (barriers to entry) or the effect (market power or performance). Having once been given a theory that places concentration firmly in the middle of this chain of causation, it is difficult to remove it. However, intellectual lethargy does not entirely explain FTC/EC guidelines, because these bodies have considerable specialist expertise.

Perhaps most important is first-mover advantage in ideas, especially when institutionalised. A more pragmatic factor is the pressure on enforcement authorities to provide businesses with clear bright-lines, and the fact that market concentration can be summarised a single number. Ironically, certainty is elusive because the reliance on market definition simply moves the uncertainty back to that factor.[67]

Barriers to Entry

Market power is rarely determined without an analysis of barriers to entry, although that analysis may be influenced or coloured by the market share statistics that preceded it. In practice, the focus is on conduct that might increase barriers to entry or otherwise prevent entry or restrict the growth of firms. In many cases, the courts incline towards entrants for fairness reasons, and pay little attention to whether the entrant is more or less efficient than the incumbent.

As noted above, conduct that excludes entrants in an anticompetitive way could improve efficiency in the sense that it would be rational for a firm not threatened by entry to do the same. Examples include below cost selling

[67] Particularly relevant is the extreme sensitivity of concentration to market definition. For example, du Pont had 75% of the market for Cellophane but only 20% of the market for all flexible wrapping materials.

(predatory pricing or sales promotion?), tying, distribution agreements, price discrimination, and consumer loyalty programmes.

Other factors creep into the analysis. These include financial security, the length of time that the market has been stable and the firm's own perception of its position. Profits and high rates of return, which were once considered important (e.g., Cellophane), are less used now.[68] On the other hand, cost inefficiencies such as high union power specific to a firm or systematic strategic management errors which may indicate X-inefficiency and slack that is not disciplined by market power are rarely introduced as evidence.

Market Definition and Unilateral Effects

Market definition is generally the first stage in the analysis of market power, with almost identical approaches the US and EU.[69] The objective is to find the smallest product space and geographic area over which demand is inelastic. As such it is conceptually identical to asking about (short run) market power in the sense of downward sloping demand.[70] Given this conceptual similarity, why do we measure market definition and then go on to analyse other factors to ascertain market power when we could simply measure market power directly?[71] In other words, why measure the short-run elasticity for a group of products instead of the long-run elasticity of demand facing a single product?

The lack of detailed data is one reason. But where data are not available, market definition comes from a subjective analysis of the characteristics, which is not obviously better than a subjective analysis of market power. Another reason is

[68] The FTC compared average margins of 30% for Toys "R" Us with margins of 9% with warehouse clubs.
[69] See the Federal Trade Commission (1992) and European Commission (1998).
[70] The US approach focuses on the elasticity of demand in the short-run. Conceptually, the EU approach incorporates supply substitutability.
[71] Landes and Posner (1981) argued that market definition was not necessary to analyse market power.

that market definition achieves consistency across cases. Dependence on market definition may not be healthy. For one, it leads to a fixation with concentration. Second, it may actually distort the market definition and make it inconsistent.

The issue is raised in the unilateral effects approach in US mergers. Previously in the US (and still in the EU), emphasis was on whether structural change in the market would either create monopoly or dampen competition because of "coordinated effects" in oligopoly. Now it asks whether the merger would enable a unilateral increase in price:

> "If a significant number of consumers consider the merging firms' products to be their first and second choices (at pre-merger prices), then the merged entity will have an incentive to impose a non-trivial price increase following the merger" (Shapiro, 1995)

A test of this would be whether the cross-price elasticities between the merging products were higher than the other cross-price elasticities.[72] This exercise, whether by use of an econometric model and extensive data or subjective interpretation of the facts, does not raise the question of defining the market. Here the market could include many products and the outcome does not depend at all on the market shares of the products in question.

Consider a market with low mobility (little product repositioning or entry), nine brands with equal market share, where two adjacent firms merge.[73] Adjacent here means that their products are the closest substitutes for each other within the market, so that the merger would increase price. The unilateral effects approach

[72] The test for existing market power would be the own-price elasticity but I use cross-price elasticities here because the test is prospective. If the cross-price elasticities are high, then the post merger own-price elasticities would be higher than the pre-merger ones. Thus the two tests should be consistent. However, I cannot measure the post merger own-price elasticity directly. The Cellophane fallacy does not apply (see footnote 55 supra).

[73] The example would be the same with 12 brands, however here it would fall below the Herfindahl threshold resulting in type II error.

enables the market to be defined broadly as including all 9 brands, and yet for the merger to be prohibited because of an increase in market power. If this approach were not available, the same effect could only be achieved either by narrowing the market to increase the concentration or to define firms with lower market shares as having market power. This can distort market definition and make it inconsistent. I examine this topic in more detail next.

VI. Single Brand Markets

Narrow Market Definition

The courts on both sides of the Atlantic have managed to define very narrow markets, even down to the market for a single product or brand. An example in the EU is Hugin, but I focus here on several US cases both because they have received more attention and because they build more clearly upon the law, economics and econometrics discussed above. In particular, I discuss Kodak (1992) and Staples-Office Depot (1997).

The fundamental issue is this. If a court believes a firm has market power, but sees that it has several competitors, it faces a choice between finding market power on a low market share or defining the market narrowly (possibly down to a single brand) and boosting the market share to levels that make a finding of market power appear reasonable. Although economic theory offers reasons why a firm with low market share might have market power, the courts have instead

defined markets arbitrarily narrowly in order to secure a finding of market power.[74]

The point is illustrated by Kodak where a central issue was whether there could be a well defined market for a single brand, namely the aftermarket parts and servicing of Kodak machines. The Court (or majority opinion) found that there was market power by defining very narrow markets for parts and services, which enabled them to find that "Kodak controls nearly 100% of the parts market and 80% to 90% of the service market". This finding of strong "concentration" made the market power finding easier to sustain.

The Court could have reasoned differently. First, it could have eschewed a definition of the market and measured market power directly. Second, it could have determined a wider market (perhaps including machines) and, despite the low market share, found dominance because of barriers to mobility, evidence on prices etc. Either would have represented a significant departure from precedent and it is easier for a government agency to revise guidelines to include unilateral effects than for the courts to fly boldly in the face of precedent. Arguably, such a radical departure might have been appropriate.

One effect of the Kodak case is that it has created confusion about market definition for single brand markets. Peritz (1999) shows how the lower courts have interpreted Kodak differently, but with most finding broader markets and, in consequence, no market power.[75]

The reluctance to move from the traditional model is also evident in the Staples case. The merging parties, Staples and Office Depot, both operated

[74] This is clearly further evidence of the implicit dominance of concentration as a fundamental criterion for market power.
[75] Peritz (1999) explores the wider historical and doctrinal issues raised by *Kodak*.

superstores for office supplies across a range of geographical markets (cities) in which the market structure changed depending on the number of superstores. The candidate relevant markets were the narrow office supply superstore market and a broader one that would include non-specialist retailers such as Wal-Mart.

An extremely novel feature of this case, and one that presages the future, was the use of sophisticated econometric evidence (based on detailed scanner data) in court by both sides.[76] An FTC study showed that the prices were higher in cities with two office superstores than those with three.[77] The defence's econometric model suggested that the effect of the merger on prices would be minor. The judge largely abandoned the conflicting econometrics and defined the market narrowly as the "non-computer related consumable office supplies as sold in office supply superstores". This lengthy term was required so as to fit precisely the business of Staples and Office Depot.[78] The very high concentration figures that resulted were important justifications of the conclusion that competition would be damaged.[79] Again, the judge, having concluded there was market power, considered it essential to define the market narrowly to copper-fasten that conclusion.

These cases are not isolated examples. In his dissent in Grinnell, J. Fortas says "the relevant geographical and product markets….have been tailored

[76] A debate continues on the subject. A summary of the evidence in the case is given by Dalkir and Warren-Boulton (1999) who incline towards the FTC. Baker (1998) also presents the FTC side and Hausman and Leonard (1998) that of the defence.

[77] A correlation between market structure and prices could be jointly caused by other factors. Time series data set could examine whether changes in market structure (entry, exit or merger) caused prices to change. The FTC data did have some time variation, but not enough to give sufficient variation in market structure to measure causality convincingly.

[78] It excludes the market for computer supplies, and for durable (non-consumable) products in which there was considerable competition. Confining the market to office supply superstores also excluded non-specialist retailers like Wal-Mart that also sell office supplies.

[79] In judging the probable effect on competition, Judge Hogan noted that "one way to do this is to examine concentration measures and (sic) HHIs in the relevant market" and immediately comments that "HHIs in many of the geographic markets are at ***problematic*** levels even before the merger" (my emphasis).

precisely to fit the defendants' business". In Jefferson Parish, the Supreme Court points out how, using precisely the same evidence on consumer choices, the District and the Appeals Courts define the market differently and, seemingly on this basis alone, the Appeals Court had found market power.

The tailoring of market definition to achieve the level of concentration required to find market power is a bad development for several reasons. First, there is the real danger that the precedent that is taken from the case is the narrow market, and not the analysis of market power. Peritz's examples illustrate the conundrum well. Second, it leads to jeopardy in deciding how to argue cases because the goalposts are not fixed. Third, it plays into the hand of concentration as the major identifier of market power, a direction that is opposite to that in which most economic theory for the last 25 years points. Fourth, it obscures the analysis of market power on its merits. In both Kodak and Staples, the courts are careful not to say that they first find market power and the define the market to get this results: however, if they are indeed doing this, then the means by which they find market power is obscured.

Finally, the tendency towards narrow markets of this kind may have unintended consequences on mergers. Traditionally, a narrow market definition was seen as inculpatory in that it increased the defendant's market share. However, the narrower the market becomes, the more likely that it becomes exculpatory in the sense that the parties are in different relevant markets. In this case, the merger has no effect on concentration in either market, and falls outside of the threshold. This will be true even if each firm has a high market share in its own relevant market, and barriers to entry are high. Market power could be increased if the parties would, in the absence of merger, be the most likely to enter each other's markets (not unlike unilateral effects, except in entry, not price). This

is exemplified in particular in cross-country mergers where the national markets are seen as distinct.[80]

Obscure Market Power

The issue of market power in both cases is hotly debated and nicely illustrates many of the points that have been raised in the earlier sections of this paper. The justification for the decision in Staples is clearly consistent with a theory whereby the number of stores caused the price differentials, and is very much in the SCP tradition. However, the FTC evidence could also be explained in other ways. Hausman and Leonard argue that towns with only one store may not benefit from the economies of scale that are available in larger towns that can support two stores. This is consistent with Sutton's theory that performance affects structure, so that concentration results endogenously keen price rivalry. The largely cross-sectional analysis of prices across towns presented by the FTC presented made it difficult to distinguish these theories. In this case, therefore, the narrow definition of the market went hand in hand with a very concentration-centred view of market power. This is consistent with the lesser status accorded to barriers to entry and mobility (of Wal-Mart) or direct evidence of market power.

Kodak raises the theoretical question of whether there could be market power in an aftermarket if there is competition in the original equipment market (as the court assumed). A company that changes its policy to exclude ISOs (as Kodak did) may exploit existing locked-in customers one time only. The court placed great weight on this short-run market power. On the fundamental issue of

[80] Fingleton (1998) gives an example of Unilever being allowed to purchase the market leader (65% market share) in the Irish tea market after it withdrew its own nascent brand. Hungarian competition policy endorsed such a narrow market definition approach to encourage foreign direct investment, see Fingleton *et al.* (1996).

the power to exploit new customers, the court relied on the inability of customers correctly to anticipate the future prices and demand.

Economic theory suggests that the firm will charge the monopoly prices for aftermarket services and that intense competition in the fore market would result in the dissipation of these rents in discounted prices for equipment.[81] Many durable products are given or loaned for free in order to generate demand for complements. On the basis that consumers know what to expect, competition in the aftermarket cannot be isolated from competition in the original market. In Kodak, the courts agrees that "competition exists in the equipment market", but does not define this precisely. Prices could be well below cost for equipment so that competition in the fore-market may not be concluded from a comparison of prices with costs. Shapiro and Varian (1999, page 146-47) argue that the court reached the wrong conclusion, apparently with such a theory in mind. As evidence, they note that Kodak position in the market relative to Xerox has been one of steady decline, hardly consistent with market power.

On the other hand, MacKie-Mason and Metzler (1999) outline a variety of reasons (and cite supporting literature) why a price increase in the after market might not result in a dramatic reduction in the sales of equipment, and argue that these lend credibility to the court's finding that there could be market power. Overall, the court had to judge the Kodak case with very limited facts so that it is difficult to see whether it got the fundamental issue of market power right or not. However, if it had considered market power explicitly (in the absence) of market definition, it would have set a clearer precedent for later courts to follow.

[81] This is another example of cross-subsidisation in the sale of complements discussed above.

The analysis of market power in the Kodak case may illustrate how defining the market too narrowly obscures the analysis of market power. Because the court felt that the original equipment market was not relevant, it could omit it from its analysis. However, many of the theoretical ideas presented even to support the Court's decision would depend on including the equipment market within the analysis.

VII. Conclusion

This paper has a few central themes. First, market power is a complex topic, and attempts to encapsulate it in a simple definition are generally misleading. Market power in economics is a different concept than that required as a criterion for policy intervention. Barriers to entry are the primary source of market power and any test for the latter should start with the former.

Second, the SCP paradigm is now largely discredited in economics, but its influence lives on in the heavy dependence on concentration in the analysis of competition. Examples include the use of concentration as a filter for market power, the presumption and inference of market power in court cases, and statements within court cases.

Third, although there is awareness of the danger of type I error due to an upper threshold (erroneously finding market power from high concentration), the Chicago School attack on SCP, led by Demsetz and Stigler some 30 years ago, does not appear even yet to have been fully absorbed in law. There is much less awareness of the type II error (erroneously dismissing market power on the basis of low concentration), perhaps because there are fewer opponents of small and concealed monopolists than there are champions of large firms that are not

monopolists. However, just as economic theory does not say that a high market share causes market power, it does not say that market power is incompatible with a low market share.

Fourth, these points are illustrated in the example of single brand markets. I have characterised Kodak and Staples cases where the court believed from evidence that there was market power, and defined the market narrowly in order to get very high concentration figures. Both courts cite their high figures very approvingly in their deductive finding of market power.

The tailoring of narrow market definition to secure high concentration, to the extent that it is occurring, is not a good development. For one, it inclines the lower courts to narrow market definition in similar markets where there is no question of market power: one danger is that the high concentration figures that result will be used incorrectly to find market power. Another is the trouble of arguing uphill that there is no market power despite the high concentration. It also obscures the analysis of market power, both because the judgements become ones in which the introduction and market definition are "written" after the conclusion, and because relevant market information is omitted (as in Kodak). A third problem is that narrow market definitions can become exculpatory in merger cases, leading to type 1 error all over again.

A simple solution would be to accept that market power can occur with lower market shares than has been traditionally acceptable to the courts. The US merger regulations have already done this with the concept of unilateral effects. In Staples, for example, the judge could have focussed on the cross-price elasticities between the merging parties on the broader market, and reached a conclusion independently of market share figures. Similarly, in Kodak, the court

might have included the market for equipment in the analysis. Even if Kodak only had 20 or 30 per cent of this market, could the court have found market power on the basis of barriers to mobility and other such factors?

Finally, the fundamental problem comes back to concentration. Suppose that courts were prevented every from measuring or mentioning concentration statistics. Would the quality of analysis be improved?

List of Cases

US

United States v. Aluminium Co. of America, 148 F.2d 416, 432 CA2 1945 (**Alcoa**)

Aspen Skiing Co. v. Aspen Highlands Skiing Corp., 472 U.S. 585, 600, 1985,

United States v. E. I. **du Pont** de Nemours & Co., 351 U.S. 377, 391, 1956, (**Cellophane**)

Fortner Enterprises, Inc, v, United States Steel Corp., 394 U.S. 495, 1969 (**Fortner I**)

United States Steel Corp. v. Fortner Enterprises, Inc, 429 U.S. 610, 620, 1977, (**Fortner II)**

United States v. **Grinnell** Corp., 384 U.S. 563, 571, 1966,

Hecht v. Pro-Football, Inc. 570 F2d 982 (D.C. Cir. 1977) cert. denied, 436 US 956 1978

Jefferson Parish Hospital District No. 2 v. Hyde, SC 466 US 2., 1984

Eastman ***Kodak*** Co. v. Image Technical Services, Inc., 504 US 451, 1992

Syufy Enterprises v American Multicinema, 793 F2d 990 (9th Cir. 1986) cert. denied, 479 US 1031 1987

Times-Picayune Publishing Co. v. United States, 345 U.S. 594, 611, 1953,

United States v. **Trans-Missouri** Freight Association, 166 US 290.

EU

Hugin v. Commission	Case 22/78	[1979] ECR 1869; 3 CMLR 345
Magill v. RTE	Case C-241/91P	[1995] ECR I-797; 4 CMLR 718
Michelin v. Commission	Case 322/81	[1983] ECR 3461; [1985] 1 CMLR 282
Tetra Pak II	Case C-333/94P	[1996] ECR I [1997] 4 CMLR 662
Oscar **Bronner**	Case C-7/97,	decided November 26 1998.

Figure 1

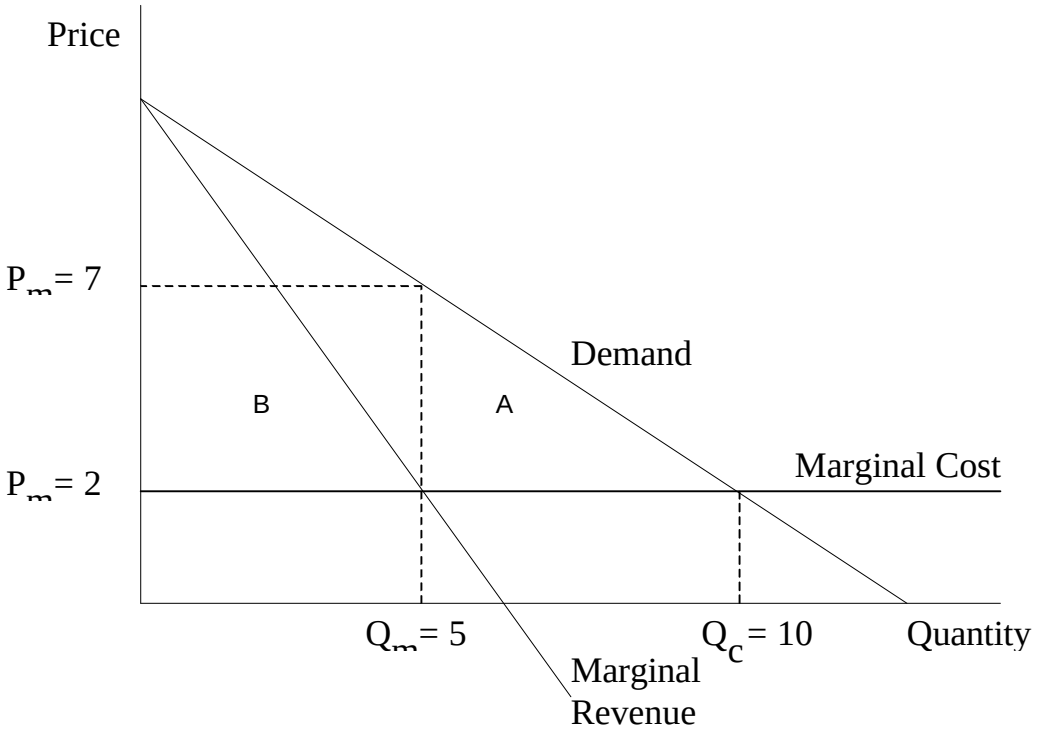
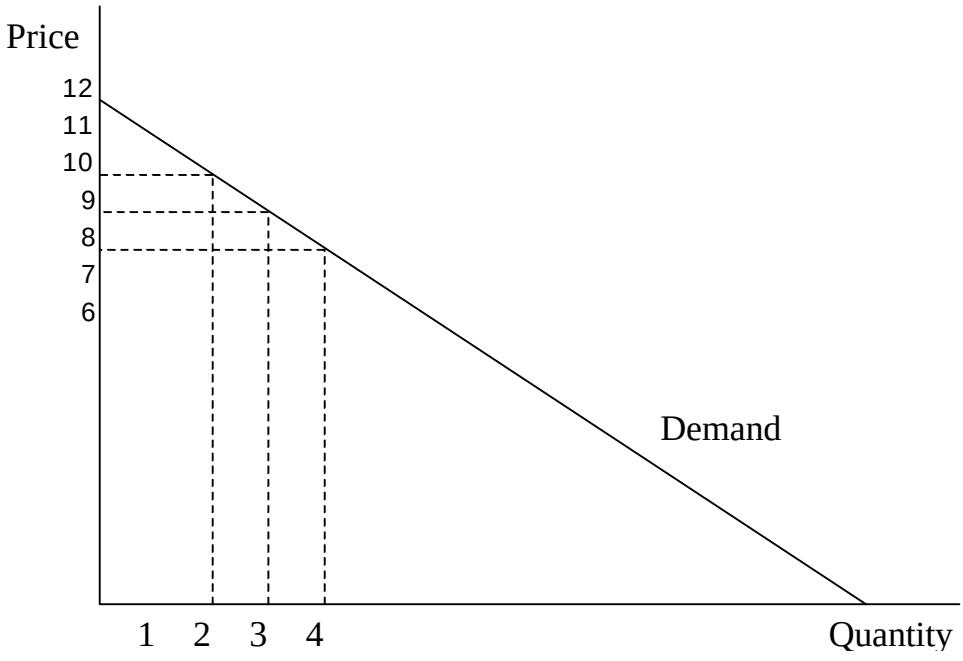


Figure 2



References

Areeda, P., and Kaplow, L. (1997). *Antitrust Analysis: Problems, Text, And Cases.* New York: Aspen Law & Business.

Armstrong, M., Cowan, S., and Vickers, J. (1994). *Regulatory Reform: Economic Theory And UK Experience.* London: MIT Press.

Bain, J.S. (1951). 'Relation Of Profit Rate To Industry Concentration, American Manufacturing, 1936-1940.' *Quarterly Journal of Economic,* 65.

Bain, J.S. (1956). *Barriers To New Competition.* Cambridge, MA: Harvard University Press.

Baker, J.B., and Bresnahan. T.F. (1988). 'Estimating The Demand Curve Facing A Single Firm.' *International Journal Of Industrial Economics*, 6, 283-300.

Baker, J.B., and Bresnahan, T.F. (1992). 'Empirical Methods Of Identifying And Measuring Market Power.' *Antitrust Law Journal,* 3-16.

Baker, J.B. (1998). 'Econometric Analysis In FTC V. STAPLES.' *Mimeo,* Available at http://www.ftc.gov/speeches/other/stspch.htm.

Baumol, W.J., Panzar, J.C., and Willig, R.D. (1982). *Contestable Markets And The Theory Of Industry Structure.* Harcourt Brace Jovanovich.

Baumol, W.J. (1982) 'Contestable Markets: An Uprising In The Theory Of Industrial Structure.' *American Economic Review,* 72, 1.

Berry, S., Levinsohn, J., and Pakes, A. (1995). 'Automobile Prices In Market Equilibrium.' *Econometrica*, 63, 841-890.

Berry, S., Levinsohn, J., and Pakes, A. (1997). *Differentiated Product Demand Systems From A Combination Of Micro And Macro Data: The New Car Market.* Washington: NBER.

Berry, S. (1994). 'Estimating Discrete Choice Models Of Product Differentiation.' *Rand Journal Of Economics,* 25, 242-262.

Bolton, P., Brodley, J.F., and Riordan, M.H. (1999). *Predatory Pricing: Strategic Theory and Legal Policy.* Princeton University: mimeo.

Borenstein, S. and Rose, N. (1994). 'Competition and Price Dispersion in the US Airline Industry.' *Journal of Political Economy*, 102, 653-83.

Bresnahan, T., and Reiss, P. (1995). 'Entry In Monopoly Markets.' *Review Of Economic Studies,* 531-44.

Bresnahan, T. (1981). 'Departures From Marginal-Cost Pricing In The American Automobile Industry.' *Journal Of Econometrics,* 17, 201-27.

Bresnahan, T. (1989). 'Empirical Studies Of Industries With Market Power.' In R. Schmalensee, and R. Willig (ed.) *Handbook Of Industrial Organization.* London: North Holland.

Carlton, D., and Perloff, J. (1994). *Modern Industrial Organization.* New York: Harpur Collins.

Carlton, D., and Perloff, J. (1999). *Modern Industrial Organization,* New York: Harpur Collins.

Chamberlain, E.H. (1933). *The Theory Of Monopolistic Competition.* Cambridge, Mass: Harvard University Press.

Coase, R.H. (1962). 'Durability and Monopoly.' *Journal of Law and Economics,* 15, 143-149.

Comanor, W.S., and Smiley, R.H. (1975). 'Monopoly And The Distribution Of Wealth.' *Quarterly Journal Of Economics,* 89, 177-94.

Cowling, K., and Mueller, C.D. (1978) 'The Social Costs Of Monopoly.' *Economic Journal,* 88, 727-48.

Dalkir, S., and Warren-Boulton, F.R. (1999). 'Prices, Market Definition, And The Effects Of Merger: Staples-Office Depot (1997).' In J.E. Kwoka, and L.J. White (ed.) *The Antitrust Revolution: Economics, Competition, And Policy.* Oxford: Oxford University Press.

Dasgupta, P., and Stiglitz, J. (1980) 'Industrial Structure And The Nature Of Innovative Activity.' *Economic Journal*, 90, 226.

Demsetz, H. (1972) 'Barriers To Entry.' *American Economic Review,* 82.

Demsetz, H. (1973) 'Industry Structure, Market Rivalry, And Public Policy.' *Journal Of Law And Economics,* 16, 1-9.

Dolmans, M., and Pickering, V. (1998) 'The 1997 Digital Undertaking.' *E.L.C.R,* 19, 112-15.

Easterbrook, F. (1984) 'The Limits Of Antitrust.' *Texas Law Review,* 63.

Ellison, G. (1994) 'Theories Of Cartel Stability And The Joint Executive Committee.' *RAND Journal Of Economics*, 25, 37-57.

European Commission. (1998). *Notice On The Definition Of The Relevant Market For The Purposes Of Community Competition Law*, Brussels.

Federal Trade Commission. (1992). *Horizontal Merger Guidelines,* Washington.

Fingleton, J., Fox, E., Neven, D., and Seabright, P. (1996). *Competition Policy And The Transformation Of Central Europe.* London: Centre for Economic Policy Research.

Fingleton, J., Evans, J., and Hogan, O. (1998). *The Dublin Taxi Market: Re-regulate Or Stay Queuing?* Dublin: Policy Institute.

Fingleton, J. (1998). 'Standards Of Competition In The Irish Economy.' *Journal Of The Statistical And Social Inquiry Society Of Ireland,* 37, 87-128.

Froeb, L.M., and Werden, G.J. (1991). 'Residual Demand Estimation for Market Delineation: Complications and Limitations. *Review of Industrial Organizations,* 33-48.

Gellhorn, E., and Kovacic, W.E. (1994). *Antitrust Law And Economics,* St. Paul, Minn: West.

Geroski, P., and Jacquemin, A. (1984) 'Dominant Firms And Their Alleged Decline.' *International Journal Of Industrial Organization,* 2, 1-27.

Gilbert, R. (1989). 'Barriers to Mobility and the Value of Incumbency.' In R. Schmalensee, and R. Willig,. (ed.) *Handbook of Industrial Organization.* London : North Holland.

Goyder, D. G. (1998). *EC Competition Law,* Oxford: Clarendon Press.

Handler, M., Pitofsky, R., Goldschmid, R.J., and Wood, D.P. (1997). *Trade Regulation: Cases and Materials.* Westbury, New York: Foundation Press.

Harberger, A. (1954). 'Monopoly And Resource Allocation.' *American Economic Review,* 44, 77-9.

Hausman, J.A., and Leonard, G.K. (1998). 'Documents Versus Econometrics In Staples.' *Mimeo,* available at:

http://www. antitrust. org/cases/staples/hausleon. html.

Hay, G.A. (1992). 'Market Power In Antitrust.' *Antitrust Law Journal*, 60, 807-827.

Kahai, S., Kaserman, D., and Mayo, J. (1996). 'Is the "Dominant Firm' Dominant?' *Journal of Law and Economics*, 39, 499-518.

Kay, J. (1984). 'General Equilibrium Welfare Losses.' *International Journal Of Industrial Organisation.*

Kovenock, D., and Phillips, G.M. (1997). 'Capital Structure And Product Market Behaviour: An Examination Of Plant Exit And Investment Decisions.' *The Review Of Financial Studies,* 10, 767-803.

Landes, W.M., and Posner, R.A. (1981). 'Market Power In Antitrust Cases.' *Harvard Law Review,* 94, no 5: 937-996.

Leibenstein, H. (1966). 'Allocative Inefficiency vs. X-Inefficiency.' *American Economic Review*, 56, 392-415.

Littlechild, S. (1981). 'Misleading calculations of the social costs of monopoly power.' *Economic Journal,* 91, 348-363.

MacKie-Mason, J.K., and Metzler, J. (1999). 'Links Between Vertically Related Markets: *Kodak* (1992).' In J.E. Kwoka, and L.J. White (ed.) *The Antitrust Revolution: Economics, Competition, And Policy.* Oxford: Oxford University Press.

Martin, S. (1994). *Industrial Economics: Economic Analysis and Public Policy*, Oxford : Macmillan.

McChesney, F.S. (1995). 'Be True to your School: Chicago's Contradictory Views of Antitrust and Regulation.' In F.S. McChesney and W.F. Shughart

(ed.) *The Causes and Consequences of Antitrust: The Public Choice Perspective.* Chicago: University of Chicago Press.

Mueller, D.C. (1996). 'Lessons From The United States's Antitrust History.' *International Journal Of Industrial Organization,* 14, 415-445.

Ordover, J., Sykes, A., and Willig, R. (1982). 'Herfindahl Concentration, Rivalry And Mergers.' *Harvard Law Review,* 95, 1847-1874.

Peritz, R.J.R. (1999). 'An Essay: The Law And Economics Of Single Brand Aftermarkets.' *Mercato, Concorrenza, Regole,* 1.

Pindyck, R.S., and Rubinfield, D.L. (1995). *Microeconomics,* London: Prentice Hall.

Porter, R. (1983). 'A Study of Cartel Stability: The Joint Executive Committee.' *The Bell Journal of Economics,* 14, 301-314.

Posner, R.A. (1975). 'The Social Costs Of Monopoly And Regulation.' *Journal Of Political Economy,* 83, 807-27.

Robinson, J. (1934). 'What Is Perfect Competition?' *Quarterly Journal of Economics,* 49, 104-20.

Salop, S. (1986). 'Measuring Ease of Entry.' *Antitrust Bulletin,* 31, 551-70.

Scheffman, D.T., and Spiller, P.T. (1987). 'Geographic Market Definition Under The US Department Of Justice Merger Guidelines.' *Journal Of Law And Economics,* 123-147.

Scherer, F. M., and Ross, D. (1990). 'Industrial Market Structure and Economic Performance.'

Schmalensee, R. (1982). 'Another Look At Market Power.' *Harvard Law Review*, 95, 1789-1816.

Schmalensee, R. (1989). 'Inter-Industry Studies Of Structure And Performance.' In R. Schmalensee, and R. Willig (ed.) *Handbook Of Industrial Organization.* London: North Holland.

Shapiro, C., and Varian, H.R. (1999). *Information Rules*, Boston, Mass.: Harvard Business School Press.

Shapiro, C. (1989). Theories of Oligopoly Behaviour. In R. Schmalensee, and R. Willig (ed.) *Handbook of Industrial Organization.* London : North Holland.

Shapiro, C. (1995). *Mergers With Differentiated Products,* Washington, also at www.antitrust.org/law/shapspeech.html: presented at The Merger Review Process in the US and Abroad, American Bar Association.

Stigler, G.J. (1964). 'The Dominant Firm And The Inverted Price Umbrella.' *Journal Of Political Economy,* 72, 55-69.

Stigler, G.J. (1968a). *The Organization Of Industry*, Chicago: University of Chicago Press.

Stigler, G.J. (1968b). 'Price and NonPrice Competition.' *Journal of Political Economy,* 72, no 1:.

Sutton, J. (1991). *Sunk Costs and Market Structure,* London, England: The MIT Press.

Sutton, J. (1998). 'Technology and Market Structure: Theory and History.'

Tirole, J. (1989). *The Theory Of Industrial Organization,* London : MIT Press.

Tullock, G. (1967). 'The Welfare Costs of Tariffs, Monopolies, and Theft.' *Western Economic Journal,* 5, 224-32.

Viscusi, W.K., Vernon, J.M., and Harrington, J.E. (1995). *Economics Of Regulation And Antitrust,* Cambridge, MA: MIT Press.

Waldman, M. (1997). 'Eliminating the market for secondhand goods: An alternative explanation for leasing.' *Journal of Law and Economics,* 40, 61-92.

Walsh, P.P. and Whelan, C. (1999). 'Modelling Price Dispersion as an Outcome of Competition in the Irish Grocery Market.' *The Journal Of Industrial Economics,* XLVII, 1-19.

Waterson, M. (1981). 'On The Definition And Meaning Of Barriers To Entry.' *Antitrust Bulletin,* 26, 521-539.

Weiss, L.W. (1974). 'The Concentration-Profits Relationship And Antitrust.' In H.J. Goldschmid, M.H. Mann, and J. F. Weston (ed.) *Industrial Concentration: The New Learning.* Boston: Little, Brown.