2 Competition Policy Analysis – An Integrated Approach

> *You're gouging on your prices if you charge more than the rest.*
> *But it's unfair competition if you think you can charge less.*
> *A second point that we would make to help avoid confusion:*
> *Don't try to charge the same amount – that would be collusion.*

<div align="right">Richard W. Grant (1963)</div>

2.1 Introduction

In this chapter, an integrated approach of competition policy analysis is developed. This approach comprises a progression of compulsory analytical steps toward creating and maintaining an efficient antitrust policy. An efficient antitrust policy consists of a set of effectively enforced rules that constrain the firms' competitive strategies aiming at maximising the total welfare contribution for a given enforcement budget. To put it differently, this chapter focuses on proposing ways of assuring that the introductory quote by Richard Grant stays a provocative poem, a far cry from reality, rather than a realistic description of contemporary antitrust policy.

Three levels of investigation are analysed here. The *fundamental level* deals with existential questions of competition and competition policy. In particular, it assesses whether competition is worth protecting, whether competition needs protection and whether competition policy is bringing more benefits than costs to society. Subsequently, the *strategic level* develops a simple progression of necessary steps for – normatively – assessing whether and how certain conducts should be subject to antitrust policy. In addition to an initial characterisation of the business conduct, a welfare assessment and a concept of detection and intervention need to be developed to ensure an integrated approach of antitrust analysis. The third level, the *operational level,* aims at implementing the concepts developed on the strategic level in a world in which the antitrust authority faces resource constraints and imperfect information. This level therefore deals with approximation techniques such as the identification of the relevant market, the assessment of market power and the application of economic frameworks for deriving appropriate conclusions about the likelihood and the severity of anticompetitive effects in the cases at hand. In order to assure the universal applicability of the chosen inte-

grated approach, it is applied to hard core cartel enforcement and merger control on all three levels. Chapters 3 and 4 also build on the integrated approach and will focus on strategic behaviour in general and predation in particular.

2.2   Fundamental Level

The fundamental level of the integrated approach covers existential questions of competition and competition policy. In particular, it assesses whether competition is worth protecting, whether competition needs protection and whether competition policy is bringing more benefits than costs to society. Figure 3 summarises the analytical structure of the fundamental level.

Fig. 3. The fundamental level
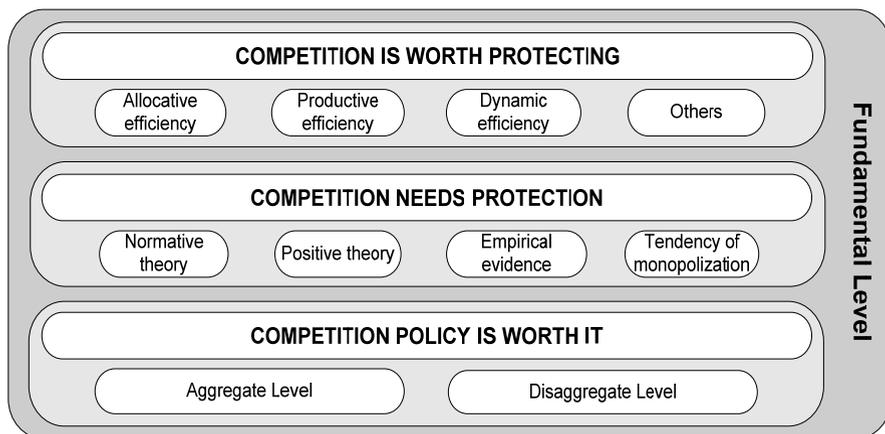
As shown in Figure 3, one task of the fundamental level is to assess the costs and benefits of antitrust enforcement. In order to allow such comparisons on an aggregate as well as on a disaggregate level, the following sections will focus on possible quantifications of especially the benefits of competition and competition policy.

2.2.1   Competition Is Worth Protecting

Economists and philosophers have both studied competition and the benefits of competition in a multitude of ways. Notwithstanding the potential relevance of any of these efforts – some of which having been very influential, such as Adam Smith's 'invisible hand' or Friedrich August von Hayek's 'competition as a discovery procedure' – the most fundamental result of all these research efforts is probably the insight that competitive markets allocate resources efficiently be-

cause they provide products to all customers willing to pay the opportunity cost of production (see, for example, Debreu, 1959).

Market power is generally defined as a deviation from this competitive benchmark. If a company can profitably raise and maintain a price above its marginal cost (i.e., the market price under perfect competition), then it possesses some degree of market power. The degree of market power is maximised in a monopoly, as the company can set the profit-maximising market price absent of other firms.[10] Although both monopoly and perfect competition are typically artificial constructs, a comparison of both extremes is a fruitful way to derive an upper bound for the benefits of competition.

From a static perspective, the presence of monopoly leads to a welfare loss that results from the absence of customers who derive a value that is lower than the price of the product but greater than the marginal cost of production (see Chart 1a in Figure 4). The size of the welfare loss can be expressed as a function of the price-cost margin, industry revenue (a measure of market size) and the industry elasticity of demand (see Annex 6.6.1 for the proof):
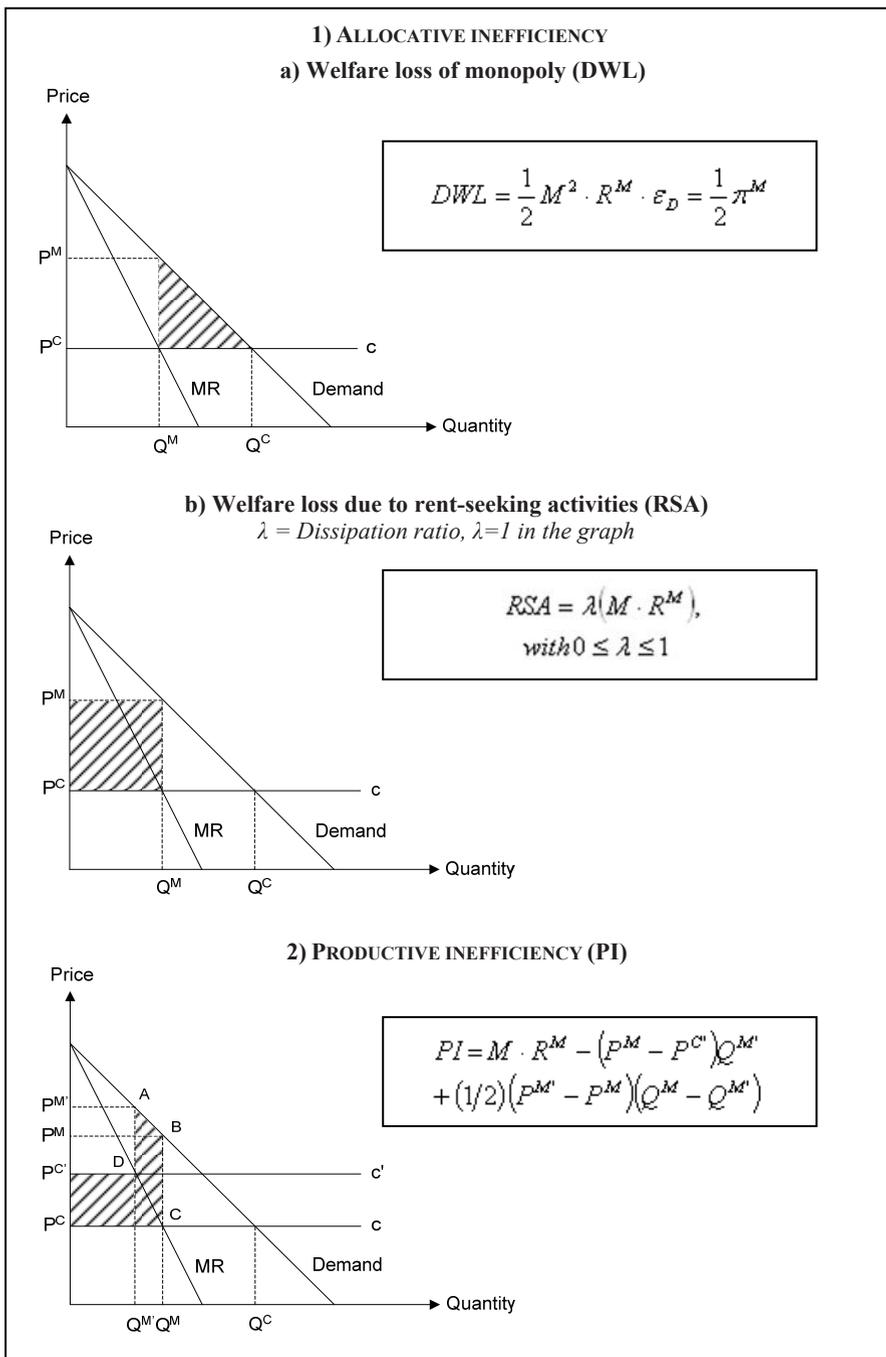
$$DWL = \frac{1}{2}M^2 \cdot R^M \cdot \varepsilon_D .$$ (1)

Harberger (1954) undertook one of the first attempts to estimate the deadweight loss for 73 US manufacturing industries from 1924 to 1928. His estimations, based on Equation (1), led to a monopoly welfare loss of around 0,1%[11] of the Gross Domestic Product (GDP). Surprised by this (seemingly) small size of the welfare loss, Harberger concluded that "we can neglect monopoly elements and still gain a very good understanding of how our economic process works" (1954: 87). In response to Harberger's analysis and conclusion, economists undertook numerous attempts to recalculate the welfare triangle loss by replacing some of his oversimplifying assumptions and/or using different data sets (see, for example, Schwartzman, 1960; Kamerschen, 1960). Furthermore, scholars increasingly investigated the follow-up question, "If the conventional loss is so small, are there other, more significant losses?" (Farrell, 1983: 1).

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[10]   Although monopolists do not face constraints of direct competitors in their price-quantity decision, they cannot act independently. They maximise profits subject to demand conditions.

[11]   Please note that in order to comply with the graphs, which were created with German-language software packages, the comma is used in place of the decimal point (i.e., 2,0% instead of 2.0%) and the full stop in place of the comma (i.e., 5.000€ instead of 5,000€).

Fig. 4. Inefficiencies caused by the exercise of market power

1) ALLOCATIVE INEFFICIENCY
a) Welfare loss of monopoly (DWL)

$$DWL = \frac{1}{2} M^2 \cdot R^M \cdot \varepsilon_D = \frac{1}{2}\pi^M$$

b) Welfare loss due to rent-seeking activities (RSA)
λ = Dissipation ratio, λ=1 in the graph

$$RSA = \lambda\left(M \cdot R^M\right),$$
$$with\, 0 \leq \lambda \leq 1$$

2) PRODUCTIVE INEFFICIENCY (PI)

$$PI = M \cdot R^M - \left(P^M - P^{C'}\right)Q^{M'}$$
$$+ (1/2)\left(P^{M'} - P^M\right)\left(Q^M - Q^{M'}\right)$$

One possible additional loss of monopoly was traced out by Tullock (1967). He pointed out that if firms compete to gain and to preserve market power, these resources diverted to unproductive activities must be added to the welfare loss of monopoly, and the overall loss therefore has the geometrical form of a trapezoid rather than a triangle. Referring to Chart 1b) in Figure 4, the additional welfare loss due to so-called rent-seeking activities is determined by the dissipation ratio λ (i.e., the percentage of the total rent dissipated by rent-seeking activities), the price-cost margin M and the monopoly revenue R^M:[12]

$$RSA = \lambda\left(M \cdot R^M\right) with\ 0 \leq \lambda \leq 1 . \tag{2}$$

Although rent-seeking expenses are typically viewed as a welfare loss of monopoly, Neumann (2000: 107) points out that such a classification of rent-seeking activities already involves a value judgment. This is because the expenses for rent-seeking activities are not lost surplus (as the deadweight loss discussed above) but rather income of other individuals and therefore not a loss of total welfare. Therefore, classifying rent-seeking activities as welfare loss depends on a value judgment that these expenses and the resulting incomes are of lower value than other incomes.

Posner (1975) was one of the first scholars who actually incorporated rent-seeking into a measure of *overall* welfare loss due to monopoly power. He studied the relative size of the deadweight loss and the resources wasted on competition to acquire and maintain monopoly profits and showed that the deadweight loss *DWL* relative to the rent-seeking loss *RSA* is given by

$$\frac{DWL}{RSA} = \frac{U^C}{2\left(1/\varepsilon_D - U^C\right)}, \tag{3}$$

with $U^C = \Delta P / P^C$ (price-cost markup). Equation (3) shows that the RSA is large relative to the DWL when U^C is small. For instance, if $\varepsilon_D = 1$ and the price-cost

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[12]   Tullock (1980) himself studied the determinants of the size of the dissipation ratio. He shows in a basic rent-seeking game that the expenditure on rent-seeking κ by each of the n individual rent seekers is given by $\kappa = \left((n-1)/n^2\right)\left(M \cdot R^M\right)$. This means that if the rent to win (i.e., the monopoly profit) is given by 50 and there are 7 firms in the contest, each firm will spend about 6,12 in the contest. This would lead to an overall investment in the contest of 7*6,12 = 42,84 and a dissipation ratio of (42,84/50) = 85,7%. Hazlett and Michaels (1993) studied lotteries conducted by the US Federal Communications Commission to award cellular telephone licenses. There were 643 licenses available, and almost everybody was (seemingly) allowed to participate in the lottery (i.e., no barriers to entry were initially noticed). In such an environment, Hazlett and Michaels would have expected total rent dissipation (as n is large, in fact about 320.000). However, their empirical results show that overall costs were $325 million, while the rents were estimated to about $611 million, leading to an (average) dissipation ratio of about 0,53. Hazlett and Michaels explain this result with the existence of entry barriers in the application process (such as a factual entry fee of nearly $3.500 per application due to general fees and attorney fees).

markup is given by 0,2, the loss due to rent-seeking activities is about 8 times larger than the deadweight loss. Using Harberger's data and estimate of the DWL, Posner estimated that, while the deadweight loss is 0,1% of GDP, rent-seeking activities account for about 3,3% of GDP, leading to an aggregated welfare loss due to monopoly of about 3,4% of GDP for the United States.

Cowling and Mueller (1978) also extended Harberger's work by changing several assumptions. For instance, instead of using unity elasticity, they applied the (inverse) Lerner index $(P^M/(P^M-MC))=\varepsilon$ and showed that the deadweight loss is then equal to half of the monopoly profits (see Annex 6.6.1 for the proof):[13]

$$\text{DWL} = \frac{1}{2} M \cdot R^M = \frac{1}{2}\left(P^M - MC\right)Q^M = \frac{1}{2}\pi^M . \tag{4}$$

By using this estimate, Cowling and Mueller avoided using separate estimates of the price markup and the demand elasticity (and therefore considered the interdependence of the observed price-cost ratios and of the value of the elasticity of demand; see, e.g., Clarke, 1985: 234). Furthermore, Cowling and Mueller also incorporated the cost of reaching and maintaining a monopoly by extending their study with several combined measures of deadweight loss and advertising expenses (as a measure for rent-seeking activities; see Table 1 for an overview of their measures). Their results show, depending on the used measure, aggregated welfare losses ranging from 3,96% to 13,14% for the United States and ranging from 3,86% to 7,20% of the Gross Corporate Product (GCP) or equivalent for the United Kingdom. An overview of influential studies on monopoly welfare losses is presented in Table 1.

Masson and Shaanan (1984) present a methodology for estimating welfare losses caused by market power which departs from the studies discussed thus far, because they explicitly take different levels of market power into account. The authors provide estimates for the actual social costs arising from existing market structures and the expected monopoly social costs that would occur if there were no competition. They define the difference between actual and monopoly welfare losses as the *value of competition* in existing markets. Masson and Shaanan find that the actual *oligopoly* deadweight loss averages 2,9% of the value of shipments for a sample of 37 US manufacturing industries from 1950 to 1966. Furthermore, they estimate a potential (average) monopoly deadweight loss of 11,6%, leading to a value of competition of 8,7% of the value of shipments.

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[13]   Cowling and Mueller's results, however, hold only in the absence of fixed costs.

Table 1. Monopoly welfare loss estimates

Study	Country	Measure	Welfare loss	Scope	Assumptions / Remarks
STUDIES FOCUSING SOLELY ON DEADWEIGHT LOSS					
Harberger (1954)	US	$0,5*M^2*R^M*\varepsilon_D$	0,1	2.046 firms in 73 US manufacturing industries from 1924 to 1928;	Unity elasticity, competitive rates of return given by average rate of return in sample
Schwartzman (1960)	US CAN	$0,5*(p^M-p^C)*z\pi$	<0,1	Sample of Canadian and US industries in 1954	Used direct price-cost margins data; allowed elasticities up to 2
Kamerschen (1960)	US	Similar to Harberger	1,9	US industry from 1956/7 to 1960/1	Inclusion of other non-manufacturing and non-corporate sectors
Worchester (1973)	US	General equilibrium model of welfare loss	0,43-0,73	Data on 500 largest industrial individual firms from 1956 to 1969	Used firm-level instead of industry-level data
STUDIES FOCUSING ON DEADWEIGHT LOSS AND RENT-SEEKING EXPENSES					
Posner (1975)	US	DWL/RSA= $(U^C/(2(1/\varepsilon_D-U^C)))$	3,4	Uses Harberger data	Assumed that resources committed to rent-seeking equal revenues obtainable
Cowling/Mueller (1978)	US	$\pi/2$	3,96	734 large US firms from 1963 to 1969	Used half monopoly profit rather than separate estimates for price-cost margins and elasticities; used independent estimate of the competitive rate of return; used firm-level monopoly profits; used advertising as estimates of rent-seeking expenditures
	US	$(\pi+A)/2$	6,52		
	US	$A+(\pi+A)/2$	12,27		
	US	$\pi'+A+(\pi+A)/2$	13,14		
Cowling/Mueller (1978)	UK	$\pi/2$	3,86	Largest 103 UK firms from 1968 to 1969	
	UK	$(\pi+A)/2$	4,36		
	UK	$A+(\pi+A)/2$	5,39		
	UK	$\pi'+A+(\pi+A)/2$	7,20		

Welfare loss is in % of GNP or equivalent; C&M use gross corporate product; z is arc elasticity of demand; A is advertising; and π and π' are pre- and post-tax profits (see Clarke 1985: 235).

Davies and Majumdar (2002: 30ff.) express their concern about the general value of measuring deadweight losses of monopoly for large parts of economies because of the oversimplifications which are necessary for such a quantification (such as an average demand elasticity and an average price-cost margin for large parts of an economy). However, in aiming at showing the sensitivity of such models, they adopt the methodology of Cowling and Mueller (1978) and apply the well-known relationship in a homogenous Cournot model that the price-cost margin equals the Herfindahl-Hirschman concentration index (HHI) divided by the market demand elasticity. Making use of this relationship by inserting it into the general deadweight loss formula derived above leads to the following estimate for the deadweight loss (see Annex 6.6.1 for the proof):

$$DWL = \frac{1}{2} HHI \cdot M \cdot R^M . \qquad (5)$$

As Equation (5) shows, the DWL now depends on a measure of market concentration, namely the Herfindahl-Hirschman index, which is somehow easier to estimate than market demand elasticity (as a lot of countries have statistics at least for major industries). In the following, Davies and Majumdar (2002: 31) attempt to calibrate Equation (5) for the UK. For the average price-cost margin, they decide to use a value of 0,1 as a defensive estimate, compared to a value of 0,08 used by Cowling and Mueller and a broader survey by Scherer and Ross (1990), which found price-cost margins between 0,1 and 0,2. In terms of HHI, they assume a value of 0,1 (in a properly defined market), largely based on rough approximations due to the fact that the UK only publishes data on concentration ratios.[14] Inserting the *M* and *HHI* values in Equation (5) leads to an aggregated welfare loss of 0,5% of GDP.

A third kind of possible loss due to monopoly is the loss in productive efficiency if a monopoly slacks off and prefers 'the quiet life' to profit maximisation. As shown in Chart 2 in Figure 4, such inefficiencies lead to a higher marginal cost level and a corresponding welfare loss given by[15] (see Annex 6.6.1 for the proof):

$$PI = M \cdot R^M - \left(P^M - P^{C'}\right)Q^{M'} + \frac{1}{2}\left(P^{M'} - P^M\right)\left(Q^M - Q^{M'}\right). \qquad (6)$$

At first glance, it seems implausible why the shareholders of a monopoly firm would be less willing to keep costs down (and let slacking happen) than those of a competitive firm (see Rasmusen, 2000: pt. VII, no. 33). To the question "Why

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[14]   For the United States, data on the Herfindahl-Hirschman indices for 443 US manufacturing industries (four-digit SIC) for the year 1992 is available (see www.census.gov/ epcd/www/concentration.html). The average HHI for the US for these industries in 1992 can be calculated to 725,49.

[15]   In the same way as explained for the case of rent-seeking activities, a value judgment stating that society values the distribution of pecuniary and non-pecuniary rents in a quiet-life monopoly state less than the results that competition would bring is needed in order to interpret the entire hatched area in the third chart in Figure 4 as a welfare loss due to monopoly (see also Neumann, 2000: 107).

would a monopolist spare efforts to reduce costs when it stands to reap all the incremental profits arising from the cost reduction (i.e., when it does not have to worry about the incremental profits being competed away)?" (Chen and Chen, 2005: 25), Farrell (1983) provides an intuitive explanation based on the separation of ownership and control. In a world of imperfect information, managers find it costly to search for better techniques. The firm itself cannot reliably tell when the manager is searching, and so cannot reimburse him for these costs. The firm also cannot reliably tell by results whether or not the manager has been diligent partly due to missing comparator firms. The best the shareholders can do is to provide a contract with some incentive to increase profits; however, the manager's risk aversion limits the effectiveness of such contracts.[16] According to Farrell (1983: 1), "[t]he inefficiency which results is ameliorated if more information becomes available about the manager's activities; and, if there is a competing firm, the market interaction may convey such information" .[17]

Empirical evidence on productive inefficiencies is diverse but still fragmentary (see Davies and Majumdar, 2002: 35ff.). In probably the most influential paper, Nickell (1996) investigates the question whether competition improves corporate performance. His results based on an analysis of 670 UK companies largely support this view. Nickell finds that market power – captured by market share – generates reduced levels of productivity. More importantly, he presents evidence that competition is associated with a significantly higher rate of total factor productivity growth. Furthermore, a study by Jenny and Weber (1983) derive an estimate for productive inefficiencies in France of 5,18% of GDP for the years 1971 to 1974. Additionally, Ahn (2002: 53ff.) provides an overview of the main methods and main findings of further studies on the competition-productivity relationship in certain sectors or industries (see especially Bailey, 1993; Baily and Gersbach, 1995; Zitzewitz, 2003; Disney et al., 2000). The results mostly show that increases in product market competition led to increases in the overall levels of productive efficiency. In line with these findings, Scherer and Ross (1990: 672) conclude their survey on productive inefficiencies by expressing their belief that productive inefficiencies are "at least as large as the welfare losses from resource misallocation."

An alternative to the study of the general relationships between competition and productivity across different product markets is an analysis of recently liberalised sectors. In such environments, economic theory would expect significant productivity improvements after deregulation due to the correction of inefficiencies typically caused by economically largely obsolete regulation schemes (see

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[16]   Nalebuff and Stiglitz (1983: 281) argue in a comparable way by focusing on principal-agent problems and conclude that monopoly does not cause productive efficiency losses in an owner-managed firm.

[17]   As discussed in more detail in McAfee and McMillan (1996: 263ff.), 'revealing hidden information' is an important characteristic of competition from a game-theoretical point of view. Other important characteristics include: 'competition works better than bargaining', 'competition creates effort incentives' and 'competition mechanisms are robust'.

OFT, 2007). Certainly, the almost unanimous result of studies by Maher and Wise (2005), Ehrlich et al. (1994), Pilat (1996) and Griffith and Harrison (2004) is that deregulation in such industries as electricity, gas, water, airlines and road freight led to substantial increases in total factor productivity growth. An overview of the results of several studies focusing on improvements in productive efficiency (as well as consumer welfare) after regulatory reforms in the United States is presented in Table 2.

Table 2. Improvements in productive efficiency and consumer welfare after regulatory reforms in the United States

Industry	Studies	Improvements in productive efficiency	Improvements in consumer welfare
Airlines	Morrison and Winston (1998)	Average industry load factors have increased from roughly 52% the decade preceding deregulation to roughly 62% since deregulation. Real costs per revenue ton-mile have declined at least 25% since deregulation. Industry profits have been very volatile during deregulation, although higher, on average, than they would have been under regulation.	Average fares are roughly 33% lower in real terms since deregulation, and service frequency has improved significantly.
Less-than-truckload trucking	Corsi (1996a)	Carriers have substantially reduced their empty miles since deregulation. Real operating costs per vehicle mile have fallen 35%, but operating profits are slightly lower than they would have been under regulation.	Average rates per vehicle mile have declined at least 35% in real terms since deregulation, and service times have improved significantly.
Truck-load trucking	Corsi (1996b)	Carriers have substantially reduced their empty miles since deregulation. Real operating costs per vehicle mile have fallen at least 75%, but operating profits are slightly lower than they would have been under regulation.	Average rates per vehicle mile have declined at least 75% in real terms since deregulation, and, because of the emergence of advanced truckload carriers, service times have also improved significantly.
Railroads	Winston et al. (1990)	Railroads have abandoned one-third of their track miles since deregulation. Real operating costs per ton-mile have fallen 60%, and rail profits are much higher than they would have been under regulation.	Average rates per ton mile have declined more than 50% in real terms since deregulation, average transit time has fallen at least 20%, and the standard deviation of transit time has fallen even more than 20%.

| Banking | Berger et al. (1995) | The real cost of an electronic deposit has fallen 80% since deregulation. Operating costs have declined 8% in the long run because of branch deregulation. Recent industry returns on equity exceed those just before deregulation. | Consumers have benefited from higher interest rates, better opportunities to manage risk, and more banking offices and automated teller machines. |
| Natural Gas | Henning et al. (1995); Costello and Duann (1996); Crandall and Ellig (1997) | Pipeline capacity has been much more efficiently utilised during peak and off-peak periods since deregulation. Real operating and maintenance expenses in transmission and distribution have fallen roughly 35%. | Average prices for residential customers have declined at least 30% in real terms since deregulation, and average prices for commercial and industrial customers have declined even more than 30%. In addition, service has been more reliable as shortages have been almost completely eliminated. |

Source: Winston (1998).

In addition to the described efforts to estimate the *true* welfare losses due to monopoly[18], some scholars argue that the economic impact of even small welfare losses can be substantially larger if other factors are taken into account. Dickson (1982), for instance, shows that a small welfare loss in a monopolised market can cause multiple damages if the transmission of monopoly distortions though successive vertical stages is considered. Neumann (1999) contributes to the discussion by adding the intertemporal dimension. He uses a simple growth model to estimate the effect of a static welfare loss due to monopoly on the growth rate of the GDP and indeed finds that the long-run welfare loss due to monopoly typically dwarfs the static loss analysed above.[19] Kwoka (2003: 11) remarks that it is not the average deadweight loss (derived by an average demand elasticity and an average price-cost margin for large parts of an economy) that matters but rather its distribution. Losses are greater in several industries where competition does not reign, and the deadweight losses can be quite substantial in these industries (although relatively low on average).

Although the analysis thus far has drawn a solely negative picture of monopoly with respect to its (static) welfare effects, economic analysis has shown that this is not generally the case. Economies of scale, for example, are one prominent reason why a monopolistic market structure might occasionally be socially desirable. On

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[18]   The maximum welfare loss due to monopoly is given by $(1/2)(P^{M'} - P^C)(Q^C + Q^{M'})$. See Annex 6.6.1 for the proof.

[19]   In a simplified example, Neumann (2000: 110f.) shows for a fixed interest rate and potential growth rate that a static welfare loss of 0,1% (the Harberger estimate) would lead to a yearly welfare loss of about 1%. A static welfare loss of 3% (one of the Cowling and Mueller estimates) would lead to a long-term welfare loss of about 26% per year.

the supply side, economies of scale can lead to situations in which a monopoly is able to supply the entire market at a lower unit cost than two or more firms. Technically, such *natural monopolies* exist if the demand curve intersects the average cost curve in its downward-sloping or subadditive part. On the demand side, economies of scale are reflected in the so-called network effects:[20] As the value of a network for an individual increases with the number of users,[21] the overall value is maximised in a monopoly network and a fragmentation would lead to consumer welfare losses.

In addition to a discussion of the largely static concepts of allocative and productive efficiency, a fundamental benefit of competition is seen in its ability to meet customer requirements *dynamically* and to ensure that old inferior products are replaced by superior new products. As stated by Kolasky and Dick (2002:6),

> Dynamic efficiency arises from market processes that encourage innovation to lower costs and develop new and improved products. Whereas allocative and productive efficiency can be viewed as static criteria – holding society's technological know-how constant – a more dynamic view of efficiency examines the conditions under which technological know-how and the set of feasible products optimally can be expanded over time through means such as learning by doing, research and development, and entrepreneurial creativity.

From such a dynamic point of view, it has been discussed extensively in the economic literature whether market power must be seen as an important precondition for technical progress and therefore, to a certain extent, as socially desirable.[22] Notwithstanding the existence of such a trade-off between static and dynamic efficiency, the empirical evidence by the majority shows that monopoly power is more likely to slow down the pace of innovative activity[23] (see, for ex-

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[20]   See Farrell and Klemperer (2006: 58f.) for a discussion as to why network effects are not always (positive) externalities. Generally, negative externalities (such as pollution caused by a production process) might be another reason to prefer monopoly over competition, simply because a monopoly reduces output and therefore reduces the negative externality. However, it is likely that an optimally regulated market in such a case would reach better performance levels than either monopoly or perfect competition.

[21]   If there are *n* people in a network and the value of the network to each of them is proportional to the number of other users, then the total value of the network to all the users is proportional to $n(n-1)=n^2-n$. For example, a tenfold increase in network size leads to a hundredfold increase in its value. This relationship is known as Metcalfe's Law (see Shapiro and Varian, 1999: 184). Given the functional form, it is obvious that demand-side economies of scale do not dissipate (as supply-side economies do when the market gets large enough).

[22]   See Evans and Schmalensee (2001) and Shapiro and Varian (1999) for overviews and discussions of implications for business strategy and public policy.

[23]   From a theoretical perspective, the relationship between market power and process innovations can be characterised by two conflicting effects. The *replacement effect* (Arrow, 1962) speaks for lower innovation incentives for a monopolist compared to a competitive industry (under the assumption that the respective firms are in each case the only firms who could implement the respective process innovation[s]). The basic

ample, Weigand, 1996; Audretsch, 1995; Geroski, 1990). However, recent discussions on 'very innovative industries' with winner-take-all markets suggest that although these firms might be dominant in their market, they face the constant threat of being replaced by firms seeking to develop better products. Following Schumpeter (1942), these monopolists competed vigorously, not necessarily in the market but for the market (see Veljanovski, 2006: 119f. and Geroski (2003) for round-ups). As a consequence, a (temporary) high level of market power in such markets might be socially desirable.

An acknowledgment of the importance of market power in keeping up innovation incentives can be seen in the existence of patent systems. As part of such a system, the state factually grants temporary monopolies to innovative firms in the form of patents. This is seen as a necessary instrument to allow these firms to recoup their investments in research and development by avoiding immediate imitation by rivals. A patent system is therefore a necessary public policy instrument to keep up the innovation incentives for firms and therefore ensure technological progress and economic development.

In addition to allocative, productive and (possibly) dynamic inefficiencies[24], the distributional effects of market power might be another reason to prefer competition over monopoly. As prices above marginal costs not only lead to net losses in overall welfare but also to a (total welfare-neutral) transfer of consumer surplus into producer surplus, market power also influences the process of wealth creation as well as the distribution of wealth in a society. Comanor and Smiley (1975) investigate the impact of enterprise monopoly profits on the distribution of household wealth in the United States between 1890 and 1962. They basically find that past and current monopoly has had a major impact on the current degree of inequality in the distribution of wealth. Creedy and Dixon (1998) estimated the relative burden of monopoly, measured as the static loss of consumer surplus for different household income levels, and find that the welfare loss associated with monopoly power is higher for low-income households compared with high-

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reason for the lower incentives of the monopolist is that by being innovative he is just replacing an already high (monopoly) revenue stream with a revenue stream that is even a bit higher. The competitive firm, on the other hand, starts from a situation of zero profits and therefore has higher incentives to implement the process innovations. If it is, however, assumed that both the monopolist and a potential rival are able to implement a certain process innovation, the *efficiency effect* shows that a monopolist now has a higher incentive to be innovative than his rival from the competitive industry, because he is in danger of losing his high monopoly excess profits in case the rival firm implements the process innovation (Gilbert and Newbery, 1982).

[24] A fourth efficiency type which might be distorted by the presence of market power is the *transactional efficiency*. "The basic insight offered by the school of thought known as 'transaction cost economics' is that market participants design business practices, contracts, and organisational forms to minimise transaction costs and, in particular, to mitigate information costs and reduce their exposure to opportunistic behavior or 'hold-ups' … transactional efficiencies frequently facilitate firms' efforts to achieve allocative, productive, and dynamic efficiencies" (Kolasky and Dick, 2003: 249).

income households. However, as Martin (1994: 38) has pointed out, the decision whether this is considered a problem from a social point of view is a matter of politics rather than economics.

In a nutshell, this section has characterised several important economic arguments why monopolies are typically inferior to competition from a total welfare point of view. Although the striving for a monopoly position remains probably the most important individual motivation for undertaking business activities[25], the permanent (ab)use of such a position likely leads to welfare-reducing inefficiencies. Although empirical studies on deadweight and rent-seeking losses show that the performance differential between perfect competition and monopoly can be surprisingly small, a closer interpretation of these results show that the true losses are very likely significantly larger. Therefore, economists might still serve a more useful purpose in fighting monopolies instead of fires or termites.[26]

2.2.2   Competition Needs Protection

The finding that competition is typically worth protecting is a necessary but not sufficient condition to justify a need for some kind of competition policy. Although the desirability of competition is probably one of the few things most economists generally agree upon, different schools of thought arrive at quite different answers to the questions of whether protection is needed and what kind of protection is needed. The spectrum reaches from laissez-faire approaches with no or only skeletal antitrust rules to quite interfering approaches which plan to create an 'optimal competition intensity'.

Without wanting to enter into these debates in detail (see, for example, Kovacic and Shapiro, 2000; Mueller, 1996; and van den Berg and Camesasca, 2001, for overviews of US and EU antitrust policy history), the basic theoretical justification for some kind of antitrust policy is its potential to reduce the so-called deadweight welfare loss of market power and, consequently, to realise better market performances than without such a policy. If the aim of antitrust policy is simply to promote economic efficiency, then the additional allocative inefficiency caused by productive inefficiencies (trapezoid *ABCD* in the third chart in Figure 4) must

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[25]   The importance of (temporary) market power as a key element in market systems is expressed in great clarity by Justice Antonin Scalia in the US Supreme Court's Trinko (2004) decision: "The mere possession of monopoly power, and the concomitant charging of monopoly prices, is not only not unlawful; it is an important element of the free-market system. The opportunity to charge monopoly prices at least for a short period is what attracts business acumen in the first place; it induces risk taking that produces innovation and economic growth. To safeguard the incentive to innovate, the possession of monopoly power will not be found unlawful unless it is accompanied by an element of anticompetitive conduct" (Verizon Communications v. Law Offices of Curtis V. Trinko LLP, 540 U.S. 398, U.S., 2004).

[26]   The original quote stems from George Stigler (1966) who once stated that „economists might serve a more useful purpose if they fought fires or termites instead of monopoly".

be added to the deadweight loss to trace out the overall potential of antitrust policy to improve total welfare. The inclusion of rent-seeking activities and the fraction of productive inefficiencies without allocative distortions is only feasible if the underlying aims of competition policy are changed (for example, by adopting a consumer surplus standard) or extended (for example, by including the aim of promoting a fair income distribution).[27]

Antitrust policy, as opposed to regulation, is applied in markets in which the competitive process is viable in principle, and only occasionally endangered by actions of individual firms or groups of firms. Therefore, as Geroski (2004: 4) indicates, competition policy only "swings into operation when serious, egregious problems are believed to exist". Although most economists would probably still agree on the desirability of these selective and episodic swings in an artificial world of perfect information, a considerable group of scholars becomes sceptical about how to decide *when* to swing as well as about the accuracy of the swings in a world of imperfect and incomplete information, in which the antitrust authority has to judge on complex forms of business behaviour in complex markets with a multitude of knock-on effects. Especially in such environments, it is believed that market forces (at least in the long run) will automatically select the most efficient firms and lead to efficient market outcomes. Antitrust interventions, on the other hand, are believed to do more harm than good, especially because "economists … have not reached a consensus about the ultimate effects of various business practices ... [I]t seems likely that well-intentioned prosecutors and judges face ... some difficulty in distinguishing good from bad business practices" (Bittlingmayer, 1996: 371).

The so-called private interest theories of regulation (and antitrust) even go one step further and question the general existence of well-intentioned prosecutors. These theories are based on the disbelief that the responsible individuals really base their decisions on the public aim of promoting economic efficiency. Stigler (1971), for instance, argues that enforcers – as well as politicians – will get captured by interest groups, and that these groups will use their regulatory and coercive powers to shape laws and regulations in a way that is beneficial to them (see Hüschelrath, 2005: 192ff., for a general description of these theories in a regulatory context). These public versus private-interest explanations for the development and persistence of antitrust law and enforcement are investigated back to the passing of the Sherman Act in the United States in 1890[28] (see Box 1 for an overview and Rowley and Rathbone, 2004, for a survey).

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[27]   The economic literature discusses a multitude of aims of competition policy. Motta (2004: 177ff.), for instance, discusses welfare, consumer welfare, defense of smaller firms, promoting market integration, economic freedom, fighting inflation, fairness and equity, as well as other public policy factors effecting competition. See also Furse (1996) for a discussion on different aims of competition policies in the United States, the European Union and the United Kingdom.

[28]   Ghosal and Gallo (2001) study the cyclical behaviour of the US Department of Justice's antitrust enforcement activity between 1955 and 1994. They find that case activity is countercyclical; i.e., in an economic downturn, antitrust enforcement activity

Box 1. Congressional intent on passing the Sherman Act

The motivations of the US Congress on passing the Sherman Act in 1890 has been the subject of several economic studies (see, for example, DeLorme et al., 1997). In general, two types of economic explanations are offered. The first type is based on a *public interest theory* of antitrust and assumes that government interventions are motivated by correcting market inefficiencies resulting from monopolies. From that perspective, antitrust laws were initially designed to prevent higher prices and consequently to reduce wealth transfers from consumers to producers (see, for example, Bork, 1966). The second type is based on a *private interest group theory* and assumes that special interest groups pressure legislators to create regulations that promote market inefficiencies. In other words, these approaches argue that US antitrust laws were designed to generate higher prices and lower outputs, protecting some special-interest groups rather than consumers (see, for example, DiLorenzo, 1985; Shughart and Tollison, 1991; Shughart, 1996).

In addition to opportunistic behaviour of captured politicians and enforcers, the companies themselves might strategically (ab)use antitrust policy for their own purposes. Baumol and Ordover (1985: 263) identified that such rent-seeking behaviour by competitors is widespread (and costly to the economy) and consequently asked for easy and costless remedies for such abuses of antitrust "by those who use it for protection from competition". McAfee and Vakkur (2004) developed a taxonomy of strategic uses of antitrust laws.[29] They identified the following seven strategic (ab)uses: 1) Extort funds from successful rival; 2) change the terms of the contract; 3) punish non-cooperative behaviour; 4) respond to an existing lawsuit; 5) prevent a hostile takeover; 6) discourage the entry of a rival; and 7) prevent a successful firm from competing vigorously. Without wanting to go though the whole taxonomy (see McAfee and Vakkur, 2004: 4ff.), a prominent example of a misuse of antitrust law (reflected in points 1 and 2 of the taxonomy) is to extort funds of a successful rival by saying, Give me something (cash, better contract terms) and I will not expose your vulnerability to an antitrust lawsuit. Another typical misuse (reflected in point 3) exploits the expensive nature of anti-

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increases, and vice versa. Based on this empirical finding, the authors conclude that private interest group theories of antitrust enforcement are not supported, as they would expect increases in producer protection in economic downturns (i.e., procyclical enforcement). One possible explanation for the identified countercyclical pattern of antitrust enforcement activity is that the number of antitrust violations increases in economic downturns.

[29]   It is important to remark that the literature on the strategic abuse of antitrust law concentrates on a system of private antitrust enforcement which is predicated on the idea that firms can sue firms. It is straightforward to see that such a system (as applied in the US) opens more possibilities for strategic behaviour than a system of public enforcement (such as currently dominant in the EU), in which the firms can only inform the antitrust authority about possible breaches of competition law but typically cannot directly bring a suit against a competitor. Such a system is likely to provide fewer opportunities for the strategic abuse of antitrust laws.

trust lawsuits and the fact that it is typically cheaper to bring a lawsuit than to defend against one.[30] This opens possibilities, for instance, to use antitrust law as a (threat of) punishment for the purpose of enforcing collusive agreements. In line with this argumentation, Yao (1998: 355ff.), in his survey on antitrust restrictions of competitive strategies, differentiates between strategies that simply include antitrust restrictions in business decisions defensively[31] and strategies that use antitrust as an aggressive strategic weapon; for instance, to reach a ban for a certain merger which might threaten the own market position.

From an empirical perspective, one way to investigate the necessity of competition policy is to analyse historic episodes with no or only lax antitrust enforcement. In the United Kingdom, Adam Smith (1776) already used this approach in his *An Inquiry into the Nature and Causes of the Wealth of Nations* and observed a general 'tendency for collusion'. In Germany, Walter Eucken, amongst others, analysed historical experiences and found a 'tendency of monopolisation'[32] (1952: 31). He concludes that competition policy is necessary to secure competitive market structures in the medium and long term and generally to preserve freedom and organisation of the economic system (*Wirtschaftsordnung*).

More recently, Baker (2003: 42) concluded that "[c]ompetition does not invariably happen by itself", as firms have incentives to restrict competition either

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[30]   Bizjak and Coles (1995) study the implications for shareholder wealth of inter-firm (so-called private) antitrust litigation and find that the average defendant loses more than the average plaintiff gains. The average wealth loss for defendants is a statistically significant 0,6% of the equity value, or an average of $4 million. Given the fact that managerial compensations are often linked to performance, the negative price reaction for the defendant upon a filing suggests that lawsuits can provide significant incentives for firms to comply with antitrust laws. The average wealth gain for a plaintiff was estimated at approximately 1,2% of the equity value of the firm, or equivalently an average gain of $3 million.

[31]   The relevance of so-called antitrust compliance programs as an integral part of a firm's business strategy is shown by Yoffie and Kwak (2001). They explain how Intel avoids antitrust litigation while Microsoft has to cope with multiple antitrust suits. "Intel's success is not a matter of luck. It's a matter of painstaking planning and intense effort. The company's antitrust compliance program, refined over many years, may not receive a lot of attention from the press and the public, but it's been an integral element in the chip maker's business strategy. In an age increasingly characterised by global markets that are dominated by a few huge companies, Intel's approach to compliance provides a valuable model for any enterprise that may come under regulators' scrutiny" (Yoffie and Kwak, 2001: 120). In the past, Michael Porter had been criticised for not considering antitrust violations in his books on *Competitive Strategy* and *Competitive Advantage* (see especially Fried and Oviatt, 1989).

[32]   "Anbieter und Nachfrager suchen stets – wo immer es möglich ist – Konkurrenz zu vermeiden und monopolistische Stellungen zu erwerben oder zu behaupten. Ein tiefer Trieb zur Beseitigung der Konkurrenz und zur Erwerbung von Monopolstellungen ist überall und zu allen Zeiten lebendig. … Universal besteht der 'Hang zur Monopolbildung' – ein Faktum, mit der alle Wirtschaftspolitik zu rechnen hat." (Eucken, 1952: 31).

collusively or exclusively. He substantiates his view (pp. 36ff) by evaluating evidence from four episodes of no or lax antitrust enforcement in the United States:

– *Industry performance before and shortly after the enactment of the Sherman Act (1890)*
  Studies of major industries during that period show successful though imperfect collusion in steel (Scherer, 1996), bromine (Levenstein, 1997), railroads (Elli son, 1994; Porter, 1983) and petroleum refining (Granitz and Klein, 1996). The activities of Standard Oil and American Tobacco also illustrated harmful exclusionary behaviour and showed the effects of anticompetitive mergers (see Granitz and Klein, 1996; Burns, 1986; Lamoreaux, 1985).

– *Industry performance in sectors in which the United States has successfully repealed the antitrust laws as they apply to export cartels (since 1918)*
  Dick (1996) conducted a study on 111 cartel episodes covering 93 industries during the years 1918 to 1965 and found many examples of long-lived export agreements motivated by price-fixing; he also found, however, examples of cartels undermined by price wars and fringe competition.

– *Industry performance during the National Industrial Recovery Act (mid-1930s) which allowed industries to develop the Codes of Fair Competition*
  Several industries used the Codes as a vehicle for price-fixing through various methods. Studies by McGahan (1995), focusing on breweries, and Baker (1989), analysing steel producers, show that at least these industries exploited the opportunity to collude and even managed to stabilise agreements for years after the Codes were declared unconstitutional.

– *Industry performance during the second term of the Reagan administration (mid-1980)*
  The second period of the Reagan administration was a period of relaxed antitrust enforcement (see Box 2 for some empirical evidence), during which the antitrust authorities wanted to prevent certain likely anticompetitive mergers, but the transactions were nevertheless later permitted (e.g., by the Department of Transportation). In particular, the acquisitions of Republic Airlines by Northwest Airlines and the purchase of Ozark Air Lines by Trans World Airlines were both characterised by substantially overlapping route networks of the merging parties. A study by Peters (2006), among others, shows that these mergers indeed led to higher fares (as well as a decrease in service quality) in some markets with estimated average price increases of at least 5-10% in city pairs where the two carriers had previously competed (see Pautler, 2003: 167ff., for an overview). Hüschelrath (1998b: 347ff.) shows that the belief that airline markets are 'perfectly contestable' in the sense of the theory of Baumol, Panzar and Willig (1982) led to the approval of these mergers.

An alternative way to study the effects of antitrust policy is to look at cross-national studies. In a recent working paper, Krakowski (2005), for instance, explores the relationship between competition policy, experience in the application of competition policy, the intensity of local competition and the standard of living. He finds that the effectiveness of antitrust policy has a significant influence on the intensity of local competition. Furthermore, his results show that in coun-

tries with a high intensity of local competition, the standard of living is higher than in countries with a low intensity of local competition.

Box 2. Did lax antitrust enforcement in the 1980s increase concentration?

In the United States, the 1980s were characterised by a lax antitrust enforcement, partly due to the influence of the Chicago School of Antitrust. In such a state, one would expect an increase in concentration due to anticompetitive mergers and successful monopolisation strategies. Based on a data set of concentration measures for 360 US manufacturing industries, the graph below shows the changes in the Herfindahl-Hirschman index from 1982 (the beginning of the lax period) to 1992 (after the end of the lax period).

Fig. 5. Change in Herfindahl-Hirschman index from 1982 to 1992
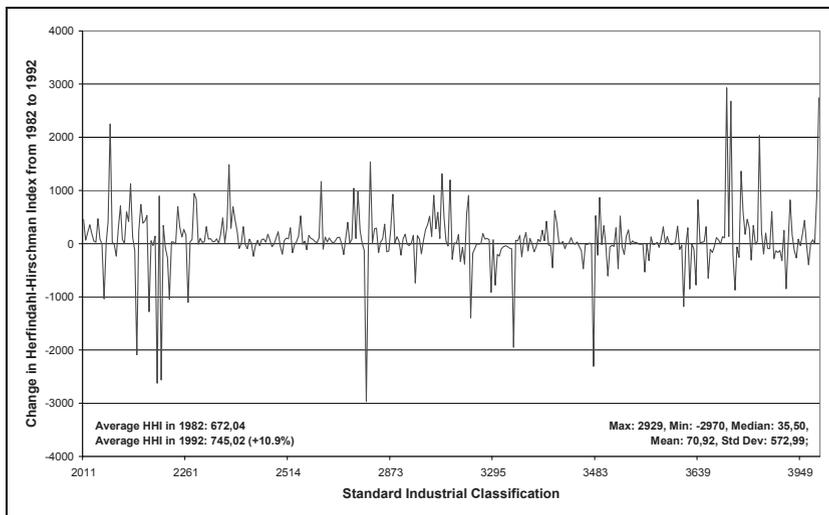
Source: Own calculations based on data from US Census of Manufactures, Concentration ratios in manufacturing 1982 and 1992 (www.census.gov/epcd/www/concentration.html). Herfindahl-Hirschman index changes may partly be influenced by changes in the SIC structure from 1982 to 1992.

The graph as well as the calculated averages show that industrial concentration indeed increased in these ten years by about 10% on average. Although causality between this development and lax antitrust enforcement cannot be substantiated with the data at hand, it is especially interesting to see that the concentration in several industries increased dramatically, while others experienced a deconcentration process. This indicates that studying industry averages alone might say little about concentration effects of lax antitrust enforcement. Additionally, it has to be kept in mind that the graphs only show manufacturing industries and therefore miss important industries (such as the airline industry) in which concentration effects due to lax antitrust enforcement can be expected to be substantial (see Baker, 2003: 38).

Baker (2003) summarises studies which seek to understand why some nations have grown wealthy and others have not. These studies find almost unanimously that impediments to competition impede innovation, growth and prosperity (see, for example, Baumol, 2002; Shleifer and Vishny, 1998; Olson, 1982). Similarly, studies by business economists (see, for example, Porter, 1990) allow drawing the conclusion that differences in the power of competition across developed countries have been an important factor in explaining the difference in the performances of major industries across economies.

Although the historical review so far corroborates the need for some kind of antitrust policy, there is also oppositional evidence. Crandall and Winston (2003) collected historical evidence to underpin the view that antitrust policy was not successful in the past in terms of maximising consumer welfare. Their study, however, was heavily criticised – partly for its selective choice of empirical studies – by antitrust experts such as Connor[33] (2004), Kwoka (2003) and Werden (2003).

Bittlingmayer (2001) investigates the detrimental effects of antitrust enforcement on investment behaviour and industry structure. He uses antitrust case filings as a measure of regulatory uncertainty aiming at explaining some of the variation in industry investment by appealing to political or regulatory uncertainty. His results imply that the low investment level of the late 1950s and early 1960s in the United States was due at least in part to a resurgence of aggressive antitrust and related initiatives. He concludes that "whatever the ability of antitrust to lower prices and increase output in theory or in isolated circumstances, one actual effect of antitrust in practice may have been to curtail investment" (Blittlingmayer, 2001: 322).

Shleifer and Vishny (1991) argue that while lax enforcement may lead to monopoly, tough enforcement could lead to an even worse industry structure: namely one dominated by conglomerates (see Box 3). Therefore, the authors vote for a lax merger enforcement standard.

In a nutshell, it was shown that mainstream theoretical analysis – as well as the majority of empirical studies – comes to the conclusion that competition needs protection and – more importantly – that evidence has shown that competition policy actually helped to improve market performance, industry performance and the performance of the whole economy. However, it is important not to disregard the sceptical views on antitrust but to interpret them as a cornerstone of the continuous improvement of antitrust enforcement. Antitrust interventions have to be aware of enforcement's significant influence on manager's decisions, market behaviour and industry structure. In order to minimise uncertainty caused by antitrust enforcement, it must be the aim to develop, as clearly as possible, rules which are based on sound economic theories but understandable and applicable for people with academic backgrounds other than economics.

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[33]   Connor (2004: 1), for instance, writes: "This paper is an oddly slap-dash product far below the usual standards of the Journal of Economic Perspectives."

Box 3. Monopolies or conglomerates?

Shleifer and Vishny (1991) review evidence on takeover waves in the 1960s and 1980s in the United States and discuss the implications of this evidence for corporate strategy, agency theory, capital market efficiency and antitrust policy. With respect to antitrust policy they generally find that it played an important role in the two take-over waves. "The extremely strict antitrust enforcement in the '60s made most related acquisitions infeasible, or at least costly, and so forced firms determined to make acquisitions to diversify" (Shleifer and Vishny, 1991: 58; see Matsusaka, 1996, for antithetic evidence). In other words, antitrust policy was at least partly responsible for the diversification wave at that time. In direct comparison to that, the authors argue that even if one sees some problems with the takeover wave (made possible due to lax antitrust enforcement) in the 1980s, it is hard to believe that they will turn out as bad as diversification in the 1960s. Consequently, Shleifer and Vishny (1991: 58) conclude that "[i]n a first best world, aggressive antitrust may be a good idea. But, in the world where corporations are committed to growth though acquisitions, antitrust policy of the '60s … had inadvertent effects much more damaging than the benefits it created. … There's no question that … lax [antitrust] policy has led to some anticompetitive mergers, such as those in the airline industry, but it is better to have a few monopolies than a lot of conglomerates."

2.2.3   Competition Policy Is Worth It

Even after concluding that competition is worth protecting and also (regularly) needs protection, the case for antitrust enforcement is still not closed. In a third step it has to be shown that the benefits of antitrust enforcement likely exceed its costs. In the words of Geroski (2004), the question Is competition policy worth it? has to be answered.

In general, there are two ways to approach such a question. On an *aggregate level*, it can be assessed whether competition policy as a whole brings more benefits to society than it costs.[34] On a *disaggregate level*, it can be investigated

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[34]   As argued by Kee and Hoekman (2003), the benefit of competition policy needs to be compared with the potential benefit of other policy options which could foster competition. Based on an empirical study of an international data set consisting of 28 industries in 42 developed and developing countries from 1981 to 1998, the authors indeed conclude that reducing trade barriers and government regulations (as two major restrictions of domestic competition by impeding entry and exit of firms) would likely generate a higher rate of return than the adoption and enforcement of competition law. However, the increased significance of especially international cartels, despite shrinking trade barriers, suggests that reductions in trade barriers and government regulations are complements rather than substitutes to competition policy norms. In other words, although trade liberalisation and reductions of government regulations are typically worth promoting from an economic perspective, they do not make competition policy norms obsolete.