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Introduction

Joseph Schumpeter ... may have been right when he wrote that monopoly profits are ‘the baits that lure capital on untried trails’. But when monopolists have the power to block those trails competition law needs to intervene.

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Innovation processes generate new knowledge which can be used as a resource.² Competition is one of the drivers for the generation and diffusion of such knowledge.³ It has even been characterised primarily as a procedure for discovering previously unknown knowledge.⁴ At the same time, post-innovation competition, in particular by imitation, may endanger the recoupment of investments into innovation and thereby reduce *ex ante* incentives to innovate. In market-based economies, the latter insight serves as a justification for intellectual property (IP) laws barring post-innovation competition by imitation, and antitrust policy takes into account this incentive function of IP.

What has been neglected in the relationship between IP and antitrust policies until recently, however, is that new or improved technologies or products may have to build on prior innovation which may be protected by IP.⁵ Follow-on innovation may thus require access to IP on initial innovation. A holder of such initial IP with market power may have the ability and the incentive to foreclose dynamic competition. Therefore, in addition to the links between pre- and post-innovation competition and initial innovation, IP and antitrust policies in their interplay also need to account for the cumulateness of innovation.

1.1 THE PREVIOUS FOCUS ON INITIAL INNOVATION

For some time, the relationship between IP and antitrust policies has been framed primarily around the Schumpeterian hypothesis that supra-competitive profits, or, more generally, lucrative post-innovation appropriability conditions, are ‘the baits that lure capital on

¹ First (2007), ‘Strong Spine, Weak Underbelly: The CFI *Microsoft* Decision’, New York University Law and Economics Working Papers 129, p 4, quoting Schumpeter (1947), *Capitalism, Socialism and Democracy*, pp 89–90.

² For an early definition of innovation see Schumpeter (1912), *Theorie der Wirtschaftlichen Entwicklung*; first English translation: (1934), *The Theory of Economic Development*; (2004), 10th edn, p 66.

³ See Arrow (1962), ‘Economic Welfare and the Allocation of Resources for Invention’ in Nelson (ed), *The Rate and Direction of Inventive Activity*, pp 609–26; Baumol (2002), *The Free-Market-Innovation Machine: Analyzing the Growth Miracle of Capitalism*, in particular at pp 286–87, and in more detail below at 2.4.1.3.

⁴ See the speech ‘Competition as a Discovery Procedure’ given by Hayek in Chicago, 29 March 1968, and, similarly, that given in German under the title ‘Der Wettbewerb als Entdeckungsverfahren’ in Kiel, 5 July 1968.

⁵ See eg Scotchmer (1991), ‘Standing on the Shoulders of Giants: Cumulative Research and the Patent Law’, 5 *Journal of Economic Perspectives* 29; Merges & Nelson (1990), ‘On the Complex Economics of Patent Scope’, 90 *Columbia Law Review* 839.

untried trails'.⁶ This view may be paraphrased using antitrust terminology for markets in the innovation chain,⁷ as follows:

- *innovation markets*, which consist of research and development (R&D) directed at particular new or improved products or processes, and the close substitutes for that research and development;⁸
- *technology markets*, which consist of the IP and its close substitutes;⁹ and
- *product markets*, both for intermediate and final products made using the IP, and for products which are used as inputs, together with the IP, in the creation of other products.¹⁰

Accordingly, IP may in particular bar post-innovation competition by imitation (ie static competition) on product markets to provide for sufficient *ex ante* incentives to innovate. These incentives may induce dynamic competition in the form of entry in particular (i) on innovation markets, (subsequently) (ii) on technology markets by introducing IP on new or improved products or processes, and/or (iii) on product markets with new or improved products.

In particular, two strands of economic theory offer to some extent competing explanations for the relationship between static and dynamic competition. In terms of *neoclassical welfare economics*, post-innovation static competition and, accordingly, allocative efficiency should be sacrificed to provide for sufficient *ex ante* incentives to innovate and thus 'dynamic efficiency' if the utility¹¹ added through innovation outweighs allocative losses.¹² Utility from innovation stems from the invention and commercial introduction of new or improved products and processes. Such products and processes enhance welfare by generating new market options, by increasing the quality of products and by promoting growth

⁶ Similarly, Schumpeter ((1942), *Capitalism, Socialism and Democracy*, p 83) found that '[a] system—any system, economic or other—that at every point in time fully utilizes its possibilities to the best advantage may yet in the long run be inferior to a system that does so at no given point in time, because the latter's failure to do so maybe a condition for the level or speed of long-run performance'.

⁷ US Antitrust Guidelines for the Licensing of Intellectual Property, issued by the DoJ and the FTC in 1995, at 3.2. This distinction according to relevant antitrust markets differs from the 'macro' terminology introduced by von Weizsäcker ((1981), 'Rechte und Verhältnisse in der modernen Wirtschaftslehre', 34 *Kyklos* 345 (English translation: (1984), 'Rights and Relations in Modern Economic Theory', *Journal of Economic Behavior and Organization* 133), who distinguishes between the levels of innovation, production and goods.

⁸ US Antitrust Guidelines for the Licensing of IP, at 3.2.3. See in more detail below at 4.4. The notion of 'products' comprises both goods and services (see also Regulation (EC) No 772/2004 on the application of Article 81(3) of the Treaty to categories of technology transfer agreements, Art 1(1)(e)). The US Antitrust Guidelines for the Licensing of IP (at 3.2.1) use the notion of 'goods markets'.

⁹ See the US Antitrust Guidelines for the Licensing of IP, at 3.2.2, and the similar definition of technology markets in the Commission's Guidelines on the application of Article 81 EC of the EC Treaty to technology transfer agreements, para 22.

¹⁰ See the US Antitrust Guidelines for the Licensing of IP, at 3.2.2. See also the European Commission's Guidelines on the application of Article 81 EC of the EC Treaty to technology transfer agreements, para 21.

¹¹ More precisely: the discounted net present value of such utility. See Schmidtchen (2007), 'Die Beziehung zwischen dem Wettbewerbsrecht und dem Recht geistigen Eigentums—Konflikt, Harmonie oder Arbeitsteilung?' in Oberender (ed), *Wettbewerb und geistiges Eigentum*, pp 9–46.

¹² See eg the analysis of Kaplow (1984), 'The Patent-Antitrust Intersection: A Reappraisal', 97 *Harvard Law Review* 1813 and Hirschleifer (1971), 'The Private and Social Value of Information and the Reward to Inventive Activity', 61 *American Economic Review* 561, at 571. See also OECD (1989), *Competition Policy and Intellectual Property Rights*, p 101: the 'short-run misallocation is the price that has to be paid to secure an improved long-term dynamic resource efficiency through an optimal level of innovative activity'.

through increased productive efficiency.¹³ In terms of *evolutionary economics*,¹⁴ the process of innovation, by its very nature, defies prediction and thus static equilibrium analysis of the ‘optimal’ amount and velocity of technological progress. On this view, the notion of ‘dynamic efficiency’ therefore cannot be defined with the same precision as ‘allocative efficiency’, but can serve as ‘shorthand’ for the dynamic effects of competition and thus for innovation.¹⁵ According to evolutionary economics, dynamic competition is characterised by trial and error as well as by successful innovation and imitation.¹⁶ Correspondingly, the multiplicity and diversity of parallel trials of firms and thus of innovation paths may be essential for both the effectiveness of competition as a discovery procedure and innovation.¹⁷ At the same time, temporary protection against imitation on product markets may be necessary to induce the necessary entry and competition in particular on innovation markets.

Irrespective of the underlying theoretical economic paradigm, there is consensus nowadays that dynamic efficiency generally is more important than static efficiency and that competition policy¹⁸ should be guided by this insight.¹⁹ As Easterbrook has pointed out poignantly, ‘an antitrust policy that reduced prices by 5 percent today at the expense of reducing by 1 percent the annual rate at which innovation lowers the costs of production would be a calamity. In the long run a continuous rate of change, compounded, swamps static losses.’²⁰ Accordingly, innovation concerns have risen on the agendas of competition authorities.²¹ Innovation has become a parameter of antitrust policy on its own aside from price, quantity and quality, although it could be integrated under a sufficiently long time horizon into the classic three parameters. In both the US and the EU—today the two biggest jurisdictions and markets with a profound history of competition policy—legislators, competition authorities and courts, albeit at varying degrees and in varying ways, have at

¹³ See eg Ordover (1985), ‘Economic Foundations and Considerations in Protecting Industrial and Intellectual Property’, 53 *Antitrust Law Journal* 503, at 505.

¹⁴ See eg Nelson & Winter (1982), *An Evolutionary Theory of Economic Change*; Kerber (1994), *Evolutionärer Wettbewerb—Zu den theoretischen und institutionellen Grundlagen der Wettbewerbsordnung*.

¹⁵ Kerber (2009), ‘Should Competition Law Promote Efficiency?—Some Reflections of an Economist on the Normative Foundations of Competition Law’ in Drexler *et al* (eds), *Economic Theory and Competition Law*, pp 93–120.

¹⁶ See in particular Clark (1961), *Competition as a Dynamic Process*.

¹⁷ Kerber (2010), ‘Competition, Innovation and Maintaining Diversity through Competition Law’, Research Paper, p 2; Farrell (2006), ‘Complexity, Diversity, and Antitrust’, 51 *Antitrust Bulletin* 165.

¹⁸ The notion of ‘competition policy’ comprises both EU competition and US antitrust policy. The notion of ‘antitrust laws’ comprises both US antitrust and EU competition law. In other respects, the terms ‘antitrust’ and ‘competition’ will be used interchangeably.

¹⁹ See eg Elhauge (2003), ‘Defining Better Monopolization Standards’, 56 *Stanford Law Review* 253, at 275. For an overview of theories of dynamic competition and dynamic efficiency see Ellig & Lin (2004), ‘A Taxonomy of Dynamic Competition Theories’ in Ellig (ed), *Dynamic Competition and Public Policy: Technology, Innovation, and Antitrust Issues*, pp 16–44.

²⁰ Easterbrook (1992), ‘Ignorance and Antitrust’ in Jorde & Teece (eds), *Antitrust, Innovation, and Competitiveness*, pp 119–36, at pp 122–23. Similarly, see Areeda (1992), ‘Antitrust Law as Industrial Policy: Should Judges and Juries Make It?’ in Jorde & Teece (eds), *Antitrust, Innovation, and Competitiveness*, pp 29–46, at p 31: ‘At least since Schumpeter wrote nearly fifty years ago, innovation has been thought to contribute far more to our well-being than keeping prices closer to costs through competition.’ But see Brunell (2001), ‘Appropriability in Antitrust: How Much is Enough?’, 69 *Antitrust Law Journal* 1, at 20: ‘Acknowledging that the long-term welfare effects of dynamic efficiency gains are far more significant than short-term allocative efficiency gains does not mean that any possible diminution in incentives, no matter how remote, ought to trump significant and certain short-term gains.’

²¹ See eg Gilbert & Tom (2001), ‘Is Innovation King at the Antitrust Agencies? The Intellectual Property Guidelines Five Years Later’, 69 *Antitrust Law Journal* 43.

least modified the application of antitrust rules to pay deference to IP rights. This applies even in those cases where the exercise of IP rights allows or protects the exploitation of significant market and even monopoly power.

1.2 THE NEED TO ACCOUNT FOR FOLLOW-ON INNOVATION

Fostering innovation has become a central goal within many public policies, not only IP and competition policies. From an economic perspective, there are good reasons to accord innovation such priority: *First*, much more than labour and capital intensity, technological progress is the most important driver of economic growth.²² *Second*, knowledge generates increasing returns, which may offset diminishing returns inherent in input accumulation.²³ *Third*, due to large spillovers, the social return on investment in R&D is much higher than its private return.²⁴ Based on the assumption that more IP leads to more innovation in their territory, legislators in many countries have expanded IP rights. In addition, the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS)²⁵ has led to an expansion of IP protection. The number of IP rights, in particular of patents, due to the accumulation of strategic portfolios by firms, as well as IP litigation, has increased significantly.²⁶ This development has even been dubbed the ‘second enclosure movement’.²⁷

However, while IP expansion might increase the incentives for initial innovation, at the same time it may raise the costs of potential follow-on innovation. This may happen in particular if a potential new or improved process or product builds on existing IP-protected technology.²⁸ Indeed, ‘innovations are rarely the dramatic breakthroughs that Schumpeter may have had in mind but rather small improvements in a new process or product in which genuine novelty and imitation-with-a-difference shade imperceptibly into one another’.²⁹ In particular, for such more incremental than radical innovation, the follow-on innovator or improver may need to have a licence for the initial IP-protected innovation to do research or to market his follow-on innovation or improvement.³⁰ This applies specifically to software, where innovation is often cumulative. And this generally

²² See Solow (1956), ‘A Contribution to the Theory of Economic Growth’, 70 *Quarterly Journal of Economics* 65, who found that between 1909 and 1949 gains from labour and capital intensity accounted for only one-eighth of US GNP growth, while the remaining seven-eighths could be attributed to technological progress.

²³ See (the formalisation by) Romer (1990), ‘Endogenous Technological Change’, 98 *Journal of Political Economy* S71.

²⁴ See eg Griliches (1992), ‘The Search for R&D Spillovers’, 94 *Scandinavian Journal of Economics* S29.

²⁵ The TRIPS Agreement is Annex 1C of the Marrakesh Agreement Establishing the World Trade Organization, signed in Marrakesh, Morocco, 15 April 1994.

²⁶ See First (2007), ‘Controlling the Intellectual Property Grab: Protect Innovation, Not Innovators’, 38 *Rutgers Law Journal* 365 (‘Intellectual property law is out of control’). For a description of and reasons for the ‘patent explosion’ and the ‘patent litigation explosion’ in the US see eg Jaffe & Lerner (2004), *Innovation and its Discontents*, pp 9–16. For an analysis of strategic patenting see the report by Harhoff et al (2007), *The Strategic Use of Patents and its Implications for Enterprise and Competition Policies*.

²⁷ Boyle (2003), ‘The Second Enclosure Movement and the Construction of the Public Domain’, 66 *Law & Contemporary Problems* 33.

²⁸ See eg Scotchmer (2004), *Innovation and Incentives*, pp 127–59.

²⁹ Blaug (1997), *Not Only an Economist*, p 110.

³⁰ ‘Improvement’ is understood broadly as anything that enhances the options of users. The notion has been introduced by Lemley (1997), ‘The Economics of Improvement in Intellectual Property Law’, 75 *Texas Law Review* 989. See also below at 7.1.

continues to hold as technologies become increasingly complex and products require ever more specialised inputs.³¹ Thus, setting the relevant IP and antitrust policy levers requires not only accounting for the consequences on dynamic efficiency generated by initial innovation and for static efficiency in particular on product markets; it is also essential to account for the effects on dynamic efficiency that might be generated by follow-on innovation. This insight has already led particular institutions in the US to re-think IP systems³² and the IP/antitrust interface.³³

Both IP and antitrust rules attempt to balance the rights of initial and follow-on innovators, improvers and competitors. Particularly by defining the bargaining positions of the different actors, these rules form part of the framework for cumulative innovation which should provide for sufficient *ex ante* incentives for initial and follow-on innovators and improvers and, at the same time, minimise distortions of competition on the markets in the innovation chain. What role antitrust rules and in particular anti-monopolisation and abuse of dominance law rules—ie section 2 of the Sherman Act³⁴ and Article 102 TFEU (ex Article 82 EC)³⁵—have to play in this framework, is the subject of this book.

1.3 THE REGULATORY PROBLEM AND THE POLICY LEVERS

A paradigmatic situation where the intricacy of the relationship between the incentives for initial and follow-on innovation and improvements as well as post-innovation static efficiency becomes evident is that of a unilateral refusal to deal based on IP rights by a firm with significant market power—in particular a refusal to license IP³⁶ by a firm with such a position on the technology market. Such refusal may have foreclosure effects in particular (i) on follow-on innovation markets, if the firm seeks the licence to do research, and (ii) on product markets, if the firm seeks the licence to market a—potentially new or improved—product.

To limit potential competitive concerns and to account for the rights of follow-on innovators, improvers and competitors, IP laws—unlike laws on tangible property—provide various policy levers, such as: the bar for protection, the scope and length of protection, the principle of exhaustion, research exemptions, compulsory licensing regimes to

³¹ Boldrin & Levine (2005), 'Intellectual Property and the Efficient Allocation of Social Surplus from Creation', 2 *Review of Economic Research on Copyright Issues* 45, at 61–62. See also Heller & Eisenberg (1998), 'Can Patents Deter Innovation? The Anticommons in Biomedical Research', 280 *Science* 698.

³² See the 2005 Report of the National Academy of Sciences Committee on Intellectual Property Rights in the Knowledge-Based Economy, *A Patent System for the 21st Century*. For an academic contribution to the debate see Shapiro (2004), 'Patent System Reform: Economic Analysis and Critique', 19 *Berkeley Technology Law Journal* 1017.

³³ See the two reports based on extensive hearings held by the FTC and the DoJ in 2002: FTC (2003), *To Promote Innovation: The Proper Balance of Competition and Patent Law and Policy*, which focuses on the patent system; and DoJ & FTC (2007), *Antitrust Enforcement and Intellectual Property Rights: Promoting Innovation and Competition*, which focuses on the role of antitrust policy.

³⁴ Here in after abbreviated as '§ 2 Sherman Act'.

³⁵ Since the entry into force of the Lisbon Treaty, 1 December 2009, which amended the Treaty on European Union and the Treaty Establishing the European Community, the former Art 82 EC is now contained in Art 102 of the Treaty on the Functioning of the European Union (TFEU). Only the notion of 'common market' has been replaced by 'internal market' (as throughout the whole Lisbon Treaty). The TFEU replaces the EC Treaty, while the revised Treaty on European Union (TEU) partly takes over function of the old Treaty on European Union.

³⁶ Another scenario would be the refusal to supply a product if the refusal is based on an IP right.

grant dependency licences, the right to reverse engineer and decompile software, misuse doctrines, as well as the potential substitution of the property for a liability rule under certain conditions. Aside from misuse doctrines under US IP laws, however, none of these ‘internal’ levers is based on a detailed assessment of market power of the entity exercising the IP right and of the effects on competition.

In such cases, an obligation to license under anti-monopolisation and abuse of dominance provisions runs into the well-known conflict with the exclusivity right of the IP holder to choose whether and to whom to give a licence as the very essence or ‘subject matter’ of his IP. In a nutshell, the position under § 2 Sherman Act and Article 102 TFEU regarding a refusal to license may be relevant in three basic scenarios. *First*, if a dominant IP owner refuses to license his IP to a person or entity requesting such a licence, the latter may initiate an antitrust action before a court, claiming that the IP owner has an obligation to license his IP under § 2 Sherman Act or Article 102 TFEU (*private enforcement of antitrust as ‘sword’*). *Second*, alternatively, the person or entity seeking the licence may also complain to a competition authority to initiate proceedings, which may result in an order to license the IP (*public enforcement of antitrust as ‘sword’*). *Third*, if the person or entity, without a licence, infringes the IP owner’s rights, the latter may initiate an infringement action, against which the infringer may invoke an obligation to license under the antitrust laws as a defence (*private enforcement of antitrust as ‘shield’*).

A potential role for anti-monopolisation and abuse of dominance laws—and in particular of the essential facilities doctrine—could be to complement IP laws by preventing the foreclosure of dynamic competition by dominant firms. The *Magill*³⁷ and *IMS Health*³⁸ judgments of the European Court of Justice (ECJ), which involved a weak copyright and a protection of a *de facto* standard, show, however, that antitrust rules may also be (ab)used as a corrective device where a general cut-back of over-broad IP protection would be preferable. Judging antitrust rules according to their effect on incentives to innovate and on competition thus not only requires assessing their substantive functioning, but also whether they are consistent with an efficient allocation of tasks between IP and competition policy.

1.4 METHODOLOGY AND STRUCTURE

The transatlantic debate on the IP/antitrust interface takes place against the background of the attempt to generate a paradigm shift in EU competition policy towards a ‘more economic’ or ‘effects-based’ approach and, ultimately, the adoption of consumer welfare as its sole goal. While such a tectonic shift would give rise to an expectation of further convergence of EU and US competition policies, the divide over the rules on refusals to deal has essentially widened:³⁹ in the EU, the Court’s jurisprudence in *Magill*, *IMS Health* and

³⁷ Decision 89/205/EEC, *Magill TV Guide*, OJ 1989 L78/43; appealed to the CFI: Cases T-69/89, 70/89 and 76/89, [1991] ECR II-485, 535 and 575; further appealed to the ECJ: Joined Cases C-241/91 P and C-242/91 P, *Raidió Teilifís Éireann (RTÉ) and Independent Television Publications (ITP) v Commission* [1995] ECR 743 (the ECJ’s judgment will be cited as ‘*Magill*’).

³⁸ Case C-418/01, *IMS Health v NDC Health* [2004] ECR I-5039 (‘*IMS Health*’).

³⁹ See in the same vein Fox (2006), ‘Monopolization, Abuse of Dominance, and the Indeterminacy of Economics: The US/EU Divide’, 3 *Utah Law Review* 725, in particular at 734–35; Kovacic (2009), ‘Competition

Microsoft has established a role for Article 102 TFEU in situations where a refusal to license prevents the marketing of a new product. Conversely, the US Supreme Court in its *Trinko* judgment,⁴⁰ in particular by embracing a Hayekian philosophy, has made clear that a unilateral refusal to deal will rarely ever give rise to liability under § 2 Sherman Act. Although the case concerned tangible property, the arguments used by the Court can be applied *a fortiori* to intellectual property.

This book challenges the mainstream assumption that IP and antitrust laws share the same goal of enhancing consumer welfare. Instead, it uses positive economic analysis in a consequentialist tradition based on the assumption of the bounded rationality⁴¹ of market actors to compare existing IP and antitrust levers in the two jurisdictions.⁴² This comparative institutional perspective also enables us to explain the differences between the US and the EU approaches vis-à-vis refusals to supply based on IP in terms of different beliefs with regard to competition, different economic interests, and a different allocation of legislative competencies in the field of IP in the two jurisdictions. In addition, policy recommendations on the division of tasks between IP and antitrust with regard to cumulative innovation and dynamic competition are developed.

In order to explore the abovementioned issues, this book follows a top-down research agenda: chapter two analyses the general relationship between IP and antitrust laws in the US and the EU and develops some meta rules and principles vis-à-vis the IP/antitrust interface. Focusing on unilateral conduct, chapter three assesses the standards which are and may be used under § 2 Sherman Act and Article 102 TFEU to determine anti-competitive exclusionary behaviour. Concentrating on refusals to deal, chapter four categorises the different types of refusals based on IP and suggests IP and competition rules that should govern them. For specific types of refusals, the chapter recommends an essential facilities type of test. Providing the building blocks for just such an essential facilities test, chapter five addresses the question of which pricing methodology could be used to determine liability for refusals to deal based on IP, as well as remedies. Chapter six proposes in detail an essential facilities rule aimed at preventing anti-competitive foreclosure arising from a refusal to supply. The suggested essential facilities rule differentiates between refusals based on tangible and refusals based on intellectual property. In the light of the previous analysis, chapters seven and eight analyse the state of US and European IP and antitrust laws with regard to refusals to supply based on IP which may impede follow-on innovation. Chapter nine compares the two different frameworks and attempts to explain the differences as a result of different beliefs, interests and constitutions in the two jurisdictions. Chapter ten concludes by summarising the results of each of the previous chapters in brief statements.

Policy in the European Union and the United States: Convergence or Divergence?' in Vives (ed), *Competition Policy in the EU—Fifty Years from the Treaty of Rome*, pp 314–43, at pp 324–25.

⁴⁰ *Verizon Communications Inc v Law Offices of Curtis v Trinko, LLP*, 540 US 398, 124 S Ct 872.

⁴¹ See eg Selten (2002), 'What is Bounded Rationality?' in Gigerenzer & Selten (eds), *Bounded Rationality—The Adaptive Toolbox*, pp 13–36. See in more detail below at 2.4.1.2.

⁴² For an analysis of the problem of 'unintended consequences' under normative economic theory and an outline of a methodology for a positive economic theory of law see Kirchner (1997), *Ökonomische Theorie des Rechts*.