

COMPETITION COMMITTEE



Competition Policy and Knowledge-Based Capital

Key Findings

Competition Policy and Knowledge-Based Capital

KEY FINDINGS

2013



ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

The OECD is a unique forum where the governments of 34 democracies work together to address the economic, social and environmental challenges of globalisation. The OECD is also at the forefront of efforts to understand and to help governments respond to new developments and concerns, such as corporate governance, the information economy and the challenges of an ageing population. The Organisation provides a setting where governments can compare policy experiences, seek answers to common problems, identify good practice and work to co-ordinate domestic and international policies.

The OECD member countries are: Australia, Austria, Belgium, Canada, Chile, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. The Commission of the European Communities takes part in the work of the OECD.

OECD Publishing disseminates widely the results of the Organisation's statistics gathering and research on economics, social and environmental issues, as well as the conventions, guidelines and standards agreed by its members.

This work is issued under the responsibility of the Secretary-General of the OECD. The opinions expressed and arguments employed herein do not necessarily reflect the official views of the OECD member countries.

© OECD 2013

You can copy, download or print OECD content for your own use, and you can include excerpts from OECD publications, databases and multimedia products in your own documents, presentations, blogs, websites and teaching materials, provided that suitable acknowledgment of OECD as source and copyright owner is given. All requests for public or commercial use and translation rights should be submitted to rights@oecd.org. Requests for permission to photocopy portions of this material for public or commercial use shall be addressed directly to the Copyright Clearance Centre (CCC) at info@copyright.com or the Centre français d'exploitation du droit de copie (CFC) contact@cfcopies.com.

FOREWORD

The OECD Competition Committee has discussed competition and knowledge-based capital extensively in recent years. Among the participants in these discussions were senior competition officials, leading academics and representatives of the business community.

This publication presents the key findings resulting from the roundtable discussions held on the Digital Economy (2012); Regulated Conduct Defence (2011); Pro-Active Policies for Green Growth and the Market Economy (2010); Competition, Patents and Innovation (2009 and 2006), Dynamic Efficiencies in Merger Analysis (2007), Intellectual Property Rights (2004) and Merger Review in High Innovation Markets (2002). The key findings from each roundtable have now been organised into a cohesive narrative, putting the Competition Committee's work in this area into perspective and making it useful to a wider audience.

The executive summaries on which this document is based, as well as a bibliography are included in this publication. The full set of materials from each roundtable, including background papers, national contributions and detailed summaries of the discussions, can be found at www.oecd.org/competition/roundtables.

TABLE OF CONTENTS

Key Findings	7
Executive Summaries	
The Digital Economy	39
The Regulated Conduct Defence	53
Pro-Active Policies for Green Growth and the Market Economy	63
Competition, Patents And Innovation	67
Dynamic Efficiencies in Merger Analysis	77
Intellectual Property Rights	83
Merger Review in High Innovation Markets	91
Bibliography	99

KEY FINDINGS *

By the Secretariat

1. Introduction

Knowledge-based capital (KBC) has emerged as an important driver of investment, innovation and growth in OECD economies. KBC is a term that encompasses a broad range of ideas, intangible assets and innovations, including computerised information, scientific and non-scientific knowledge and processes, business methods, intellectual property, and economic competences such as firm-specific human capital and efficiency-enhancing know-how. KBC complements and may even supersede physical capital in stimulating and facilitating economic growth. Competition is another factor that can drive growth, investment, and innovation—including investment and innovation related to KBC itself. Accordingly, sound competition policy and effective competition law enforcement can and should support the development of KBC.

As KBC-focused businesses have grown in economic importance, they have started to encounter and create more competition law and policy issues. During the past several years, there has been a string of high-profile competition law enforcement matters involving KBC-focused businesses. Many of these have occurred in the digital economy and involved companies such as Google, Apple, Facebook, Microsoft, and Intel. Not all of them were IT firms, however, as settlements with major banks like UBS and JPMorgan Chase over price-fixing in bond markets illustrate.

Yet it remains the case that while most competition authorities and many courts in OECD countries have substantial experience applying competition principles to markets that involve physical goods and capital, they generally have less experience with competition in KBC-intensive markets. Indeed, questions often arise concerning whether traditional competition law and policy

* This section is based on meaningful findings extracted from the executive summaries compiled in this publication. They were reorganised into a cohesive narrative that captures the different aspects covered.

principles are even applicable in such markets and, if they are, whether they need to be adjusted to account for the differences between KBC-intensive markets and other kinds of markets.

Competition law and policy, as a general rule, is a flexible framework that can be adapted to fit diverse markets. Traditional competition laws and principles can and should be applied to prevent and deter anticompetitive behaviour in any setting. That fosters investment and innovation, including in KBC-focused markets. Nonetheless, certain features of those markets—such as their tendencies toward rapid change, constant innovation, market tipping (when the nature of a market makes it likely to be monopolised) and a prominent role for intellectual property—can complicate competition policy analysis.

This volume draws upon the work of the OECD Competition Committee to identify and discuss recurrent competition issues that may affect KBC-focused markets. The aim is to provide policymakers with a comprehensive overview of the role of competition and competition policy in supporting the development of KBC, including the use of competition enforcement to address anticompetitive behaviour that hinders innovation and retards economic growth.

Section II considers the theory and empirical evidence on the relationship between competition and innovation. Although the question of what degree of competition leads to the greatest innovation is complex and probably varies from industry to industry, two key policy recommendations can be discerned from the available evidence: implement effective competition law enforcement to combat anticompetitive behaviour, and eliminate unnecessarily anticompetitive product market regulations. Section III addresses the relationship between competition policy and intellectual property rights, which are commonly owned and used in KBC-intensive markets. Section IV considers competition issues that may arise specifically in digital markets, an increasingly important sector in which KBC plays a central role. Section V concludes.

2. Competition & Innovation

Rapid innovation is a common and highly desirable feature of KBC-focused markets. Innovation leads to better, and often cheaper, products and services. Because competition influences the degree of innovation taking place in a market, competition policy has important implications for the evolution and success of KBC-focused industries.

The relationship between competition and innovation is a complex and often contradictory one. The intensity of product market competition affects

innovation efforts, but the question of how, exactly, competition affects innovation seems to have no universal solution. Instead, the answer requires a host of conditions, exceptions, and caveats. What seems certain, at least, is that competition is capable of both promoting and deterring innovation. On the one hand, strong competition can encourage companies to innovate so as to keep up with, get ahead of, or remain ahead of their competitors. On the other hand, some degree of market power (a firm has market power when it can profitably hold its price above the level that would prevail in a competitive market) may stimulate innovation by making it easier to recover costs and earn profits. Policymakers are left with the complex task of creating an environment in which the rewards for innovation are sufficient to encourage it, but where there are also competitive pressures that encourage firms to create, use and circulate innovations. Finding the optimal degree of competition is further complicated by the fact that innovation processes, as well as the importance of factors such as intellectual property rights in spurring innovation, vary considerably across industry sectors and types of inventions.

2.1 *The Theory of Competition & Innovation*

An academic dialogue about the relationship between competition and innovation has endured for many years. The Schumpeterian view, named for the work of Joseph Schumpeter, posits that big, dominant firms are more likely to innovate than smaller ones that lack market power, but also that innovations are “gales of creative destruction” that render market power ephemeral in high-innovation industries [Schumpeter (1942)]. The opposing view, often associated with the work of Kenneth Arrow, is that competition promotes more innovation because entrenched market power makes managers less inclined to spend money on developing new technologies, while firms facing greater competition have more to gain by innovating [Arrow (1962)]. In between, there is an intermediate theory that asserts that moderate levels of competition produce the most innovation; that is, the curve describing the relationship between market concentration and innovation looks like an inverted U-shape.

Thus, economic theory regarding the relationship between competition and innovation remains unsettled. Where it is difficult for firms to appropriate the value of their innovations, theory predicts that competition will reduce innovation incentives. This suggests that in some cases permitting a merger (or some other type of conduct) that harms competition will actually increase innovation incentives. On the other hand, theory also indicates that more competition should boost innovation in many situations.

2.2 *Empirical Evidence on Competition and Innovation*

Unfortunately, empirical data does not resolve those conflicting theoretical forces, as the empirical literature also reaches mixed results. In essence, some studies find that competition encourages innovation, while others conclude that it reduces innovation, depending on various circumstances and assumptions see detailed discussion in OECD (2007).

The unsettled state of the literature is not due to insufficient effort. An abundance of econometric studies focuses in one way or another on the relationship between competition and innovation. Because both competition and innovation are hard to measure directly, these studies almost always employ proxies, such as concentration ratios or profit margins (the Lerner Index) for competition and R&D intensity or the number of patents granted for innovation. The proxies are imperfect, as it is now well understood that market structure and the level of competition in the market are not necessarily strongly correlated, and that R&D intensity and patents are not completely reliable indicators of innovation. Nevertheless, these models are continually being modified in order to minimise distortional effects and make the proxies as useful as possible. If it is possible to tease one central, reasonably well-accepted finding from the empirical literature, it would probably be the idea that there is an **inverted U-shape** relationship between market concentration and R&D intensity when the former is plotted on the horizontal axis and the latter on the vertical axis (e.g., Aghion, et al (2005)). In other words, there is growing support for the proposition that concentration and R&D intensity generally have a positive relationship at low levels of concentration, with R&D activity reaching a peak at a moderate level of concentration, after which the relationship becomes negative and R&D intensity shrinks as concentration continues to rise. Again, to the extent that market concentration is a good reflection of the degree of competition, the idea here is that the most fertile environment for innovation is a market with a moderate amount of competition.

An early game theory approach by Scherer predicted that greater rivalry, represented by lower concentration indices, stimulates R&D spending up to a certain point, but that too little market concentration discourages R&D because it becomes too difficult for firms to appropriate a sufficiently enticing share of the returns from their innovations [Scherer (1967)]. In the 1980s, models based on decision theory agreed with Scherer's theory that intermediate market structures often exhibit the most innovative activity [Kamien & Schwartz (1982)]. Newer models continue to predict that the relationship between product market competition and innovation is best described by the inverted-U shape

[Aghion *et al.* (2005)]. It must be emphasised, nonetheless, that the inverted U-shape idea is a generalised description. Findings vary from industry to industry, among other things, and some studies reach ambiguous or unsupportive results. As Scherer and others have pointed out, the inverted U theory does not always hold up well when additional factors that affect innovation, such as technological opportunity available in an industry, are taken into account [Scherer & Ross (1990); Symeonides (1996)].

One subject area where the data line up more in support of Schumpeter's vision concerns the kinds of innovation that large incumbents pursue in comparison to what challengers typically attempt to do. The former group tends to focus on developing inventions that build on or extend the status quo technology, whereas smaller firms and entrants are more likely to concentrate on disruptive innovation that will seriously alter the fundamental nature of markets. Because new technologies that change the elements necessary for success may reconfigure the state of competition, they are often welcomed as a strategic opportunity by marginal competitors while being treated as a threat by the leading firms. That is often true even if the leading firms are the ones who created the new technology. In those cases, the incumbent simply shelves the technology, having patented it, kept its existence secret, or taken other measure to prevent competitors from using it. Consequently, breakthrough or disruptive inventions—the kind Schumpeter had in mind when he wrote about creative destruction—are often brought to market by small start-ups or companies that were operating in other markets [DeSanti & Cohen (2001); Bower & Christensen (1995)]. An implication for competition enforcers is that innovation is most likely to thrive in market environments that support a variety of firm sizes and feature low barriers to entry for technologically innovative entrants [Scherer & Ross (1990)].

Innovation-intensive markets frequently display some or all of the following characteristics: high R&D intensity and dependence on intellectual property rights coupled with a closely related heavy reliance on human instead of physical capital; a high degree of technical complexity; rapid technological change and short product cycles; increasing returns to scale; substantial network effects (meaning that a product or service becomes increasingly useful and valuable as more customers use it, like telephones for example); and significant compatibility and standards issues (OECD (2002)). The stronger these features, the more competition may assume a “winner takes all” character. High innovation markets tend to have clear market leaders. At the same time, however, the position of market leader could be highly dependent on continued superiority in innovation, and “dominant” firms may be unable over the long run

to make substantial supra-competitive profits. These topics are discussed further in Section IV below, which considers competition in digital economy markets.

2.3 *Anticompetitive Market Regulation*

Anticompetitive and/or unnecessary market regulation can be a significant impediment to effective innovation, particularly in KBC-focused market where the pace of innovation tends to be rapid. Empirical studies conducted by the OECD have found a negative correlation across national economies between the level of anticompetitive product market regulation and innovation [OECD (2005)]. Of the many policy levers studied, reducing anticompetitive regulation was found to be the second most powerful incentive to raise the level of business R&D spending (See Table 1). Creating more competitive conditions in the market had a substantially stronger effect than enhancing the protection of intellectual property rights on this measure of innovation, or granting State subsidies for private R&D.

Table 1. Long-Run Effects on Proxies for Innovation of a One Standard Deviation Increase in Various Factors *
(Measured in percentage change of the dependent variable)

	Business R&D spending	Total domestic patents
Science policies and institutions		
B-index **	-1¾	-6
Subsidies for private R&D / GDP ratio	¼	-3
Share of business funding in non-business R&D	8¼	2½
Non-business R&D / GDP ratio	7¼	3¾
IPR index	1½	8
USA real wage of researchers	-3¼	-¾
Years of education	1	¾
Economic conditions		
Profit / GDP ratio	5¼	4¼
Private sector credit / GDP ratio	-1½	-3¼
Equity financing / GDP ratio	5¾	10
Foreign R&D stock / GDP ratio	12¾	6
Openness	-5¾	-4¼
Import penetration	-¼	0
Real interest rate	-5	-2¾
Real exchange rate	-3	-1¾
Framework policies (decrease)		
Product market regulation	9	4 ½
FDI restrictions	· ·	13
Employment protection legislation	1	6 ½

* The standard deviation is the average of within-country standard deviations, and the effects of a one standard deviation increase in factors are evaluated at the sample mean of the variables.

** The B-index is defined as one minus the rate of tax subsidy for R&D.

Source: Jaumotte & Pain (2005).

Thus, while regulation continues to provide governments with an important tool for preserving and promoting public policy objectives, needlessly anticompetitive regulation harms the public interest by hindering beneficial innovation. Accordingly, anticompetitive product market regulation should be eliminated where possible.

The OECD's Competition Assessment Toolkit (2010)

The OECD developed the Competition Assessment Toolkit to help governments reduce counterproductive regulation. The Toolkit provides a general methodology for identifying unnecessarily anticompetitive regulatory restraints and developing alternative, less restrictive policies that still achieve government objectives. Designed for use by officials at all levels of government and requiring no specialised training in economics or competition policy, the Toolkit consists of a series of simple questions. In particular, the Toolkit aims to:

- Facilitate the evaluation of draft new laws and regulations, for example, through regulatory impact assessment programmes;
- Enable the evaluation of existing laws and regulation, whether in the economy as a whole or in specific sectors; and
- Assist government bodies engaged in development and review of policies, such as ministries that develop laws or the competition authority in its evaluation of competitive impacts of regulations.

The Competition Assessment Toolkit is available at www.oecd.org/competition/toolkit.

2.4 Competition Law Enforcement to Facilitate Innovation

A second conclusion that follows from the inverted U-shape relationship between market concentration and innovation is the need to maintain effective competition law enforcement in KBC-focused markets. The inverted U-shape indicates that, in general, moderate amounts of competition create the market environment that is most conducive to competition. Most competition enforcement occurs in relatively concentrated markets; that is, in markets with significant potential for greater competition and therefore increased innovation. Accordingly, by addressing and eliminating anticompetitive restraints imposed by private firms in KBC-focused markets, competition authorities create space and opportunities for innovation and growth.

Competition Enforcement Fostering Innovation: The AT&T Case

Competition law enforcement has a long track record of opening doors to greater innovation in KBC-heavy sectors. For example, in 1974, the US Department of Justice filed an antitrust lawsuit against telecommunications giant Atlantic Telephone & Telegraph, which at the time was the largest corporation in the world. The complaint alleged that AT&T had been using its monopoly in local exchange telecommunications service to monopolise the telephone equipment manufacturing and long distance telecommunications service markets. [United States v. AT&T Co., 552 F. Supp. 131 (D.D.C 1982).] Prosecutors claimed that AT&T had, among other things, failed to connect competing carriers with its network on reasonable terms and had reduced its prices only in the markets where it faced competition. Several years later, the two sides reached a settlement agreement that imposed structural and behavioural remedies on AT&T.

The structural part of the remedy was a vertical divestiture. AT&T divested its local service providers, leading to the formation of seven regional operating companies (called “RBOCs”). AT&T kept its long distance, equipment manufacturing, and research divisions, but was required to transfer enough assets to the RBOCs to allow them to operate. Those assets included, on a royalty free basis, all existing patents as well as all patents issued for the next five years.

The behavioural remedy took the form of regulatory provisions governing each RBOC. For example, to prevent the RBOCs from emulating AT&T’s strategy, the decree required them to obtain the court’s approval before expanding the scope of their business beyond local exchange services. The RBOCs were also obliged to provide every long distance carrier equal access to their local exchange networks.

The decision to break up AT&T was highly controversial. Opponents argued that the quality of service would decline, national security would be endangered, a precious research and development enterprise would be damaged, and shareholders would suffer. However, most observers now believe the net effects were quite positive – including the effects on innovation. When the lawsuit was filed, wireless communication and the internet were virtually unknown, while telephone answering and facsimile machines were just beginning to develop. People still used rotary dial phones and long-distance calls cost a fortune compared to today’s rates. All of that changed rather quickly after the divestiture. Moreover, greater competition among long-distance providers led to the rapid deployment of fibre optic cable in the US that later supported the development of the internet and the explosion of innovation that accompanied it.

Nonetheless, in markets characterised by high rates of innovation, any potential negative impacts of competition enforcement must be taken into account, which may involve complex and uncertain calculations. In particular, in assessing restraints on innovation and competition by dominant firms, static efficiency gains must be balanced against dynamic effects. As it is difficult to identify upfront whether conduct restricts innovation and therefore competition, some commentators argue that *ex post* intervention, where the agencies can identify competitive harm, is to be preferred over *ex ante* intervention. On the other hand, others note that care has to be taken as to the effectiveness of *ex post* interventions, especially in situations where there is a risk that all effective competition might be eliminated. Otherwise interventions may come too late, creating a risk of long lasting harm to consumers.

2.5 Mergers in Innovative Markets

Competition enforcement in innovation-intensive KBC-oriented markets includes applying merger control rules. Determining whether a merger will be likely to promote or prevent innovation requires a complex, case-specific inquiry. A merger could lead to efficiencies in research and development (basically, the ability to do better and/or cheaper R&D), yet reduced rivalries and greater market power could slow the post-merger rate of technological change. Although some mergers save costs by eliminating duplicative R&D, protecting competition in R&D is also important because R&D is inherently uncertain. A special analytical framework is neither necessary nor desirable for merger review in innovation-intensive markets, as the traditional merger review analytic is sufficiently flexible to be applied in such cases. However, in high innovation markets there may be a need for some customisation in approach, in particular as regards defining markets and assigning market shares; assessing the significance of changes in market structure; giving proper weight to benefits consumers reap through innovation; assessing the ability of merging parties to exclude or restrict competitors; and designing appropriate remedies.

Market definition and assigning market shares are particularly challenging tasks in rapidly changing sectors including typical KBC-focused industries. In innovation-intensive markets, estimated changes in market shares may not tell us much about the likelihood that a merger will lead to higher prices or less innovation. Consequently, the traditional initial screen based on market shares should ideally be supplemented by considering other readily ascertainable data, such as the degree of recent instability of market shares, the rate of growth of the market, and estimates of the rate of technological change. The higher such

indicators are, the greater the probability that the merger should be cleared without an in-depth analysis.

Due to a high degree of product differentiation (basically, the opposite of commoditisation – differentiated products have features that distinguish them from other products on the market) and the potential for disruptive innovation, mergers in high innovation markets typically have little potential to produce anticompetitive co-ordination. Conversely, such mergers frequently raise concerns about anticompetitive unilateral effects, and so the ability and incentive to exclude or restrict rivals deserves prime attention in reviewing mergers in high innovation markets. In addressing anticompetitive mergers in high innovation markets, there is good reason to question the traditional preference for structural as opposed to behavioural remedies. Instead, a highly customised use of behavioural remedies, sometimes accompanied with a necessary divestment, may be the best way to address potential competition problems. Moreover, the complexity of mergers in high innovation sectors may require rethinking the merger review process (i.e. strict time limits), increasing sector specific expertise in competition authorities, and taking pro-active steps to prepare for mergers in high innovation markets.

Mergers sometimes create positive effects called efficiencies. Generally speaking, **dynamic efficiencies** are synergies that enable firms to improve their performance, whether in terms of cost, quality, service, or new product development, on a potentially continuing basis. This might involve learning by doing, eliminating redundant R&D expenditures, or achieving economies of scale in R&D. **Static efficiencies**, by contrast, enable improvements that occur only once—for example, by generating economies of scale in production. Today, efficiencies are commonly viewed as factors that favour allowing mergers. In markets where innovation is critical—as in many KBC-intensive industries—dynamic efficiencies are especially important.

It is difficult to measure the extent of the efficiencies that may result from a merger. In particular, dynamic efficiencies are difficult to gauge because such dynamic effects will occur—if at all—over several time periods and may be more abstract in nature than static effects. Yet, it seems likely that dynamic efficiencies have a considerably greater potential to benefit consumers than static efficiencies. Therefore, it would be desirable—in an ideal world—for dynamic efficiency considerations to feature more frequently and more prominently in merger decisions. The problem in practice is that there is no robust methodology available by which to do so; rather than engage in speculation, courts have

tended to avoid dynamic efficiency analysis in cases where it may be relevant. Due to their complexity, dynamic efficiencies will rarely be quantifiable; yet qualitative approaches may yield some helpful information.

2.6 Innovation and “Green Growth”

“Green growth” is generally defined as economic growth under environmental constraints, similar to what is commonly referred to as sustainable growth. Technological innovation is generally acknowledged to play a central role within any strategy for encouraging green growth, such as the use of smart grids in the energy sector. The OECD’s work to date on approaches to green growth indicates that market-based policies should be pursued wherever possible to encourage environmentally-friendly innovation, such as the use of emissions trading schemes, subsidies for R&D, provided that they do not distort competition and trade, production standards or tax exemptions for green investment and production.

3. Competition & Intellectual Property

Intellectual property rights (IPRs) play an integral part in the development and use of KBC. IPRs are viewed by many as indispensable within modern technologically-advanced economies, and effective competition policy recognises and encourages the value of the innovation that IPRs represent. Investment in innovation requires a predictable legal system and, as a result, antitrust policy should be formulated to ensure that incentives to innovate are not unnecessarily weakened or destroyed. It has therefore been argued that a strong and predictable intellectual property rights system is important to many disruptive innovations that create dynamic competition and provide consumers with major technological advances.

Nonetheless, the exploitation of IPRs challenges some traditional assumptions about the benefits of competitive markets. Competition policy generally aims to secure the benefits that flow to consumers from marginal cost pricing by promoting competition. Intellectual property laws, on the other hand, aim to bring about the benefits that accrue from new products and creations by protecting innovators from some forms of competition, which sets up an apparent conflict between these policy regimes. Businesses generally have the freedom to determine the circumstances and terms under which they would like to licence, and correspondingly refuse to licence, their IPRs. When and whether competition law should be used to restrict that freedom is a controversial matter, but most agree that competition law should not be used as a bludgeon against all IPRs.

Patents do not necessarily create monopolies or dominance; firms apply for patents in the hopes of obtaining market power but very few inventions constitute a true innovation leading to a new product or process. Although dominance may occasionally be related to one patent, a greater concern is agglomerations of patents that could close off a field of technology. The traditional view of patents is that they provide a positive incentive for innovation and may grant some market power to firms. There is a growing concern that patents could have a negative effect on innovation, particularly where a product is dependent on many patents and in industries based on standards where there are substantial network effects. Yet patents can also have a positive effect on competition and innovation. For instance, venture capitalists recognise that for investment purposes, patents are the only important asset that many high tech companies possess.

Both intellectual property policy and competition policy aim to encourage innovation, but both can discourage innovation if pursued too strongly or too weakly. If patents are granted too readily, for example, potential inventors may be discouraged from innovating, because there are so many parties with so many patents that it becomes too difficult and expensive to determine which licenses are needed and to pay for them. Conversely, if competition enforcement is pursued so aggressively that rivals can make unencumbered use of a company's innovation, there is little incentive to innovate in the first place. A balance has therefore been achieved by rewarding inventors with some temporary protection from free-riders, after which competition is facilitated by permitting the invention to be copied and sold by anyone. That balance does not ensure, however, that the two policies are always well-aligned in practice.

The challenge for competition authorities, regardless of how far they venture into the intellectual property sphere, is how to minimise the anticompetitive effects of IPRs while respecting their existence and the societal goals these rights are meant to promote. Moreover, in view of the recurrent use of IPRs within KBC-focused industries, these concerns are especially pressing and acute in such markets.

3.1 *The Effects of Patents on Innovation*

Patents reward inventors for their discoveries by giving patent holders the exclusive right to make, use, and sell inventions for a limited time within the jurisdiction where the patent is held. In general, patents should be granted only for inventions that are novel, non-obvious, and useful. Moreover, a patent right—and the market power it may create—should be granted only if, and to

the extent that, it is necessary to encourage the innovation covered by the right. Patent “scope” or “breadth” helps to determine the value of a patent by setting the boundary between what is protected and what is not: the broader the scope, the more likely that competing products and processes will infringe the patent. “Patentability” refers to how easy or difficult it is to meet the standards for obtaining a patent on an invention. Patent breadth and patentability can have both positive and negative effects on innovation. There is a growing need to ensure that patent systems strike the right balance between allowing patent owners an appropriate return from their innovations and fostering technological progress for society as a whole.

Patents encourage innovation in several ways. First, they give inventors greater incentives to innovate by providing a measure of protection against imitators. Second, and in exchange for that protection, patents require the inventor to tell the public that the technology exists and to explain how it works. That disclosure enhances the process of knowledge diffusion by helping others to understand the invention and improve upon it or incorporate it in a new invention of their own, thereby stimulating new ideas. Another benefit of disclosure is that it tends to decrease redundant R&D investments by firms who might otherwise continue trying to develop exactly the same technology. Finally, patents add to knowledge diffusion by facilitating exchanges via licensing agreements.

On the other hand, the exclusive rights that patents confer may distort competition and prevent the efficient allocation of resources. The easier it is to obtain patents and the broader the patents granted, the more patents there will tend to be issued and the more comprehensive they will be, up to a saturation point. That, in turn, can lead to five types of costs. First, static inefficiencies increase because more patents and greater patent breadth make monopolisation and its attendant deadweight losses more likely. Second, dynamic inefficiencies increase because it will become more difficult for others to invent without infringing someone else’s patent. An “anticommons,” or patent gridlock, arises in circumstances where so many patents have been awarded that the difficulty of identifying which licenses are needed, and or negotiating and paying for those licenses is so great that further innovation is discouraged or even halted. Third, a greater number of broader patents might encourage socially wasteful rent-seeking behaviour, such as patent trolling. Fourth, enforcement costs are higher since there are more patents to enforce. Finally, it is possible that overbroad patent rights and easier patentability will lead to inefficient overinvestment in R&D.

In practice, the effects of patents on innovation vary substantially from industry to industry. Innovation is not always favoured by a stronger patent system, or by a system in which patents are easy to obtain, particularly where there is uncertainty as to outcomes with many inventions being patented but relatively few being valuable. A difficulty for policymakers is that it is virtually impossible to quantify the net value of the innovation that will be gained or lost if they opt for a tighter or more permissive patent policy. Nonetheless, the conviction that patents are good for innovation has helped bring about important changes in many patent regimes during the past quarter century or so. In general, patent rights have been broadened and strengthened through expanded coverage into new fields; increased scope of individual patents; curtailment of research exemptions; and increased protection granted to patent rights by courts (Martinez & Guellec (2004)).

However, some contemporary commentators argue that too many patents are issued at present, that the claims allowed are too broad, and that the rights conferred on patent holders are too strong. The result, the critics claim, is that innovation is actually being discouraged because it is difficult and costly to identify the patents that might be relevant to an invention and to pay for any necessary licenses. Instead, it is argued, patents rights should be more limited, to reflect the original conception of patents as a limited exception to what was supposed to be the prevailing paradigm: competition (e.g. Lemley (2005); Langenfeld (2001)).

Many empirical studies have been conducted to analyse the effects of these changes in patent policies. Some studies conclude that while stronger patent rights contribute to a significant increase in the number of patents granted, they have little effect on R&D expenditures, which suggests that they are not boosting innovation significantly (OECD (2005); Bessen & Hunt (2004)). There is sound empirical evidence that the availability of patents is an important factor in firms' decision to invest in R&D only in certain industries; notably, however, these industries include a number of sectors where KBC is an important factor, including computing and pharmaceuticals (Levin *et al.* (1987); Cohen *et al.* (2000)).

Most national patent systems incorporate a version of the generally accepted principle that use of a patented invention for purely experimental purposes does not result in patent infringement liability. The experimental use exemption is important not only because it may ease the effects of any eventual anticommons, but because it can also lead to greater competition, depending

upon how liberally it is interpreted. At the same time, the experimental use exemption must be used judiciously because it may discourage innovation if applied too readily.

3.2 *Competition Issues in IPR Markets*

IPRs do not convey total immunity from competition law. The main objective of patent laws is to encourage the advancement of scientific knowledge, rather than to enrich patent owners. Moreover, the patenting process and subsequent licensing arrangement can create distinct opportunities for anticompetitive conduct by patent holders and/or licensees. However, the extent to which competition law enforcement is an appropriate mechanism by which to correct market failures stemming from IPRs is a much-disputed question. The following sections consider competition problems that may arise with pending and granted patents, including those which relate to KBC-focused innovation.

3.2.1 *Patent Pendency Problems: Patent Ambush*

There has been a significant increase in the number and complexity of patent applications filed in the world's major patent agencies, resulting in a greater backlog and substantially longer pendency periods. This increase is due to globalisation of the patent system, leading to multiple applications before different national or regional patent offices; the increased technological development of emerging markets; and the expansion in the range of technologies in respect of which patents can be granted. More applications pending for longer periods have led to greater uncertainty about which inventions are and will be protected by patent rights.

A number of strategies that are potentially harmful to both competition and innovation have been adopted by some firms to take advantage of the uncertainty created by growing backlogs and longer pendency periods. Most of these strategies can be enhanced or enabled through the use of a procedural device known as a “divisional” application in some jurisdictions and a “continuation” application in others. Some of these divisionals are mandatory while others are filed voluntarily, but they all derive from an earlier, related application and they all take on a life of their own once they come into existence. This means they are examined separately and have their own, separate publication schedules. It is also possible to file divisionals repeatedly, such that a whole series of them may spring from a single original application. Among other things, divisionals make it possible for companies to keep their patent applications pending longer than would otherwise be the case. They also

make it possible to keep those pending patents hidden from public view for longer. That, in turn, makes them potentially valuable tools for a company that wishes to engage in anticompetitive conduct. This may include behaviour such as (i) ambushing a standard-setting organisation (SSO), (ii) forcing a rival to cross-licence its technology for free, or on more favourable terms, by using the leverage obtained from a patent flooding strategy, and (iii) keeping applications pending and unpublished through divisionals, then modifying the application in an additional filing so that it perfectly describes a rival's new product, thereby ensuring that the rival will be liable for infringement.

Standard-setting activities generally have pro-competitive effects because they can increase the number of suppliers in the market, reduce the cost of producing goods, allow customers to use the components they want from different suppliers instead of having to single source an entire product line, and reassure customers that compatible products will be available and supported in the future. However, SSOs can be “ambushed” by a company that conceals relevant granted or pending patents that are relevant to the standard being developed until it has been set and then sues for infringement. Once the standard has been widely adopted and implemented, switching to another standard tends to become very costly. In this manner, companies might acquire dominant positions that they would not otherwise have had and, as a result, they may be able to collect royalties that are higher than they would have otherwise been. The result can be a chilling effect on further standard-setting, a resulting decline in interoperability of products, higher prices for consumers, and delays, or even a complete halt in further implementation of the ambushed standard.

To avoid pending patent ambushes, competition authorities may need to engage in advocacy efforts to help SSOs to design and improve their procedural rules so that they minimise opportunities for patent ambushes without offending competition laws against co-ordinated conduct. Three types of rules have been proposed for that purpose: FRAND licensing terms, disclosures and joint *ex ante* negotiations.

Avoiding Patent Ambush: Options for Standard-Setting Organisations

- **FRAND commitments:** One strategy for fighting ambushes, which has already proven to be popular among SSOs, is to require members to make an *ex ante* commitment that if any technologies on which they hold patents or pending patents are included in the SSO's standard, they will license those technologies on "FRAND" or "RAND" terms, meaning (fair) reasonable and non-discriminatory terms. (For convenience's sake, the term "FRAND" is used here.) FRAND commitments are typically worded in a broad fashion and do not specify actual license terms. The precise terms of each license are usually negotiated bilaterally outside the SSO setting. While the "non-discriminatory" component of FRAND is generally deemed to be a useful concept, the "fair" and "reasonable" aspects have been controversial, with critics arguing that FRAND commitments provide little or no protection against price gouging as a result (e.g. Ohana *et al.* (2003), Lemley (2002)).
- **Disclosure:** Another strategy is to require *ex ante* disclosures by participants in any standard-setting exercise. Two main types of disclosures could be required or encouraged. First, SSOs may find it helpful to create rules that impose obligations on their members to make accurate disclosures of any patents and pending patents they have that could overlap with the standard under development. The disclosures would have to be made both before and during the standard-setting process. Second, SSOs could oblige their members to disclose the maximum fees and most restrictive licensing terms they would demand for such patents if the technology they cover were to become part of the standard. While there are reasons to doubt the effectiveness of FRAND commitments, disclosure requirements do not have the vagueness problem that FRAND has. SSOs could enforce compliance with disclosure rules, if necessary, by relying on contract law.
- **Ex ante negotiation:** The third anti-ambush strategy that has been proposed builds on the disclosure requirements and calls for joint *ex ante* negotiations between all the SSO members who are prospective licensees of a technology and the member who is a prospective licensor of that technology over the royalties that the latter would charge if the technology were incorporated into the SSO's standard. However, such commitments and discussions may also raise competition concerns of their own. SSO members are often competitors and discussions among competitors about the prices they are willing to pay or the terms they are willing to give sellers obviously have the potential to be deemed unlawful. For that reason, some SSOs' policies forbid discussions of royalty rates and terms among their members.

Some have questioned whether patent ambushes can ever amount to a competition law breach. Although several competition authorities have pursued enforcement action under this theory of abuse, one view is that such behaviour is purely a patent law problem, or else a form of fraud based on deception, rather than a competition law problem. Of the cases taken by competition authorities to date, an important theme is that for patent ambushes to amount to a problem under competition law they must harm competition. Dishonest conduct is not necessarily the same as conduct that is unlawful because it is exclusionary, and the way to distinguish these types of behaviour is by looking at the conduct's effect on competition.

From a competition policy perspective, it is difficult to understand why behaviour such as maintaining a patent pending for extended periods with cascading divisionals has been tolerated. Regrettably, some major patent agencies lack effective procedural tools to control this behaviour at present. The optimal solution is to make changes within the patent regime itself, allowing patent offices to take steps like placing limits on the number of times and the period in which applicants are allowed to use divisionals.

3.2.2 *Competition and Granted Patents*

Competition problems may also arise after a patent has been granted, particularly in relation to licensing arrangements for exploitation of the IPR.

A **grant-back obligation** is a provision in a licensing arrangement that requires the licensee to grant a license on any improvements it patents related to the original invention back to the licensor. Grant-backs may encourage efficient licensing by serving as a form of financing for cash-poor licensees who are willing to share some of the fruits of their research with licensors in lieu of an up-front payment. Some grant-back arrangements, however, are more likely to damage incentives to innovate and/or cause competitive problems than others, depending on whether they encompass severable improvements and whether they are exclusive. Severable improvements can be used by licensees without infringing the original invention, whereas non-severable improvements cannot be used without infringing the original invention. Because licensors already have a measure of authority over non-severable improvements, even exclusive grant-backs of non-severable innovations are relatively less likely to cause competition concerns. In contrast, grant-backs of severable improvements may damage incentives for follow-on innovation because they are not otherwise legally dependent on the licensor. They may also serve as a means of prolonging the licensor's market power by nullifying or reducing the threat of

what would otherwise become rival products. Therefore, these types of grant-backs should be subjected to relatively more scrutiny, particularly if they are exclusive.

A uniformly tough competition policy towards grant-backs would be counter-productive. First, a distinction should be made between non-exclusive licences (where the follow-on inventor retains rights to its invention), and assignments (where no rights are retained). There is a much lower risk of competitive harm when the licences are non-exclusive. In fact, such licences may be pro-competitive because they allow more than one firm to use the follow-on technology. Second, if competition authorities sought to enjoin all grant-backs, they would probably encourage inefficient refusals to licence. A better result overall may be reached by exempting grant-backs to non-profit entities and permitting other grant-backs as long as they do not give the original licensor either an assignment of follow-on rights or an exclusive licence to them. This policy could ease licensors' fears about losing market share to licensees while leaving licensees with at least some incentive to innovate.

Patent pools are formed when two or more parties collaborate and arrange to licence their patents as a package. Patent pools, like most licensing arrangements, are usually beneficial to competition. They may, however, occasionally reduce or eliminate competition, in particular if the pool includes patents that are substitutes for each other and/or non-essential technology, as opposed to complementary and/or essential patents. More specifically, patent pools can create risks for competition by reducing competition in horizontal technology markets, facilitating collusion in downstream product markets, foreclosing competing technologies, or by reducing incentives to innovate. In those circumstances, patent pool arrangements may merit competition law scrutiny.

Cross-licensing agreements give two parties the rights to use each other's patents. The agreements may also include rights to pending patents, and/or cross-licensing agreements may be grouped together to form a licensing pool for the purpose of sharing complementary technologies held by several parties. Cross-licensing agreements and licensing pools are usually efficient and pro-competitive. There are, however, a number of ways in which pending patents could be used anti-competitively in these arrangements. These include entry deterrence and patent flooding scenarios where a dominant firm files a large number of poor quality patent applications that are at the margins of the original company's patent, with the aim of either keeping a rival out of the market or

forcing it to cross-license its valuable technology, often on a royalty free basis. These strategies depend on the fact that even weak pending patents can have powerful effects on competition. The victim will probably not have the time or resources to determine the validity of so many pending patents, and there is a very good chance that at least some fraction of them will be granted. Furthermore, the risk of infringing even a weak pending or granted patent can be extremely high because if its validity is upheld, the owner may obtain very substantial damages or injunctive relief.

Sometimes a **unilateral refusal to licence IPR** may raise competition concerns. However, there is some disagreement as to whether unilateral refusals to licence intellectual property should ever be deemed anticompetitive for competition law purposes, and if so, how to remedy these problems. EU competition law admits the possibility of compulsory licensing remedies when unilateral refusals to licence prevent the emergence of a new product, are unjustified, and exclude any competition in a secondary market. Conversely, the US Supreme Court's decision in *Verizon Communications Inc. v. TRINKL* (540 U.S. 398 (2004)) suggests that there can be no antitrust liability for such conduct and thus, no mandatory licensing remedy (under antitrust law, at least) either.

Another potential competition problem in IPR markets relates to the **strategic accumulation of standard-essential patents** by individual firms. Generally, standards incorporate the best available technology, regardless of whether the technology is under patent. Where patents are included in a standard, FRAND licensing commitments are employed to ensure, at least in theory, that the standard remains available to all developers on adequate terms. However, an emerging problem is the deliberate accumulation of standard-essential patents by individual firms, and subsequent strategic use of patent litigation against competitors. This development raises two questions: the extent to which patent-holders are respecting FRAND commitments agreed during standard-setting processes, and potential scope for competition enforcement to address the resulting hold-up problems. The merger control rules are also of relevance, to determine whether patent acquisitions will substantially reduce competition.

3.3 *Competition & IPRs: The Role for Competition Authorities*

What is the appropriate role for competition authorities within the area of IPRs? Traditionally, the patent and competition law enforcement processes have been viewed as distinct, and therefore carried out separately. However, both

processes share the goal of promoting innovation, and so are actually quite complementary. It is generally accepted that competition authorities should not become involved in the IPR-granting process itself, but nevertheless they can undertake a variety of measures to promote a greater consideration of competition issues by intellectual property agencies during their approval procedures. Moreover, in an “easy patentability” environment, competition authorities and courts may compensate by using competition laws to limit the negative effects of over-patenting. Given that competition law is a relatively blunt instrument for that purpose, however, it is preferable to fix the problems from within the patent system rather than externally through competition enforcement.

For reasons such as a lack of relevant technical expertise and limited resources, it does not appear to be prudent for competition authorities to assume responsibilities related to the initial review of IPR applications. Nonetheless, outside the patent-granting process itself, there is significant scope for competition authority involvement to improve the impact of patents on competition. Competition authorities have expertise in identifying and analysing the anticompetitive effects of overly-broad or invalid patents. Competition authorities could therefore collaborate with IPR-granting agencies to improve their awareness of competition issues so that the latter agencies can begin to take any necessary steps to improve the IPR approval process themselves. Such activities may take the form of interdisciplinary dialogues with patent agencies to foster greater mutual understanding of each other’s fields, commissioning expert reports that study a nation’s patenting system to determine whether and how it is causing any undue competition problems, and/or holding seminars or hearings in which academics, public and private sector practitioners, and industry participants come together to discuss the overlap between IPR and competition policies.

Co-operation between competition authorities and patent offices has improved in some jurisdictions, such as the United Kingdom and the United States, over the last few years. This has triggered increased dialogue and cross-agency activities aimed at improving information exchange and understanding. Examples include specific competition advocacy programmes targeted at the IPR community, the issuing of joint agency reports, establishment of monitoring networks, high level symposiums on the interface between IPR and competition and secondment of experienced patent office staff to competition authorities to assist in the preparation of sector specific reports. Another potential harmonising strategy would be reciprocal training programmes carried

out by officials from both agencies on the basics of the respective disciplines. More concretely, statutory changes could be sought to enable a greater flow of information between the patent offices and competition authorities.

Competition authorities have a core competency in examining the effects of restraints, market conduct, and rules on consumer welfare, especially when this analysis is performed through empirical research and by economists. Because competition authorities have experience in an effects-based method of inquiry, they can play a meaningful role in advising patent policy makers on the impact of current laws and on recommended reforms.

With respect to businesses, competition authorities should consider publishing a set of guidelines describing how they will analyse licensing agreements and other conduct involving intellectual property. Such guidance would assist businesses in structuring their IPR arrangements so as to ensure that these are consistent with competition law. Moreover, this would have the additional benefit of increasing legal certainty in many KBC-focused markets. Whatever IPR-related initiatives competition authorities may take, they should strive to limit the anticompetitive aspects of IPR while respecting its necessity.

4. Competition Policy in the Digital Economy

The digital economy is at the forefront of KBC's growing importance to economic activity in OECD countries. The digital economy is an umbrella term used to describe markets that focus on digital technologies. These typically involve the trade of information goods or services through electronic commerce. The digital economy operates on a layered basis, with a separation between the transportation (physical) and applications (intangible) segments. This is a vitally important sector of the economy, driving significant growth in recent years. Moreover, the impact of the digital economy extends beyond the immediate information goods and services provided, to other areas of the economy (for example, the entertainment industry) as well as lifestyles more generally.

Competition within digital markets typically takes on a rather distinctive form. First, competition between business models or platforms tends to be more important than competition within business models because platform competition often leads to a "winner takes all" outcome where monopoly is the nearly inevitable outcome of market success. Second, digital markets are often characterised by strong network effects and economies of scale, which are largely responsible for winner-take-all outcomes. Third, many digital markets are two-sided, so that two or more user-groups benefit from use of the digital

platform. For example, search engines are used both by individuals to access information on the internet and by advertisers to access viewers. Fourth, as the digital economy becomes increasingly interconnected, a degree of co-ordination and co-operation between firms is unavoidable and indeed procompetitive. Fifth, digital markets (like other KBC-focused markets) are characterised by high rates of investment and innovation, which leads to rapid progress within the sector.

Consequently, competition within these markets has sometimes been cyclical in nature. Successful firms may acquire significant market power for a time, but that market power may turn out to be vulnerable to displacement by the next cycle of innovation and therefore transient. Accordingly, dynamic competition considerations should be taken into account as much as possible, given the importance of preserving incentives to invest and innovate in the digital economy. Moreover, while “big” is not automatically “bad” in any market, that is especially true in the digital context, where successful competition leads the market toward monopoly more often than in other sectors.

4.1 *The Scope for Competition Enforcement in Digital Markets*

The appropriate scope of competition enforcement in digital markets is a controversial question. Given the importance of preserving incentives to invest and innovate, digital economy firms sometimes say that regulatory intervention, including competition enforcement, is to be avoided. In particular, there is a risk that excessive or inappropriate intervention may damage competition by diminishing dynamic efficiency. Under that view, it is more advisable to defer to self-regulation by the industry or simply the disciplining effects of the competitive process in digital markets. The nature of platform competition may give platform owners strong incentives to self-regulate and ensure effective competition within their systems.

However, at the OECD’s 2011/12 hearings on competition in the digital economy, the broad consensus was that competition law retains a significant role within the digital economy, particularly as these markets stabilise and mature. The precept that competition law should protect the competitive process and not competitors holds true in digital markets. However, competition enforcement may be necessary to eliminate and deter anticompetitive behaviour that would otherwise inhibit dynamic competition. For example, competition law might be deployed to address potentially anticompetitive mergers or acquisitions by digital firms, hold-up problems caused by dominant platforms or the misappropriation of an applications developer’s investment by a platform owner.

The appropriate timing of any public intervention in digital markets is a complex issue. Once again, dynamic considerations are to the fore, with the need to balance the risk that premature intervention could inhibit further procompetitive developments against the risk that dominance may become entrenched. In view of these particular considerations, an approach based on *ex ante* monitoring by competition authorities could prove more effective than an *ex post* enforcement strategy, although competition authorities have historically been reluctant to take on such a quasi-regulatory role.

Another issue is when a firm is to be considered dominant or to hold a monopoly. Although many of the key players within the digital economy are large and profitable, vigorous competition between them as well as the dynamic or cyclical nature of competition in some digital markets may render durable dominance elusive. At the OECD's digital economy hearings, a panellist suggested as a broad rule-of-thumb that intervention for abuse of dominance (or unlawful maintenance of monopoly) should occur only if a firm has been dominant for five to seven years, has survived several challenges, and is profitable.

Where dominance cannot be established, an alternative approach is to address significant instances of anticompetitive behaviour by the non-dominant firm through provisions regulating unfair trade practices by firms, such as §5 of the US's Federal Trade Commission Act. Conduct may also run afoul of provisions against attempted monopolisation, if such prohibitions are included in a jurisdiction's competition rules.

In general, the ordinary competition rules are sufficiently flexible to be applied within digital markets. However, certain recurrent difficulties arise in competition enforcement in this sector. First, competition authorities may lack adequate technical knowledge. Moreover, given the fast-moving nature of the digital economy, there is a risk that knowledge acquired initially will become outdated rather quickly. Options for increasing the technical expertise of an authority include the use of expert advisors, the conducting of sector inquiries into digital markets, and participation in industry coordinative processes.

Second, as the digital economy is essentially worldwide in its geographic scope, there may be a problem of jurisdiction or territoriality. It may be difficult to identify an appropriate entity with responsibility for the anticompetitive behaviour located within the national territory, for example, or a restraint may apply in or seek to divide numerous markets, a recurring issue in e-commerce.

As a result, there is a particular need for international co-ordination and co-operation between competition authorities relating to digital markets.

Third, there may be some difficulties in applying established competition law concepts within the digital context. Convergence, cross-subsidies, platform competition and constant cycles of innovation may complicate the task of market definition. The assessment of whether conduct is anticompetitive frequently turns on highly technical questions of product design or coding. Furthermore, structural remedies may become rapidly obsolete, so that behavioural remedies may be preferred, although regular monitoring is then required.

4.2 *Characteristics of Digital Markets: Network Effects & Switching Costs*

Network effects arise where the value of a product to its users is related to the number of additional users of the product. Direct network effects arise where users of the product interact with each other, meaning that greater numbers of users facilitates greater interaction. A quintessential modern example is the social network: connection to greater numbers of users on the network increases its utility and attractiveness for individual users. Indirect network effects arise where high usage rates for one product increases the attractiveness of that network for another group, which in turn results in indirect benefits for users of the original product. For example, the widespread adoption of a single operating system (OS) attracts applications developers, who produce new applications compatible with that OS, to the benefit of its users. Although not unique to digital markets, network effects can be especially strong in them. Network effects can be conceptualised as a variety of demand-side economies of scale. Supply-side economies of scale may also arise in digital markets, most notably in the context of search engines, where increased data from users allows for the development of more accurate search algorithms.

Network effects function as a positive externality, rendering a product more valuable to its users or to other groups. A higher market share therefore improves product quality, a procompetitive outcome. At the same time, network effects may also have a detrimental impact on competition, as they may make entry more difficult and increase switching costs for consumers. The key fear is that users will become locked in to a product benefitting from network effects, which in turn may lead to a snowball effect or “tipping point” toward market dominance for that product.

Certain market features militate against the occurrence of a tipping point in the digital economy, though. Diminishing returns to scale, congestion effects, low switching costs, and per-transaction charges would all weaken the competition-suppressing effects of cross-group externalities. On the other hand, as digital markets mature, network effects may strengthen with the entrenchment of market dominance. Thus, network effects are not an *a priori* competition problem; however, a firm that benefits from network effects should not seek to strengthen its market position through exclusionary behaviour. As a result, network effects must be assessed on a case-by-case basis, in order to determine the competitive implications in the circumstances.

Switching costs are costs incurred by a user in moving from one product to another, such as exit charges or learning costs. Although switching costs can strengthen the anticompetitive impact of network effects, the extent to which switching costs present a competition concern in the digital economy varies between products.

Additionally, multi-homing is common in digital markets. That is, it is not unusual for consumers to affiliate with two or more platforms, e.g. with both Facebook and Twitter. Accordingly, participation in one network does not prevent the user from participating in and benefiting from other networks, which may reduce the prospect of tipping.

4.3 *Characteristics of Digital Markets: Open versus Closed Platforms for Applications Development*

The “winner takes all” mode of competition in digital markets takes place at a platform-level, between competing platform models. Conventionally, a distinction is drawn between open and closed platform models. Increasingly, however, digital markets sees a spectrum or continuum of approaches, from more or less fully open (for example, Google’s Android OS) to partially open (for example, the Apple system) through to largely closed approaches (for example, the RIM system). Moreover, there is an increasing movement towards the development of integrated technology ecosystems, comprising a platform and bundled product offerings. This development has raised barriers to entry into the platform market, as new entrants must now compete in two or more markets from the outset; nonetheless, vibrant competition is the norm in the platform sector at present.

Well-designed platforms function as innovation catalysts, facilitating the development of interoperable follow-on technology. Information technology

platform owners make their facility accessible to other entrepreneurs, sometimes including potential rivals, to enable third party innovation. The platform model is therefore a key factor in driving the high rates of innovation and growth in the digital economy.

Inter-platform competition refers to competition between competing platforms. Inter-platform competition is the predominant source of competitive pressure within the digital economy at present. Competition occurs between more open and more closed approaches to platform development, and there are pros and cons to each approach. On a more closed platform, the platform owner can exert greater control over issues like security and applications quality and pricing, and avoids free-riding on its investment. On the other hand, open source models are more successful at attracting greater levels of investment and applications development by third parties. Nonetheless, open source platforms still require on-going management input from the platform owner, in order to maintain quality and confidence in the platform and its applications. Although a dominant mobile platform may emerge in due course, the selection of any dominant platform is a choice that should be made by the market through the process of competition rather than a top-down decision for government agencies. However, governments retain an important supervisory role in this process, whether through sector-specific regulation or competition enforcement, in order to safeguard a level playing field and ensure that dominance emerges solely as a result of competition on the merits rather than through exclusionary firm conduct.

Intra-platform competition refers to competition *within* a platform, and in particular, the relationship between the platform owner and applications developers. Although in a sense subsidiary to inter-platform competition, significant investment and innovation nonetheless continues to occur at the intra-platform level. Accordingly, competition problems arising at this level may have a negative impact on both static and dynamic efficiency in digital markets. First, there is a risk that the platform owner may seek to exclude third party applications developers, either to protect its own vertically-integrated applications subsidiary or to prevent the emergence of a potentially competing platform that may challenge the incumbent's dominance. Second, the platform owner may initially encourage significant investment by third party developers in producing applications for its platform, but then attempt to misappropriate the developers' investment by copying or cloning the third party applications produced. The extent to which intra-platform competition presents an appropriate area for competition law enforcement remains a controversial

question. The issue of investment incentives is central to this debate, with a need to balance incentives for platform development against incentives for applications development. Although applications developers should endeavour to protect their investments *ex ante* through contractual means where appropriate, there remains scope for competition authorities to intervene *ex post* to protect the competition process in these markets

4.4 Interoperability, Standardisation & Patents in the Digital Economy

In an increasingly integrated and converging digital economy, **interoperability** allows different platforms and applications produced by different developers to connect and communicate, thereby increasing value for users. Interoperability increases the value of products for users by facilitating access to a far broader range of functions and content through a single platform. At present, interoperability is facilitated primarily through voluntary disclosures by single firms and industry-wide standardisation. Because interoperability increases the attractiveness of a product for consumers, developers have incentives to facilitate such interconnection, particularly for new products seeking to gain a foothold in the market. In the context of established platforms in particular, however, the incentives of the platform owner may shift away from interoperability in order to protect a downstream subsidiary or eliminate a potentially competing platform.

Data portability refers to the capacity to move or reuse data between different platforms and applications, which facilitates switching by users. It remains a technologically complex task, which developers have limited incentives to facilitate. Nonetheless, several of the leading technology firms have committed to improving data-portability within their platforms.

Unilateral voluntary disclosure of a product's application programming interface (API) is a frequently-used method for the sharing of interoperability information. Voluntary disclosure facilitates rapid follow-on innovation. However, by placing this information in the public domain, the disclosing firm relinquishes a large measure of control over the development of interoperable products. Conversely, the receiving firm must comply with the design choices, good or bad, made by the disclosing firm, and moreover, becomes dependant on the latter for timely disclosure and vulnerable to subsequent alterations of the original platform.

The potential use of competition law to address failures to voluntarily disclose interoperability information is a much disputed competition policy

question. On the one hand, failures to disclose may create hold-up problems and inhibit intra-platform competition. On the other hand, the refusal to supply doctrine is rarely applied in competition law more generally, particularly in markets where investment and innovation are important and incentives may be damaged by imposing a duty to supply. It is fair to say that competition enforcement is rarely an optimal means by which to address unilateral interoperability disclosure problems.

Standardisation provides an industry-wide alternative to individual disclosures of interoperability information. Under this approach, industry participants collectively identify the best technology for a particular function and establish it as the generally-applicable standard for the sector. This facilitates interoperability through the standardised technology, while lowering barriers to entry for small firms that can build to the established standard. Moreover, the market benefits from increased network effects without the risk of a snowball effect to monopoly. In this sense, standardisation, like platforms, functions as an innovation catalyst.

However, standardisation is not an automatic panacea for interoperability or other competition problems in digital markets. First, the standard-setting process itself must be open and transparent. Second, although many digital standards have been adopted, few are successful in practice. An effective standard must be well-designed, meet a genuine need and be implemented widely. Third, innovation based on standardisation works more slowly than single-firm innovation. Moreover, it tends to inhibit product differentiation, which may be a desirable feature for certain products, particularly relating to the user interface. Fourth, and of increasing importance, where the standard incorporates patented technology, licensing must nonetheless be available to all on FRAND terms. However, as considered in Section III (ii) above, while FRAND commitments may secure access to the technology for rivals, such arrangements are not always effective at preventing price gouging by patent holders. Moreover, the strategic accumulation of digital patents and potential hold-up through patent litigation has become an increasing concern in the digital economy in recent years.

5. Conclusions

Innovation is the lifeblood of industries that are based on KBC, driving product development and fostering market growth. Accordingly, optimal competition policy for KBC-intensive markets should be innovation-focused. Ambiguity regarding the precise relationship between competition and

innovation, which exists both in theory and at an empirical level, complicates the task of determining the proper role for competition law in such markets. The evidence suggests, however, that at the very least there is scope for strategic, well-targeted intervention by competition authorities to support and augment the process of innovation. Eliminating unnecessarily anticompetitive regulation further facilitates innovation.

This chapter has reviewed some of the common features of KBC markets and the competition problems that may arise in them. Industry standard-setting is a frequent practice, yet one that is vulnerable to both anticompetitive collusion and single firm manipulation. The importance of IP, particularly patents, in KBC-based markets highlights the issue of the optimal scope of patents for encouraging investment and innovation without deterring beneficial competition. In digital economy markets, where inter-platform competition seems to be of greatest importance to innovation, one question is the extent to which intra-platform competition should also be actively protected through competition law mechanisms. Mergers, and in particular the scope for resulting dynamic efficiencies, are another consideration, with the strategic aggregation of patents through mergers and acquisitions an issue of increasing concern. Nonetheless, existing competition laws are sufficiently flexible to be applied in intangible asset markets, as long as enforcers and courts take due account of the specific market context and the importance of innovation in spurring growth in such sectors.

The following considerations should be taken into account when formulating and applying competition policy in KBC-intensive markets:

- Innovation is a primary concern in KBC-focused industries, so promoting and encouraging dynamic efficiencies should be prioritised. Although economic evidence on the relationship between competition and innovation remains somewhat ambiguous, it is increasingly clear that a moderate degree of competition tends to foster innovation most effectively. However, KBC-heavy markets are just as susceptible (if not more) to competition problems as other types of markets. Accordingly, robust competition law enforcement is necessary to create space for innovation and growth in KBC markets.
- Elimination of anticompetitive governmental regulation also tends to encourage greater innovation. The OECD's Competition Assessment Toolkit provides a comprehensive framework for identifying and assessing potentially restrictive regulatory arrangements.

- Governmental interventions, by means of State regulatory measures or subsidies, may be helpful in overcoming situations where company initiatives to bring about the desired level of innovation are insufficient due to market failures. It is important, though, that such interventions do not restrict competition and trade.
- Intellectual property rights (IPRs) are commonly owned and used by firms in KBC-focused markets. Competition policy must balance the innovation that IPRs can stimulate against the risks that they might be abused to reinforce or acquire dominance through anticompetitive means. Arguably, reforming the patent system might be the best way to address certain problems that affect competition in IPR-intensive markets. Nonetheless, in certain circumstances a measured use of competition law enforcement against IPR abuses is appropriate to tackle competition problems that threaten innovation and consumer welfare.
- The risk of patent ambush has emerged as a danger in standard-setting processes, which are common in KBC-focused industries. Competition authorities can work with standard-setting organisations to reduce the risk of patent ambush and other potential competition problems by implementing appropriate rules and conditions, such as ex ante licensing commitments, disclosure obligations or negotiation.
- In the digital economy, certain market characteristics—including inter-platform competition, two-sided markets, and strong network effects—may complicate competition law enforcement. Although it is generally acknowledged that competition laws remain fully applicable in such markets, the digital context is important. The timing of any intervention can be especially tricky to determine: although it is necessary to act before dominance is entrenched, competition enforcers should be wary of intervening too readily in still-competitive markets. Their challenge is to keep digital markets open and innovative without inhibiting the process of “creative destruction” that has driven much of the technological progress in these markets to date.

THE DIGITAL ECONOMY *

-- October 2011 and February 2012--

Executive Summary by the Secretariat

This summary is based primarily on the submissions, presentations and comments of the following panellists: Michael Baye (Indiana University), Eric Brousseau (University of Paris-Dauphine), David Heiner (Microsoft), Fabien Curto Millet (Google), and Tim Wu (Columbia University). The summary also takes into account the general discussion at the two hearings, the Secretariat's issues note, and the written submissions of a small number of delegations, but the points below mainly reflect the panellists' views and should not be interpreted as OECD consensus statements.

1. Understanding competition in digital markets

- (1) *The digital economy is comprised of markets based on digital technologies that facilitate the trade of goods and services through e-commerce. The expansion of the digital sector has been a key driver of economic growth in recent years, and the shift towards a digital world has had effects on society that extend far beyond the digital technology context alone.*

The digital economy is an umbrella term used to describe markets that focus on digital technologies. These typically involve the trade of information goods or services through electronic commerce. It operates on a layered basis, with separate segments for data transportation and applications. Conventionally, data transportation was considered to be a natural monopoly, while applications were

* OECD (2011), *The Digital Economy*, Series Roundtables on Competition Policy, Hearing No. 04, OECD, Paris. The full set of materials from this roundtable discussion is available at <http://www.oecd.org/daf/competition/The-Digital-Economy-2012.pdf>

assumed to be a very competitive segment. Increasingly, however, this dichotomy has been reversing as the transportation segment is liberalised and many applications markets become more concentrated. The Committee's hearings focused on competition issues relating to software platforms and applications.

The digital economy is a vital sector, driving very substantial growth. Furthermore, the impact of the digital economy extends beyond information goods and services to other areas of the economy as well as lifestyles more generally. The development of mobile devices, in particular, has greatly expanded the reach of the internet in society. Consequently, competition issues arising in the digital economy have become increasingly significant for competition authorities.

- (2) *Competition in digital markets has certain distinctive characteristics, including tendencies toward “winner takes all” competition for the market, network effects, two-sided markets, fast-paced innovation and high rates of investment. The cyclical nature of competition means that successful digital platforms have tended to acquire significant but transient market power. There was general agreement that dynamic competition, based on continual cycles of innovation, development, and disruption, is paramount in the digital economy. The optimal market structure for encouraging investment and innovation remains an unsettled issue, though.*

Competition in major digital markets often takes on a rather distinctive form. First, competition between business models or platforms tends to be more important than competition within a business model because platform competition often leads to a “winner takes all” outcome. In other words, dominance -- or even monopoly -- can be the virtually inevitable outcome of success. Second, digital markets are often characterised by strong network effects and economies of scale, which reinforce this competition-to-dominance trait. Third, many digital markets are two-sided, so that two or more user groups benefit from use of the digital platform. For example, search engines are used both by individuals to access information on the internet and by advertisers to access viewers. Fourth, as the digital economy becomes increasingly interconnected, a degree of co-ordination and co-operation between firms is unavoidable and indeed pro-competitive. Fifth, digital markets are characterised by high rates of investment and innovation, which lead to rapid technological progress in the sector.

Competition in digital markets has, historically, often been cyclical in nature. Successful firms may acquire significant market power, yet this dominance can turn out to be vulnerable to displacement by the next cycle of innovation, and therefore transient. Accordingly, the panellists recommended that dynamic competition considerations should generally take precedence over static efficiency concerns. Several participants stressed the importance of preserving incentives to invest and innovate within the digital economy.

Moreover, while big is never automatically bad in any market, in the digital context that is especially true because successful, legitimate competition there tends to lead to monopoly more often than in other sectors. Indeed, extensive user participation in the innovation process in many digital markets may facilitate a “virtuous loop of dominance,” whereby firms maintain their market-leading positions by developing products to closely match the requirements of consumers. However, there is no clear answer to the question of what form of market structure best encourages and facilitates this process of innovation and development.

2. The scope for competition enforcement in digital markets

- (3) *The appropriate scope of competition enforcement in digital markets is a controversial issue. The dynamic and technical nature of the digital economy have led some commentators to call for regulatory restraint due to concern that excessive enforcement will inhibit the innovation that drives competition in the digital economy. However, the majority view that emerged in the hearings was that there is a clear need for competition enforcement in certain circumstances. There is a particular need to protect the competitive structures that drive innovation and to deter exclusionary behaviour that prevents legitimate competition.*

Given the importance of dynamic competition in the digital economy, and especially the need to preserve incentives to invest and innovate, some scholars and practitioners have expressed doubt about the wisdom of regulatory intervention, including competition enforcement, in the sector. Their main concern is that excessive or inappropriate intervention will wind up damaging competition rather than protecting it. Under this view, it is better to defer to self-

regulation by the industry or simply the disciplining effects of the competitive process.

However, the broad consensus that emerged in the hearings was that competition law retains a significant role in the digital economy, particularly as these markets mature. Competition law enforcement may be necessary to stop and deter anticompetitive behaviour that would otherwise inhibit the process of dynamic competition. The hearings featured some examples of situations in which competition law might be appropriately used, such as potentially anticompetitive mergers, hold-up problems caused by dominant platforms, or the misappropriation of an applications developer's investment by a platform owner.

- (4) *The optimal timing of competition law interventions is a complex matter. Given the vigorous competition existing between different platforms in many digital markets, it can be hard to determine the point at which a firm may be considered dominant for competition law enforcement purposes. The scope for intervention against powerful firms that do not yet hold a dominant market position is an unresolved issue, with laws regulating unfair trade practices providing a possible alternative where applicable.*

The appropriate timing of any public intervention in digital markets is a difficult issue. Once again, dynamic considerations are vital given the need to balance the risk that premature intervention will inhibit further procompetitive developments against the risk that dominance may become entrenched. Some participants at the hearing suggested that an approach based on *ex ante* monitoring by competition authorities may prove more effective than an *ex post* enforcement strategy, but competition authorities have historically been reluctant to take on such quasi-regulatory roles.

A central issue when enforcing competition laws in digital markets is the question of when a firm is to be considered dominant or to hold a monopoly position. Although many of the key players in the digital economy are very large and profitable firms, the vigorous competition among them as well as the dynamic or cyclical nature of competition in digital markets usually renders durable dominance elusive. One panellist suggested, as a rule of thumb, that a market-leading digital economy firm could be presumed to be dominant if it remains unchallenged for five years, or if it very easily defeated any challenges that did arise, and is profitable.

Where dominance cannot be established, an alternative approach is to address significant anticompetitive behaviour by non-dominant firms through provisions regulating unfair trade practices, such as §5 of the Federal Trade Commission Act in the United States or the unfair trade provisions in Japan's Antimonopoly Act. Such activities may also constitute an anticompetitive attempt to monopolise the market, which is unlawful in some jurisdictions.

- (5) *In general, competition laws are sufficiently flexible to be applied in digital markets. However, certain recurrent difficulties have arisen with competition enforcement in this sector, including issues relating to digital market expertise, territoriality and the multinational nature of digital economy firms, and technical problems in adapting established competition concepts to the digital context.*

It was undisputed at the hearings that existing competition laws are sufficiently flexible and nuanced to be applied in the digital economy. However, participants identified a variety of recurrent difficulties that complicate the application of competition law in digital markets. First, although technical expertise with digital technologies was viewed as essential for applying competition law effectively in the digital economy, several delegates reported a lack of such expertise in their competition authorities. Moreover, given the fast-moving nature of the digital economy, there is a risk that any knowledge the authorities happen to acquire will become outdated rather quickly. Options for increasing the technical expertise of an authority include using expert advisors, conducting sector inquiries into digital markets, and participating in industry co-ordinative processes.

Second, because many markets in the digital economy are worldwide in geographic scope, there can be jurisdictional or territorial problems. For example, it may be difficult to identify within a given country a physical entity that is legally representative of the party responsible for the anticompetitive behaviour. Alternatively, an anticompetitive practice may affect several jurisdictions—a recurring issue in e-commerce—thus raising the question of which agency should take enforcement action. The participants therefore emphasised the need for international co-ordination and co-operation between competition authorities when dealing with matters involving the digital economy.

Third, there may be difficulties in applying established competition law concepts in the digital context. Convergence, cross-subsidies, platform competition and constant cycles of innovation may greatly complicate market definition. The assessment of whether conduct is anticompetitive frequently turns on highly technical questions of product design or coding. Furthermore, structural remedies may become rapidly obsolete, so behavioural remedies may be preferable, but then regular monitoring may be required.

3. Network effects

- (6) *Network effects arise where the value of a product to its users increases with the number of other users of the product. A form of demand-side economies of scale, such effects may be direct or indirect. Network effects arise frequently in digital markets, where the increasing popularity of a platform attracts additional users as well as other groups, such as advertisers or applications developers, to the platform.*

Direct network effects arise where users of the product interact with each other, so having more users makes the product more useful and valuable. The quintessential contemporary example is the social network: the more users there are on the network, the greater its attractiveness is. Indirect network effects arise where high usage rates for a product increase its appeal to another group, which in turn results in indirect benefits for the original users of the product. For example, the widespread adoption of an operating system (OS) attracts applications developers, who produce new applications compatible with that OS, to the benefit of its users.

Although not unique to digital markets, network effects are a prevailing feature and apply with particular strength in the digital economy. Network effects can be conceptualised as a variety of demand-side economies of scale. Supply-side economies of scale may also arise in digital markets, most notably in the context of search engines, where increased data from users leads to more accurate search algorithms.

- (7) *Network effects are procompetitive insofar as they improve the quality and value of a product for both its users and other groups. However, network effects can have a detrimental impact on competition where they raise barriers to entry or increase switching costs. This may result in lock-in to a particular platform and/or lead to a tipping point*

where a single platform emerges as dominant. Firms that benefit from network effects should not attempt to abuse those effects to strengthen market dominance.

Network effects as a positive externality make a product more valuable, both to its direct users, and to other groups that might interact with the product, such as developers of compatible products. A higher market share may improve product quality, for example -- a pro-competitive outcome. But network effects may also have detrimental effects on competition. They might raise barriers to entry, for example, or increase switching costs for consumers. The key concern is that users may become locked in to the product, which in turn may lead to a snowball effect or a tipping point at which that product's dominance becomes inevitable.

However, certain common market features militate against the appearance of tipping points in the digital economy. These markets may feature diminishing returns to scale, congestion effects and even repulsion effects; switching costs tend to be low; and per-transaction charges weaken the competition-suppressing network effects of cross-group externalities. On the other hand, as digital markets mature, network effects may strengthen with the entrenchment of market dominance. Thus, network effects are not an *a priori* competition problem, but a firm that benefits from network effects should not seek to strengthen its market position through exclusionary behaviour. Consequently, network effects have to be assessed on a case-by-case basis to determine their competitive implications.

- (8) *Although increased switching costs are a common feature of markets with strong network effects, switching costs to date have been relatively low in digital markets. Moreover, the prevalence of multi-homing in the digital economy means that concurrent participation in numerous competing platforms is common.*

Switching costs are costs incurred by a user in moving from one product to another, such as exit charges, learning costs or opportunity costs. Switching costs tend to deter consumers who want to change suppliers, insofar as the costs incurred negate or even outweigh the benefits of switching. Although switching costs can strengthen the anticompetitive impact of network effects, the extent to which switching costs present a competition concern in the digital economy

varies from market to market. For example, there are fewer costs for users associated with the move from one search engine to another than from one social network to another, insofar as much of the value of the latter is derived from the identity of other users.

Additionally, multi-homing is common in digital markets. That is, affiliation with two or more platforms or networks is widespread. Accordingly, participation in one network does not prevent users from participating in and benefiting from other networks, which may reduce the likelihood of tipping.

4. Open versus closed platforms for mobile applications development

- (9) *Competition in the mobile communications sector is increasingly taking place at the level of entire technology eco-systems. The conventional dichotomy between open and closed platforms has been largely superseded by the emergence of a broad spectrum of approaches, from mostly closed systems to more or less fully open platforms. In the mobile space, well-designed platforms serve as innovation catalysts, facilitating the development of applications that increase the functionality of the platform and therefore its value for users.*

The “winner takes all” mode of competition in digital markets takes place at a platform level (between competing platform models). Conventionally, a distinction is drawn between open and closed platform models. Increasingly, however, digital markets feature a spectrum or continuum of approaches, such as in the mobile telecommunications sector. There, options range from the more or less fully open (such as Google’s Android operating system) to partially open (such as Apple’s system) to largely closed approaches (e.g. the RIM/Blackberry system).

There is an increasing movement towards the development of integrated technology ecosystems, comprising a platform and bundled product offerings. Although this development raises barriers to entry in the platform market because new entrants must now compete in two or more markets from the outset, panellists maintained that at present vibrant competition continues to be the norm among mobile communications platforms.

Well-designed platforms function as innovation catalysts, facilitating the development of interoperable follow-on technology. Information technology open platforms are unique among production infrastructure in the economy, insofar as the platform owner essentially opens its facility to other entrepreneurs, including potential rivals, to enable third party innovation. The platform model is therefore a key factor in driving the high rates of innovation and growth in the digital economy.

- (10) *Inter-platform competition constitutes the primary competitive force in the digital economy today. There are pros and cons to both more open and closed approaches to platform development, although it is generally accepted that open approaches attract greater investment and thus facilitate greater innovation. While a dominant platform may eventually emerge, this choice should be left to the competitive market process, rather than being mandated through government intervention. However, governments have a role to play in ensuring that anticompetitive conduct does not impair competition between platforms.*

Panellists agreed that inter-platform competition is the predominant source of competitive pressure in the digital economy at present, including within the mobile space. Competition occurs between more open and more closed approaches to platform development, and there are pros and cons to each approach. On a more closed platform, the platform owner can exert greater control over issues like security and applications quality and pricing, and it can avoid free-riding on its investment. The panellists' held the view that market dominance is more likely to arise in the context of an open source model because such platforms have proven more successful at attracting investment and applications development. Even open source platforms require ongoing management input from the platform owner, so as to maintain quality and confidence in the platform and its applications.

Although the panel believed it was likely that a dominant mobile platform would emerge in time, they asserted that the selection of any dominant platform was a choice to be made by the market through the process of competition, rather than a top-down decision for government agencies. However, they urged governments to retain a supervisory role in this process, whether through sector-specific

regulation or competition enforcement, to safeguard competition and ensure that dominance emerges as a result of merit rather than exclusionary conduct.

- (11) *At the intra-platform level, two categories of competition issues may arise: exclusionary tactics by a vertically-integrated platform owner relating to the applications market, or the misappropriation by the platform owner of investments made by an applications developer through illegitimate copying or incorporation of the functionality within the platform. The extent to which such problems can and should be addressed through competition law, however, was debated at the hearings, with the need to balance innovation incentives emerging as a central concern.*

Intra-platform competition refers to competition within a platform, and the term includes the relationship between the platform owner and applications developers. While it is secondary to inter-platform competition, very significant investment and innovation nonetheless occur at the intra-platform level. Competition problems arising at this level may have a negative impact on both static and dynamic efficiency in digital markets. First, there is a risk that the platform owner may seek to exclude third party applications developers, either to protect its own vertically-integrated applications subsidiary or to prevent the emergence of a potentially competitive platform that may challenge the incumbent's dominance. Second, the platform owner may initially encourage significant investment by third party developers in producing applications for its platform, but then subsequently attempt to misappropriate the developers' investment by copying or cloning the applications they produce.

The extent to which intra-platform competition presents an appropriate area for competition law enforcement was an unresolved issue for the panellists. The question of investment incentives was central to this debate, with the need to balance incentives for platform development with incentives for applications development. Although applications developers should try to protect their investments *ex ante* through contractual means, numerous hearing participants argued that there should also be scope for competition authorities to intervene *ex post* to protect the competitive process in these markets. Some also noted that certain business practices of closed platforms that are legitimate where there is vigorous inter-platform competition may be deemed anticompetitive where the platform has a dominant position,

even if the acquisition of that position was a result of legitimate competition.

5. Interoperability, standardisation and the patent system

- (12) *In an increasingly integrated and converging digital economy, interoperability allows different platforms and applications produced by different developers to connect and communicate, thereby increasing value for users. However, interoperability tends to facilitate the development of competing as well as complementary products, which may skew a developer's incentives against allowing interoperability, particularly for dominant products.*

Interoperability relates to the interconnection and interaction between elements of software and hardware. Interoperability between different platforms and applications allows these separate components to connect and communicate, which is an essential feature in view of the growing convergence between digital technologies. In particular, interoperability increases the value of products for users by facilitating access to a far broader range of functions and content through a single platform.

At present, interoperability is facilitated mainly through voluntary disclosures by single firms and industry-wide standardisation. Because interoperability increases the attractiveness of a product for consumers, developers have incentives to co-operate, especially for new products that need a foothold in the market. In the context of established platforms, however, the incentives of the platform owner may shift away from interoperability due to a desire to protect a downstream subsidiary or eliminate a potentially competing platform.

- (13) *Voluntary disclosure of a product's application programming interface is a common method by which firms enable interoperability. Voluntary disclosure can facilitate rapid innovation, but may bring certain risks for both the disclosing and receiving firms. A controversial question is the extent to which the refusal to supply principles of competition law can be used to force a reluctant dominant firm to disclose interoperability information.*

Unilateral voluntary disclosure of a product's application programming interface (API) is a frequently used method for sharing interoperability information. Voluntary disclosure facilitates rapid follow-on innovation. However, by placing this information in the public domain, the disclosing firm relinquishes a large measure of control over the development of interoperable products. Conversely, the receiving firm must comply with the design choices, good or bad, made by the disclosing firm, and moreover, it becomes dependant on the disclosing firm for timely disclosure and vulnerable to subsequent alterations of the original platform.

As the discussion at the hearings demonstrated, the potential use of competition law to address failures to voluntarily disclose interoperability information is a highly controversial issue. On the one hand, failures to disclose may create hold-up problems and inhibit intra-platform competition. On the other, in competition enforcement more generally, the refusal to supply doctrine is rarely used, especially in markets where investment and innovation are important and incentives may be damaged by imposing a duty to supply. A majority consensus emerged among the panellists to the effect that competition enforcement is rarely an optimal means by which to address unilateral interoperability disclosure problems.

- (14) *Standardisation of technology is an alternative way to promote interoperability in the digital economy. When standards are well-designed, meet a genuine need, and are widely-adopted, they also function as an innovation catalyst. However, standardisation is not always the answer to interoperability issues.*

Standardisation provides an industry-wide alternative to unilateral voluntary disclosures. Under this approach, industry participants collectively identify the best technology for a particular function and establish it as the generally applicable standard for the sector. Standardising the technology facilitates interoperability while lowering barriers to entry for small firms that can build products using

the established standard. Moreover, the market benefits from increased network effects without the risk of a snowball-to-monopoly effect. In this sense, standards, like platforms, function as innovation catalysts.

However, the panellists emphasised that standardisation should not be viewed as a panacea for interoperability or other competition problems in digital markets. First, the standard-setting process must be open and transparent. Second, although many digital standards have been adopted, few are successful in practice. An effective standard must be well-designed, meet a genuine need and be implemented widely. Third, innovation based on standardisation works more slowly than single-firm innovation. Moreover, it tends to inhibit product differentiation, which may be a desirable feature for certain products, particularly relating to user interfaces. Fourth, and of increasing importance, where the standard incorporates patented technology, licensing must be available to all on FRAND (fair, reasonable, and non-discriminatory) terms.

- (15) *When standard-essential patents are included in a standard, FRAND licensing commitments may reduce the risk of subsequent hold-up by the patent owner. However, the strategic accumulation of digital patents and potential hold-up through patent litigation has been a growing concern in the digital economy in recent years.*

Generally, standards incorporate the best available technology regardless of whether the technology is patented. Where patents are included in a standard, FRAND licensing commitments are often used to ensure that the standard remains available to all developers on satisfactory terms. However, an emerging problem is the deliberate accumulation of standard-essential patents by individual firms and subsequent strategic use of patent litigation against competitors. This behaviour raises two issues: the extent to which patent holders are respecting FRAND commitments made during standard-setting processes, and the potential scope for competition law enforcement to address the resulting hold-up problems. Merger control is also relevant because it can be used to determine whether patent acquisitions will substantially reduce competition.

THE REGULATED CONDUCT DEFENCE *

-- February 2011 --

Executive Summary by the Secretariat

In the light of the written submissions, the background note and the oral discussion, the following points emerge:

- (1) *In many jurisdictions a “regulated conduct defence” shields conduct from competition law consequences where it is required by a federal or state regulation. When firms invoke the doctrine as a defence against allegations of illegal anti-competitive behaviour, they seek what is sometimes called a regulated conduct defence or regulated conduct exemption. The regulated conduct defence is a narrower form of immunity than exempting an entire sector from the application of competition law, and permitting this defence should be preferred to broad, sector-wide exemptions from competition law.*

In most cases, competition law and regulation pursue distinct objectives, use different tools, and affect different aspects of business conduct. Therefore, the two instruments complement each other and may be applied cumulatively.

In some cases, however, the application of both competition law rules and regulation are incompatible as regulation may restrict competition (e.g. by establishing entry barriers) or impose behaviours that may be condemned under competition law (e.g. fixing minimum prices). In such cases, regulation may imply an exemption to the application of competition law. Such exemption may be beneficial to society when

* OECD (2011), *The Regulated Conduct Defence*, Series Roundtables on Competition Policy, No. 116, OECD, Paris. The full set of materials from this roundtable discussion is available at <http://www.oecd.org/daf/competition/mergers/48606639.pdf>

the regulation aims to correct market failure or ensure distributional objectives, whilst minimising anti-competitive effects. If, however, regulation goes beyond what is necessary to achieve the underlying public interest objectives, the competition law exemption is likely to be detrimental. Thus where a specific rationale for exemption has been identified, consideration should be given to the means by which its scope can be minimized. For example, an exemption which is narrow and focused is better than a broad one. In Romania, any intervention by the NRA must respect the principle of minimum distortion of competition.

These issues are now clearly understood in most jurisdictions where the solution to “exempt” the whole regulated sector from the application of competition law has been progressively abandoned. In the US, several antitrust exemptions have been narrowed or eliminated over time, due in part to advocacy efforts of the antitrust agencies directed at federal and state entities. Similarly in Korea, the KFTC enacted the Omnibus Cartel Repeal Act in 1999, a series of 18 laws which abolished 20 cartel practices by implementing measures such as lifting the limit on wage schemes for professional service providers such as lawyers, and reducing the number of items subject to group private contract. More recently, the KFTC has focused on reforming entry regulations. In Japan, the antitrust agency requested a fundamental review of antitrust exemptions in several sectors, including international aviation and the international shipping industry.

- (2) *The core principles, conditions and underlying legal doctrines behind the regulated conduct defence are similar across OECD jurisdictions, although there are some differences between both sides of the Atlantic.*

In principle, antitrust authorities can not intervene, and the regulated conduct defence applies, when firm behaviour has been mandated or dictated by regulation. Conversely, antitrust authorities may intervene when the behaviour has been autonomously decided by the firm. When the firm was induced to violate competition rules, for instance due to administrative guidance, this could be taken into account as a mitigating factor to reduce, without necessarily suppressing, the fine.

The principles of legal certainty and of legitimate expectation should be respected.

Often, an anti-competitive regulation cannot be directly challenged by antitrust authorities, the only route being to rely on advocacy and try to convince the author of the regulation to change it. However, in some jurisdictions, regulation that violates superior antitrust principles should be dis-applied.

The underlying legal doctrine of the regulated conduct defence could be viewed as related to a hierarchy of norms.

- *When competition law and regulation are at the same hierarchical level, the regulated conduct defence may be based on express immunity when one of the legal rules explicitly provides for competition law immunity or an implied immunity when there is a plain repugnancy in the application of both legal rules to the challenged conduct. In some jurisdictions, the defence also applies when there is no added value in applying competition law in conjunction with regulation.*
- *In multi-level governance settings such as federal states, when competition law is at a “superior” level to the regulation, the regulated conduct defence may be based on some form of “state action” doctrine and applies, in accordance with national law, when the challenged conduct is imposed or at least actively supervised by the regulator.*

The regulated conduct defence may be based on an explicit competition law exemption. Such immunity is often provided by the competition law itself, but it may also be provided by a regulation when adopted at the same level as the competition law. Such explicit exemptions are strictly construed in OECD jurisdictions. Although free-market competition is the fundamental U.S. economic policy and hence the vast majority of the US economy is subject to the antitrust laws, several statutory competition exemptions exist. Statutory exemptions from antitrust law exist for example in the following sectors: insurance, agricultural and fishing cooperatives, maritime shipping, rail transportation, sports broadcasting, labour, and export associations. Narrow statutory exemptions for specific categories of conduct exist for example in trademarked soft drink licensing,

international civil aviation alliances, healthcare, and education. In Australia, the main sectors with exemptions are: postal, banking, financial and insurance services, as well as customs. In Japan, there are currently 21 exemption systems stipulated in 15 legislations. In Hungary, exemptions are very rare, but exist for quantitative restrictions in agriculture for instance.

A regulated conduct defence may also be based on antitrust immunity which is only implicitly in the law and deduced by the courts. Such cases may require a “plain repugnancy” between the competition law and the regulatory provisions. In the US, there are several recent Supreme Court cases (Trinko, Credit Suisse, linkLine) that some commentators have interpreted to imply that antitrust rules should not apply when there is no added value compared to regulation, a position that may represent a shift of the belief in the relative efficiency of regulation and competition rules to police market behaviour. According to some authors, these decisions increase the scope of the regulated conduct defence in the US and make it broader than in other jurisdictions such as the EU. However, the interpretation of these cases is controversial.

The application of the regulated conduct defence in multi-level governance settings can be based on a form of “state action” doctrine. The situation is more complex as different legal principles collide and anti-competitive state regulation may in some circumstances be displaced. In such settings, there is usually a legal principle of hierarchy of norms whereby the norm adopted at the superior (e.g., federal) level prevails over the norm adopted at the inferior (e.g., state) level. According to this principle, federal competition law prevails over state regulation and, in such circumstances, the regulated conduct defence would not be accepted. However, according to principles of state autonomy and of subsidiarity, courts in some OECD jurisdictions allow regulation adopted at an inferior level to include an exemption from competition law adopted at a superior level. Moreover under the principles of legal certainty and legitimate expectations (extensively relied on in some jurisdictions such as Spain) which are crucial for the business community, courts have decided that undertakings abiding by regulation that is contrary to a superior competition law norm should not be sanctioned.

In the U.S., the Supreme Court accepted a state action defence for private actors when the challenged conduct met two conditions:

- the conduct is clearly authorised, ensuring that the state has affirmatively authorized departures from free-market competition, and
- the conduct is actively supervised by the state, ensuring that state action immunity shelters only the particular anticompetitive acts of private parties that, in the judgment of the State, are deemed to further state regulatory policies.

The US antitrust agencies, seeking to limit possible anticompetitive effects of regulation, have active advocacy programs at the sub-federal level, and have advocated limits on the breadth of the state action doctrine.

In the EU, the Court of Justice decided that Member States may not adopt regulations that would deprive EU competition rules of their effectiveness. The Treaty on the Functioning of the European Union nonetheless does provide such exceptions in this matter, particularly with regards to the provision of services of general economic interest. Thus, Member States (legislative, executive, regulatory authorities) may not adopt regulations that would encourage or force undertakings to violate EU competition law and if they do, regulations should be dis-applied. A regulatory authority, for instance, may not approve or authorise any price fixing arrangements between companies or any excessive price contrary to EU competition rules. However, if a Member State does not fulfil its obligations under EU law and adopts a regulation compelling undertakings to adopt anti-competitive behaviours that cannot be justified to ensure the provision of a service of general economic interest, a regulated conduct defence may be allowed to preserve the principles of legal certainty and legitimate expectations. This will, however, only be the case when the regulated firm has no autonomy and if the national law has not yet been declared contrary to EU law by a national authority or by the European Commission. The regulated conduct defence is not permitted when the regulation merely encourages or authorises the undertakings to engage in autonomous anti-competitive conduct. In such cases, the presence of a regulation is merely a mitigating factor

when setting the sanction. The European Commission reduced the fines by 10% when condemning Deutsche Telekom and when condemning Telefonica for an abuse of a dominant position in the presence of regulation. This is also the case in several EU Member States (such as Germany, Bulgaria, Romania, Hungary) or in other OECD jurisdictions such as Chile.

- (3) *The regulated conduct defence is sometimes used as a defence in merger cases on the basis that merged companies, even if they gained market power, would not be able to harm others due to access or price regulations, that constrain the ability to exercise market power.*

Merger review may be based on different substantive standards. It may be based on a competition law standard relating to efficiency (the merger should be prohibited if it significantly lessens competition but otherwise is should be allowed). It may also be based on a broader regulatory “public interest” standard (the merger should be prohibited if it goes against the public interest but otherwise it should be permitted).

In the jurisdictions and sectors where a competition law merger review standard is applicable, the merger review authority may decide to take regulation into account when it pursues the same goals as competition law and controls the possible anti-competitive behaviours resulting from the merger. This is particularly the case in recently liberalised sectors where regulation supports competition law in steering the market towards effective competition.

In the EU for instance, the European Commission does not impose competition law remedies in order to approve concentrations if the sector regulation is deemed to be sufficient to prevent anti-competitive behaviour or anti-competitive effects as a result of a merger. In Spain, mergers in the gas and electricity sector have been cleared because the access regulation was sufficient to prevent any abuse of dominant position by the merging parties.

(4) *Institutional settings can reduce potential inconsistencies between the design and the enforcement of regulatory structures and competition law, for example by:*

- *Assessing competitive effects of regulations before their adoption. If the assessment identifies significant potential for weakening competition within the affected industry or related industries, policymakers should consider the least anti-competitive alternative that would achieve the same policy goal. Moreover, the benefits and costs of such a regulatory approach should be weighed against each other. Anti-competitive regulation is only justified if its benefits exceed its costs.*
- *Ensuring mutual co-operation between regulators and competition authorities through both formal and informal agreements.*
- *Ensuring that competition authorities undertake an important advocacy role which involves convincing other public authorities to abstain from either designing or enforcing a regulation in an unduly anticompetitive way.*

Competition assessment, as for instance set out by the OECD Competition Assessment Toolkit, is increasingly used in OECD jurisdictions. This is for instance the case in a number of countries: the US, the EU with the 2009 Impact assessment guidelines, Japan with the 2010 Regulatory Impact Analysis, and Spain with the 2009 Guide to Competition Assessment. The competition assessment should be integrated at an early stage in the policy making process and competition authorities should be involved.

When different authorities are in charge of the enforcement of competition law and regulation, formal co-operation agreements could be put into place in order to alleviate or reduce conflict between their activities. Co-operation agreements may allow a division of tasks between authorities. This is particularly important in jurisdictions where competition and regulatory authorities have concurrent jurisdiction, as is for instance the case in South Africa where a Memorandum of Agreement between the competition and the communications authorities exists. In Slovakia, the competition authority will only intervene in a case already dealt with by the regulatory body when it is efficient to do so.

Co-operation agreements may also encourage closer cooperation between both authorities with:

- a right for the competition authority to make submissions or provide industry regulators with comments or expert reports, as well as to participate in regulatory hearings, and ask for optional referrals;
- joint proceedings in certain instances in order to make use of complementary expertise;
- mandatory agreements, consultations and referrals by the competition authority to the regulator, or notification of investigations that are within the jurisdiction of the other agency, and mandatory consultation or referrals.

In Korea, regulatory authorities have to consult with or notify the KFTC in advance when intending to propose potentially anticompetitive legislation or revise laws that have anticompetitive provisions. In most EU Member States, there is strong cooperation between the telecom regulatory agency and the competition authority for the market analysis. In general, the opinion of the competition authority given to the regulatory authority is not binding and does not prejudice any competition law case. In Romania, cooperation mechanisms have been set by MoUs signed between the Romanian Competition Council and the main regulators, covering mainly the exchange of information between parties and the delineation of attributions and coordination of market interventions. When competition and regulatory agencies deal with the same case, they shall consult each other in order to ensure the consistency of the decisions and proportionality of the sanctions.

Competition and regulatory authorities may also rely on more informal and soft techniques of co-operation including the development of a shared culture.

Antitrust authorities in OECD countries rely very much on advocacy, which should be strong, reliable and evidence-based. For instance, the US antitrust agencies have recently engaged in competition advocacy in the sectors of health care, legal services, and real estate transactions. They benefit from the federal nature of the country

where the natural experiments in the different states may be benchmarked against each other.

In the specific context of deregulation, advocacy has been carried out in three main ways:

- the elaboration of sector-specific studies and sector enquiries that take into account market structure and emphasise the benefits of allowing access and of introducing competition;
- the implementation of co-operation agreements between the sector regulatory agencies and the competition authorities. These are especially useful in helping regulators to detect anticompetitive practices;
- the drafting of guidelines and sector codes of conduct or compliance with the competition law.

**PRO-ACTIVE POLICIES FOR GREEN GROWTH
AND THE MARKET ECONOMY ***

-- October 2010 --

Executive Summary by the Secretariat

Considering the discussion at the roundtable, the delegates' written submissions and the Secretariat's background paper, several key points emerge:

- (1) *Various forms of market-based environmental policies, including taxes and fees, subsidies, and emissions trading, have been implemented across OECD countries.*

Examples of market-based environmental policy instruments that have been or are currently in use in OECD countries include taxes and charges (such as automobile tax differentiation, taxes on CO₂ and other emissions, fuel taxes, as well as targeted stationary and mobile source fees), emissions trading programs (such as the European Union's Emission Trading Program (EU ETS) and the United States' Acid Rain Program), subsidies (such as those for vehicle upgrades and renewable energy production), performance standards, as well as a range of other policies (e.g. public programs to increase the market share of electric vehicles).

* OECD (2010), *Pro-active Policies for Green Growth and the Market Economy*, Series Roundtables on Competition Policy, No. 114, OECD, Paris. The full set of materials from this roundtable discussion is available at <http://www.oecd.org/daf/competition/sectors/48316422.pdf>

- (2) *There are a number of ways to define green growth, as well as a broad range of tools that can be used to promote it.*

Green growth is generally defined as economic growth under environmental constraints, similar to what is commonly referred to as sustainable growth. The range of motivations underlying green growth includes environmental conservation, energy security, innovation, green jobs, promotion of infant industries and industrial policy, among others. Naturally, such a diversity of motivations gives rise to different priorities, as well as the desire for a range of policy mechanisms. During the roundtable, the speakers and delegates highlighted various policies that can be used to promote green growth, including emissions taxes, fees, subsidies, and tradable performance standards. The delegates offered real-world examples of these policy instruments as well as less well known programs such as bi-lateral debt-for-environment swap agreements. An important lesson was that policy choices will (and should) reflect both the particular circumstances facing a country and its specific goals underlying the promotion of green growth.

- (3) *A preference for market-based environmental policy instruments was evident. A number of arguments, discussed in the Background Note and underscored by comments from the delegates, support using market-based approaches over command-and-control ones whenever possible.*

Many of the written submissions and delegate interventions expressed a preference for achieving environmental goals with market-based policies. At the same time, a few delegations indicated ongoing support for non-market-based environmental policies in certain circumstances. Nonetheless, the general preference was for market-based approaches relative to many command-and-control alternatives. The principal considerations in favor of market-based environmental policy include enhanced compliance flexibility, cost-effectiveness, and incentives for technological innovation.

- (4) *Clear rationales should be given in cases where multiple policy instruments are used to address a single environmental problem.*

The roundtable included a discussion of the rationale for continued subsidisation of renewables when a negative externality is already

internalised, i.e. the marginal damages from CO₂ emissions are correctly priced. In particular, it was noted that if a binding cap-and-trade policy is in place, emission reductions cannot be the rationale for additional environmental policy measures. However, there can be *other* rationales that make additional policies attractive. In the context of subsidies for renewable energy, examples of alternative justifications include the fact that inventions and innovations are public goods (i.e. investment in renewable energy will be less than socially optimal), learning-by-doing has spillover effects, and that energy security is a public good.

The important distinction between fixed-price policies, such as an emissions tax, and endogenous-price policies, such as a cap and trade system, was noted. The contribution of additional measures can be seen in light of this distinction. For example, implementing additional policy measures to reduce emissions will have no effect on emissions under a fixed-price (endogenous-price) policy regime since the allowance price will adjust to reflect (and ultimately offset) the reductions that the additional policy was implemented to achieve.

- (5) *Policymakers must understand the implications of multiple, overlapping policies.*

Part of the roundtable focused on the implications of multiple, overlapping environmental policy instruments. Examples include emissions taxes, generation tax exemptions for renewable energy, emissions performance standards, tradable green tariffs, feed-in-tariffs, production subsidies, investment subsidies, and R&D subsidies. The distinction between environmental policy instruments that allow for price impacts when overlapping policies are implemented and those that do not is important. Under a cap-and-trade system, overlapping policies to further reduce emissions will be ineffective, as they serve only to lower the emissions price, ultimately raising emissions elsewhere in the economy. Such cases raise concerns about the cost-effectiveness of the overall policy, as it becomes more costly to achieve a given emission reduction goal. As a result, promoting green growth requires a delicate balance of the alternative policy tools and a clear understanding of the problem being addressed in order to avoid redundancy and efficiency losses.

- (6) *Policymakers must evaluate a number of important considerations when designing market-based environmental policies.*

The Background Note and guest experts mentioned a range of considerations for designing policies on emission taxes, fees, and charges. These included defining the basis of the tax, determining the tax/fee rate, entities responsible to pay, use of government revenues, and the effect of market structure on outcomes. In the case of subsidies, policymakers must evaluate which entities (as well as activities) receive subsidies, the level and form of the subsidies, the source of revenues used to pay for them, as well as whether market structure affects the effectiveness or justification for the subsidies themselves.

- (7) *Market-based environmental policy considerations often have competitive implications and vice versa. Given this reality, several delegates proposed that competition authorities should have an expanded role in the development of market-based environmental policies.*

An important theme of the roundtable was the interconnection of environmental and competition policies, including the competitive effects of product standards and the role of market structure in determining environmental policy outcomes. Because environmental policy has the ability to affect competitive outcomes, competition authorities have an opportunity to ensure it does so in a constructive way. Some delegates highlighted the role that competition agencies could play in the development of market-based environmental policies, including further *ex ante* assessments of the competitive effects of a proposed change in policy. While these assessments may be conducted by the agency sponsoring the policy change, competition authorities can provide specific guidance on the competition issues. In countries where such an assessment process is not in operation, an *ad hoc* process could be adopted. Overall, it is anticipated that new opportunities will emerge for competition authorities to participate as new policies are implemented to foster green growth. In particular, competition authorities can help to ensure that future market-based environmental policies are based on sturdy competitive foundations. There are a number of ways competition authorities can pursue the goal, including both advocacy and enforcement.

COMPETITION, PATENTS AND INNOVATION

-- June 2009 ¹ and October 2006 ²--

Executive Summaries by the Secretariat

The two following summaries take into account general discussions on two roundtables on competition, patents and innovation held in June 2009 and October 2006 in the Competition Committee.

1. Roundtable held in June 2009

- (1) *There has been a significant increase in the number and complexity of patent applications filed in the world's major patent agencies, resulting in a greater backlog and substantially longer pendency periods. More applications pending for longer periods have led to greater uncertainty about which inventions are and will be protected by patent rights.*

The number of patents applied for and granted has grown sharply in the past 20 years, with the backlog of unprocessed applications now estimated to be 5 -10 million. This is in part due to globalisation and the expansion of geographic markets requiring multiple country filings, with the same invention frequently being examined by several different patent offices. In addition, economies such as China and Korea are advancing, creating patentable inventions of their own

¹ OECD (2009), *Competition, Patents and Innovation (II)*, Series Roundtables on Competition Policy, No. 101, OECD, Paris. The full set of materials from this roundtable discussion is available at <http://www.oecd.org/daf/competition/45019987.pdf>

² OECD (2006), *Competition, Patents and Innovation (I)*, Series Roundtables on Competition Policy, No. 72, OECD, Paris. The full set of materials from this roundtable discussion is available at <http://www.oecd.org/daf/competition/39888509.pdf>

while becoming increasingly desirable places to hold patent rights. Finally, many of the types of technology for which patents can be granted are developing and becoming more complicated. All of these factors have led to a much greater number of pending patents remaining pending for longer than ever before.

- (2) *A number of strategies that are potentially harmful to both competition and innovation have been adopted to take advantage of the uncertainty created by growing backlogs and longer pendency periods, including strategic uses of divisionals.*

There are several ways in which patent applicants may use pending patents to their advantage. Most of those strategies can be enhanced or enabled through the use of a procedural device known as a divisional application in some jurisdictions and a continuation application in others. Some of these “divisionals” are mandatory and others are filed voluntarily, but they all derive from an earlier, related application and they all take on a life of their own once they come into existence. This means they are examined separately and have their own, separate publication schedules. It is also possible to file divisionals repeatedly, such that a whole series of them may spring from a single original application. Among other things, divisionals make it possible for companies to keep their patent applications pending longer than would otherwise be the case. They also make it possible to keep those pending patents hidden from public view for longer. That, in turn, makes them potentially valuable tools for a company that wishes to engage in anticompetitive conduct. This may include behaviour such as (i) ambushing a standard-setting organisation (discussed below in 4), (ii) forcing a rival to cross licence its technology for free, or on more favourable terms, by using the leverage obtained from a patent flooding strategy (discussed below in 5), and (iii) keeping applications pending and unpublished through divisionals, then modifying the application in an additional filing so that it perfectly describes a rival’s new product, thereby ensuring that the rival will be liable for infringement.

- (3) *Standard setting organisations (SSOs) facilitate the design of interoperable products by developing and issuing technical standards and are generally regarded as pro-competitive.*

SSOs issue technical standards, such as DVD, MP3 and GSM, that help companies to design interoperable products. SSOs have pro-competitive effects because they give consumers more choices (rather than having to select one source for an entire product line), reduce the costs of producing goods, and reassure customers that compatible products will be available and supported in the future. Therefore, competition authorities, while remaining alert to the risks associated with collective actions by competitors who participate in SSOs, generally perceive competitive benefits from standard setting.

- (4) *SSOs can be ‘ambushed’ by a company that conceals relevant granted or pending patents until a standard has been set and then sues for infringement. Competition agencies can combat patent ambushes by allowing and advocating certain ex ante measures by SSOs, such as rules on disclosures, negotiations of licensing terms, and by taking enforcement action against ambushers, when necessary.*

Several competition agencies have noted the potential danger of patent ambushes. A patent ambush occurs when a member company of an SSO conceals granted or pending patents that are relevant to the standard being developed. At the same time, that company may be moulding the claims in its pending patent applications to fit the emerging standard. Once the standard has been widely adopted and implemented, switching to another standard tends to become very costly. At that point, the company reveals its hidden IP and threatens legal action for infringement. In this manner, companies might acquire dominant positions that they would not otherwise have had and, as a result, they may be able to collect royalties that are higher than they would have otherwise been. The result can be a chilling effect on further standard-setting, a resulting decline in interoperability of products, higher prices for consumers, and delays, or even a complete halt in further implementation of the ambushed standard.

- (5) *Cross-licensing agreements are not usually anticompetitive, but the uncertainty associated with pending patents can be used strategically in cross-licensing contexts in ways that harm competition.*

Cross-licensing agreements give two parties the rights to use each other's patents. Sometimes the agreements also include rights to pending patents. Furthermore, cross-licensing agreements may be grouped together to form a licensing pool for the purpose of sharing complementary technologies held by several parties. Cross-licensing agreements and licensing pools are usually efficient and pro-competitive. There are, however, a number of ways in which pending patents could be used anti-competitively in these arrangements. These include entry deterrence and patent flooding scenarios where a dominant firm files a large number of poor quality patent applications that are at the margins of the original company's patent, with the aim of either keeping a rival out of the market or forcing it to cross-license its valuable technology, often on a royalty free basis. These strategies depend on the fact that even weak pending patents can have powerful effects on competition. The victim will probably not have the time or resources to determine the validity of so many pending patents, and there is a very good chance that at least some fraction of them will be granted. Furthermore, the risk of infringing even a weak pending or granted patent can be extremely high because if its validity is upheld, the owner may obtain very substantial damages or injunctive relief.

- (6) *Competition and patent agencies have complementary roles in promoting innovation. Increased dialogue and a greater flow of information between the two types of agencies could be beneficial.*

Traditionally, the patent and competition law enforcement processes have been viewed as distinct, and therefore carried out separately. However, both processes share the goal of promoting innovation. Co-operation between competition agencies and patent offices has improved in some jurisdictions over the last few years. This has triggered increased dialogue and cross-agency activities aimed at improving information exchange and understanding. Examples include specific competition advocacy programs targeted at the IP community, the issuing of joint agency reports, establishment of monitoring networks, high level symposiums on the interface between IP and competition and secondment of experienced patent office staff

to competition agencies to assist in the preparation of sector specific reports. Another potential harmonising strategy would be reciprocal training programs carried out by officials from both agencies on the basics of the respective disciplines. More concretely, statutory changes could be sought to enable a greater flow of information between the patent offices and competition authorities.

2. Roundtable held in October 2006

- (1) *The pressure of competition can spur innovation, and so can the promise of exclusive intellectual property rights. But competition and patent protection each may have mixed effects on innovation incentives. These effects depend on circumstances and vary from one industry to another. These complications make it difficult to draw general conclusions.*

Innovation is responsible for most of the increase in material standards of living that has taken place since the industrial revolution. Some experts who have found that intellectual property rights (“IPR”) regimes are conducive to innovation conclude that patent rights should be strengthened. Others disagree and contend that patents can sometimes impede innovation, not improve it. Furthermore, while some commentators hold that competition results in greater innovation, others claim that innovation comes mostly from companies that face little competition in contestable markets. In any event, patent policy and competition policy share the same goal, to improve consumer welfare, and should be considered complementary instruments in the pursuit of that goal.

2.1 Competition and Innovation

- (2) *Similarly, neither economic theories nor empirical studies have been able to determine which degree of market concentration/market contestability faced by which types of firms produces the most innovation.*

Claims about the relationship between levels of competition and levels of innovation are complex and contradictory. One view holds that innovation is stronger in highly concentrated markets because large, dominant firms have more resources to pay for it and a greater prospect of reaping the rewards from it. The opposing view holds that

smaller firms in more competitive environments are more likely to innovate because they have more to gain and less to lose from innovation, and indeed they may face more pressure to innovate in order to survive. And in between, there is the theory that moderate levels of market competition produce the most innovation; that is, the curve describing the relationship between concentration and innovation looks like an inverted U. Empirical research has yielded diverging results regarding the two extreme positions and it has not definitively confirmed the inverted U theory, either.

Studies of this relationship must take care in assessing the strength of competition. Although there is a tendency to identify competition with concentration, whether concentration is a good proxy for competition depends on the nature of the market in question. The number of competitors is just one of several indicators. The geographical aspect must also be taken into account, as national markets may reflect specific characteristics or constraints.

A connection between competition and innovation appears when the national regulatory environment is also considered. Empirical studies done by the OECD have found a negative correlation across national economies between the level of anti-competitive product market regulation and innovation. Of the many policy levers studied, reducing anti-competitive regulation was found to be the second most powerful incentive to raise the level of business R&D spending. Creating more competitive conditions in the market had a substantially stronger effect than enhancing the protection of IPRs on this measure of innovation.

- (3) *Determining whether a merger will be likely to promote or prevent innovation requires a complex, case-specific inquiry. A merger could lead to efficiencies in research and development, yet reduced rivalry and greater market power could slow the post-merger rate of technological change.*

The parties to a proposed merger often claim that their transaction will yield savings in R&D costs and consequently spur greater investment in innovation. Although some mergers do save costs by eliminating duplicative R&D, protecting competition in R&D is also important because R&D is inherently uncertain. Innovation may be more likely if two companies remain separate and pursue different paths toward

the same objective. It is also possible, though relatively rare, that a competition agency will approve a merger that promotes efficiencies in R&D even though it substantially increases concentration and market power, as well. The influence of innovation considerations on merger analysis is highly case-specific.

- (4) *Investment in innovation requires a predictable legal system and, as a result, antitrust policy should be formulated to ensure that incentives to innovate are not unnecessarily weakened or destroyed.*

The view has been expressed by many experts that a strong and predictable intellectual property rights system is important to many disruptive innovations that create dynamic competition and provide consumers with major technological advances. Accordingly, IPR protection in several OECD countries has been strengthened during the past 20 years. Businesses generally have the freedom to determine the circumstances and terms under which they would like to license, and correspondingly refuse to license, their IP rights. When and whether competition law should be used to restrict that freedom is a controversial matter, but most agree that competition law should not be used as a bludgeon against IPRs. Such use could easily have a broad, negative effect on innovation incentives. Instead, compulsory licensing as an antitrust remedy should be approached with caution and ordered only after a careful review of the facts and in the face of a clear anticompetitive use of substantial market power.

As for the question of how to assess restraints on innovation and competition by dominant firms, there does not appear to be any general consensus about the proper framework to balance static and dynamic gains. As it is difficult to identify upfront whether conduct restricts innovation and therefore competition, it has been suggested by some commentators that ex post intervention, where the agencies can identify competitive harm, is to be favoured over ex ante intervention. On the other hand, others note that care has to be taken as to the effectiveness of ex post interventions, especially in situations where there is a risk that all effective competition will be eliminated. Otherwise interventions could come too late and there would be a risk of long lasting harm to consumers.

2.2 *Patents and Competition*

- (5) *Patents do not necessarily create monopolies or dominance; firms apply for patents in the hopes of obtaining market power but only a very few inventions constitute a true innovation leading to a new product or process. Although dominance may occasionally be related to one patent, another concern is agglomerations of patents that could close off a field of technology.*

The traditional view of patents is that they provide a positive incentive for innovation but may grant some market power to firms. There is a growing concern that patents could have a negative effect on innovation, particularly where a product is dependent on many patents and in industries based on standards where there is a substantial network effect. Patents may also have a positive effect on competition. For instance, venture capitalists recognize that for investment purposes, patents are the only important asset that many high tech companies possess.

- (6) *The relationship between patents and innovation is complex. The effects of patents on innovation vary substantially from industry to industry. It does not appear that innovation is always favoured by a stronger patent system or one in which patents are easy to obtain, particularly where there is much uncertainty as to outcomes with many inventions being patented but relatively few being valuable.*

Despite the lack of clear evidence that there is a positive relationship between patents and innovation in general, a number of countries began to strengthen their patent systems in the 1980s and have continued to do so. During the past 10 years or so, there has been a great surge in the number of patents issued. There are many other potential explanations for this surge besides the strengthening of patent rights, including an increase in the number of patentable inventions in knowledge-based economies, the deregulation and privatisation of national monopolies, and the impact of worldwide markets which inflates the number of global patents.

Patent rights have expanded into new fields, including biotechnology and genetic material. Software is patentable as are business methods in the US and in Europe. Furthermore, the rights themselves have been enhanced. In addition, some commentators take the position that

patenting standards, notably the inventive step or the non-obviousness criteria as it is sometimes called, have probably been lowered on the whole over the last 10-20 years, making it easier to obtain patents.

Many empirical studies have been conducted to analyse the effects of these changes in patent policies. Some of them have concluded that while stronger patent rights contribute to a significant increase in the number of patents granted, they have little effect on R&D expenditures, which suggests that they are not boosting innovation significantly. For the past several years, some commentators have been raising concerns that too many patents are being issued now, that their claims are too broad, and that the rights they confer on patent holders are too strong. The result, the critics claim, is that innovation is actually being discouraged because it is difficult and costly to identify the patents that might be relevant to an invention and to pay for any necessary licenses.

Another concern relates to the application by patent offices of the same criteria for patentability across industries and technologies. Many experts have also suggested that the non-obvious requirement should be strengthened, which would reduce the number of patents being issued. In fact, the US Supreme Court tightened the non-obvious criterion this year in *KSR v. Teleflex*.

- (7) *There is a great heterogeneity among firms in terms of the means they use to protect their investments in innovation.*

Patents seem to be an important factor in motivating firms to invest in R&D in only a handful of industries, such as the chemical and pharmaceutical industries. Surveys have also found that patents are important in the plastics and medical instruments sectors and sometimes in all or parts of special machinery industries. Elsewhere, patents are not considered to be very effective in protecting innovations. Indeed, some studies show that most firms rely on patents the least among various methods for protecting the returns from their inventions, whereas secrecy, lead time (being first to market) and customer sales and service are used most heavily.

- (8) *Competition authorities could collaborate with patent agencies to improve the patent process.*

There are a number of ways for competition authorities to assist IP agencies in taking steps to improve the IP granting process. These include holding interdisciplinary dialogues with patent agencies to encourage greater mutual understanding of each other's field, commissioning expert reports that study a country's patent system to determine whether and how it is causing any harm to innovation, and holding seminars or hearings in which academics, public and private sector practitioners, and industry participants come together to discuss problems and possible improvements to IP policies.

Competition authorities have a core competency in examining the effects of restraints, market conduct, and rules on consumer welfare, especially when this analysis is performed through empirical research and the use of economists. Because competition authorities have experience in an effects-based method of inquiry, they can play a meaningful role in advising patent policy makers on the impact of current laws and on recommended reforms. A view expressed by a minority of the delegates is that there is little scope for a relationship between competition authorities and patent agencies. However, in some countries, such as Canada, the US, and Denmark, the competition authorities have already conducted joint studies and programs with the national patent and IP agencies.

DYNAMIC EFFICIENCIES IN MERGER ANALYSIS *

-- June 2007 --

Executive Summary by the Secretariat

Considering the discussion at the roundtable, the delegates' submissions and the background paper, several key points emerge:

- (1) *The distinguishing feature of dynamic efficiencies is that they have recurring effects. That characteristic considerably enhances their potential impact on performance.*

Mergers sometimes create positive effects called efficiencies. Efficiencies may be static or dynamic. In general, dynamic efficiencies are synergies that enable firms to improve their performance, whether in terms of cost, quality, service, or new product development, on a potentially continuing basis. Efficiencies that enhance the ability or incentive to innovate, for example, are considered dynamic. Learning by doing, eliminating redundant research and development expenditures, and achieving economies of scale in R&D are all examples of dynamic efficiencies. Static efficiencies, in contrast, enable improvements that occur only once. Economies of scale in production, for instance, are a static efficiency. Over time, the benefits of dynamic efficiencies may outweigh those of static efficiencies even if the latter are initially larger.

- (2) *Competition authorities and courts have a more favourable view of efficiencies today than they did in the past. Incorporating static*

* OECD (2007), *Dynamic Efficiencies in Merger Analysis*, Series Roundtables on Competition Policy, No. 77, OECD, Paris. The full set of materials from this roundtable discussion is available at <http://www.oecd.org/daf/competition/EconomicEvidenceInMergers2011.pdf>

efficiencies into merger reviews in a rigorous way has proven to be difficult, though. The difficulty is even greater with respect to dynamic efficiencies.

There was a time when courts and competition enforcement agencies tended to view merger efficiencies as either irrelevant or as a basis for blocking transactions. It was believed that large combinations were likely to be harmful regardless of any arguments that could be made about their actual economic effects. A significant change in economic thinking about efficiencies began in the 1970s and it has influenced competition policy in more and more jurisdictions in recent years. Competition authorities and courts have gone from ignoring efficiencies or even being hostile toward them to appreciating their value to society. Today, efficiencies are commonly viewed as factors that favour allowing mergers rather than disallowing them.

In spite of the greater respect now given to efficiencies, instances in which they play a substantial role in merger analysis remain uncommon, particularly in court decisions. The problem is not so much that courts still think efficiency-enhancing mergers are bad for competition, but that it can be difficult to gauge the efficiencies themselves. Making a prospective determination about whether a merger will lead to static efficiencies and how such efficiencies measure up against any anti-competitive effects that the merger is expected to cause can be very challenging. Dynamic efficiencies pose an even greater measurement problem than static efficiencies because dynamic effects will occur – if at all – over several time periods and may be more abstract in nature than static effects. Courts have shown a tendency to avoid delving into such exercises whenever possible.

Several types of complications may arise when one tries to assess dynamic efficiencies. For example, “apples-to-oranges” comparison problems may come up under a standard that focuses on price effects. A merger may cause price to rise soon after consummation but it may also bring about dynamic efficiencies that have positive non-price effects (*e.g.*, benefits from new or improved products) in the longer term. That puts investigators in the awkward position of needing to compare different concepts from different time periods – and possibly from two or more different markets with different sets of consumers. This presents a complex quantification problem. How much quality

enhancement or how many new products are necessary for some customers to compensate for a given expected price increase affecting other customers? It may be difficult or even impossible to answer such questions. Other complicating factors include the uncertainty inherent in innovative activity regarding its cost, timing, and the likelihood and extent of its commercial success, difficulties in measuring innovation itself, the problem of how to conceptually transform innovation into some measure of welfare, and informational asymmetry between the merging parties and the enforcement agencies.

- (3) *Nevertheless, some commentators argue that agencies pay too much attention to short-run price competition in their merger reviews and not enough attention to dynamic efficiencies and non-price competition.*

That argument has been growing louder in recent years, showing up most recently as a recommendation by the US Antitrust Modernization Commission to give greater weight to efficiencies that promote innovation. The argument is on solid ground in the sense that it is clear that innovation is vital to economic growth and welfare. The economist Joseph Brodley has stated that innovation efficiency “provides the single most important factor in the growth of real output in the industrial world.” The OECD has likewise concluded that innovation is responsible for most of the increase in material standards of living that has taken place since the industrial revolution. It seems likely that dynamic efficiencies have a considerably greater potential to benefit consumers than static efficiencies have. Therefore, it would be desirable – in an ideal world – for dynamic efficiency considerations to feature more frequently and more prominently in merger decisions. The real-world problem is that no one has figured out a robust way to do that yet, and rather than engage in speculation, courts have tended to avoid dynamic efficiency analysis in cases where it could have been relevant.

- (4) *When competition agencies assess efficiencies, they typically consider several factors to determine how much weight to assign to them, including whether the efficiencies are quantifiable. Due to their complexity, it appears that dynamic efficiencies will rarely be quantifiable. Qualitative approaches may yield some helpful information, though.*

Virtually all OECD jurisdictions place responsibility for providing evidence of the existence and adequacy of efficiencies on the merging parties. The factors that competition agencies usually consider when assessing efficiencies claims include merger-specificity (an efficiency is merger-specific when there are no less anticompetitive but reasonable alternatives that would be likely to achieve the efficiencies other than the proposed merger), whether at least some of the benefits of the efficiencies will be passed on to consumers, and whether the efficiencies will lower fixed costs or variable costs (with a preference for variable cost reductions). Other considerations include effects in other markets and the degree to which the efficiencies are quantifiable, substantial, and timely.

The “timely” factor is especially significant with respect to dynamic efficiencies, which may take several years to bear fruit. The farther out into the future the prediction of benefit is, though, the harder it will be for parties to provide satisfactory evidence. Not only will a discount factor be applied to the claimed future benefits, but in general the farther out into the future they are expected to be, the more speculative the claims will be deemed. That leads to another consideration – verifiability. Agencies typically examine whether there is sufficient information to verify by reasonable means the claimed efficiencies’ likelihood and magnitude.

A pessimistic view appears to be warranted, at least with respect to quantification. Qualitative approaches to dynamic efficiencies may provide more useful results, however, so some agencies focus on them. The Merger Enforcement Guidelines issued by Canada’s Competition Bureau, for example, indicate that the Bureau generally examines dynamic efficiencies from a qualitative perspective. Much can be learned by studying how well the merging parties have integrated with previous merger partners, how adept the companies have been at turning R&D into successful innovations, and whether

any of their innovations are attributable to synergies from past mergers. Studying characteristics of the relevant industry – particularly what encourages innovation and whether the merger will help the combined firm to capitalise on those factors – can also be helpful. Finally, whether the merger will combine substitute or complementary technologies is a relevant factor because R&D efficiencies tend to be stronger when complementary technological assets are combined. Therefore, one way to promote the realisation of those efficiencies is to take a lighter approach toward vertical and conglomerate mergers.

- (5) *In any event, giving more attention to dynamic efficiencies in merger analysis may change the outcomes in only a small percentage of cases.*

For a variety of reasons, the fact that dynamic efficiencies have historically been largely ignored by courts and agencies may have affected relatively few mergers. One of those reasons is that merging parties have tended to ignore dynamic efficiencies, too. A number of competition agencies simply have never been confronted with a case in which the parties attempted to make an argument based on dynamic efficiencies. Several delegations expressed the view that even when parties do present such arguments, alleged efficiency gains of any type rarely have the magnitude and credibility necessary to overturn a finding that competition would otherwise be substantially lessened. Some delegations referred to empirical studies which have concluded that it is actually unlikely that most mergers enhance efficiency. Furthermore, others expressed the view that the vast majority of mergers that are likely to produce significant dynamic efficiencies do not raise substantial competitive concerns in the first place. Specifically, the safe harbours (concentration thresholds) built into most merger guidelines tend to spare mergers that combine firms with complementary as opposed to overlapping assets. It has been argued, therefore, that the number of cases in which dynamic efficiencies are impeded by regulatory intervention is limited.

INTELLECTUAL PROPERTY RIGHTS *

-- June 2004 --

Executive Summary by the Secretariat

Considering the discussion at the roundtable, the delegate submissions and the background paper, a number of key points emerge:

- (1) *Competition policy and intellectual property (IP) policy are interdependent and affect each other in important ways.*

Overzealous enforcement of competition laws against IP owners can damage the incentives to innovate that IP systems are designed to foster. On the other hand, when IP is excessively easy to obtain, it may lead to market power, to the detriment of competition and consumers. Therefore, in an “easy patentability” environment, for example, competition agencies and courts tend to compensate by using competition laws to limit the negative effects of over-patenting. Because competition law is a relatively blunt instrument for that purpose, however, it would be preferable to fix the problems from within the patent system rather than from outside it.

* OECD (2004), *Intellectual Property Rights*, Series Roundtables on Competition Policy, No. 50, OECD, Paris. The full set of materials from this roundtable discussion is available at <http://www.oecd.org/daf/competition/abuse/34306055.pdf>

- (2) *Competition agencies should not become involved in the IP-granting process itself, but nevertheless they can undertake a variety of measures to promote a greater consideration of competition issues by IP agencies during their IP approval procedures.*

For several reasons, such as a lack of relevant technical expertise and limited resources, it does not appear to be prudent for competition authorities to assume responsibilities related to the initial review of IP applications. Instead, delegates came up with a variety of ways for competition authorities to try to improve IP agencies' awareness of competition issues so that the latter agencies can begin to take any necessary steps to improve the IP approval process themselves. Among the ideas that have already been successfully implemented in some jurisdictions are opening interdisciplinary dialogs with patent agencies to foster greater mutual understanding of each other's fields, commissioning expert reports that study a nation's patenting system to determine whether and how it is causing any undue competition problems, and holding seminars or hearings in which academics, public and private sector practitioners, and industry participants come together to discuss the overlap between IP and competition policies. Whatever IP-related initiatives competition agencies may take, they should strive to limit the anticompetitive aspects of IPR while respecting its necessity.

- (3) *Competition agencies should consider publishing a set of guidelines describing how they will analyse licensing agreements and other conduct involving intellectual property.*

Issuing guidelines will help businesses to structure their IP arrangements so that they are consistent with competition laws. In addition, competition agencies themselves will benefit from the exercise of determining what their approach will be to various types of licensing conduct and other uses of IP. For example, the European Commission recently issued new guidelines on patents and licensing that explain the Commission's approach, create "safe harbours" in which businesses can be assured that they are acting within the law, and aim to create a good balance between protecting incentives to innovate and protecting competition. Similarly, the Korean Fair Trade Commission has enacted guidelines for reviewing the exercise of IP rights that include a "black list" of behaviour that can harm

competition, as well as a “white list” of exempted practices that may be shown to have either a benign or a positive effect on competition.

- (4) *When evaluating licensing arrangements, it is advisable for competition authorities to determine whether the parties’ relationships are vertical or horizontal.*

In other words, it is helpful to identify whether agreements are between competitors or between non-competitors because that information will inform the policy decision that needs to be made. Obviously, agreements between competitors are more likely to cause competitive problems and should therefore be subjected to greater scrutiny. Authorities in some jurisdictions expressly distinguish horizontal from vertical licensing agreements, as reflected in the European Commission’s new guidelines, whereas other authorities, such as the Japan Fair Trade Commission, take the structural nature of the relationship into account as part of a broader rule of reason approach.

- (5) *When evaluating grant-back obligations, it is advisable for competition authorities to distinguish between severable and non-severable improvements.*

A grant-back obligation is a provision in a licensing arrangement that requires the licensee to grant a license on any improvements it patents related to the original invention back to the licensor. Grant-backs may encourage efficient licensing by serving as a form of financing for cash-poor licensees who are willing to share some of the fruits of their research with licensors in lieu of an up-front payment. Some grant-back arrangements, however, are more likely to damage incentives to innovate and/or cause competitive problems than others, depending on whether they encompass severable improvements and whether they are exclusive. Severable improvements can be used by licensees without infringing the original invention, whereas non-severable improvements cannot be used without infringing the original invention. Because licensors already have a measure of authority over non-severable improvements, even exclusive grant-backs of non-severable innovations are relatively less likely to cause competition concerns. In contrast, grant-backs of severable improvements may damage incentives for follow-on innovation because they are not otherwise legally dependent on the licensor. They may also serve as a

means of prolonging the licensor's market power by nullifying or reducing the threat of what would otherwise become rival products. Therefore, these types of grant-backs should be subjected to relatively more scrutiny, particularly if they are exclusive.

- (6) *Patent pools, like most licensing arrangements, are usually beneficial to competition. They may, however, occasionally reduce or eliminate it. When evaluating patent pools, it is advisable for competition authorities to determine whether the pooled technologies are complementary and essential.*

The discussion reflected general agreement that patent pools have strong pro-competitive potential, particularly in the biotechnology industry. Patent pools are formed when two or more parties get together and arrange to have their patents licensed as a package. They make it easier to exploit technology by removing IP barriers, promote the integration of complementary technologies, and reduce the transaction costs of obtaining multiple licenses. They are also viewed as a cheaper and faster way to resolve some disputes than litigation is. Nevertheless, patent pools are uncommon in the biotechnology industry so far and when they do arise, they also bring some competition concerns with them. Patent pools that include only complementary and essential patents are especially less likely to cause competitive problems than other kinds of pools. If, on the other hand, a pool includes patents that are substitutes for each other, then there is a risk that the pool is actually a device for jointly selling what would otherwise be competing technologies. Moreover, if a pool includes patents that are not essential (*i.e.*, patents that have substitutes outside the pool), then it may foreclose third-party technologies because pool licensees will have already been granted access to the technology included in the pool.

- (7) *An “anticommons” problem does not seem to be a problem at present in the biotechnology industry, but the conditions that could cause one to develop do exist.*

An anticommons is a situation that is often mentioned in academic literature as a cause for concern for IP and competition policymakers. It arises when so many patents have been awarded that the difficulty of identifying which licenses are needed, and of negotiating and paying for those licenses, is so great that further innovation is

discouraged or even halted. There is, however, little evidence to suggest that the biotechnology industry currently has an anticommons problem, according to several sources such as the 2002 hearings held on competition and IP policy by the U.S. antitrust authorities and an expert report by the Swiss Federal Institute of Intellectual Property on research and patenting in biotechnology. Nevertheless, the biotech industry does have several characteristics that make it fertile ground for an anticommons, such as a proliferation of patents held by a large number of market participants and an occasional tendency by companies to accumulate IP for defensive purposes.

- (8) *There is some disagreement about whether unilateral refusals to license IP should ever be deemed anti-competitive and, if so, how to remedy them.*

In several jurisdictions, it is possible for a unilateral refusal to license IP to violate competition laws, and there are procedures for using compulsory licensing as a remedy in such cases. Typically, in those jurisdictions, the competition agency performs a dominance test and if it is met, then the agency examines whether that dominance is being used via an IP right to create conditions that might reduce competition. For example, a recent decision by the European Court of Justice allows compulsory licensing remedies when unilateral refusals to license IP prevent the emergence of a new product, are unjustified, and exclude any competition in a secondary market. Compulsory licensing can be a fast and effective means of forcing competition into a market, but it has certain disadvantages and burdens that affect innovation, competition agencies and courts. In contrast, there are very few examples of liability stemming from unilateral refusals to license IP in other countries such as the U.S., where the recent *Trinko* decision suggests that there can be no antitrust liability for such conduct and thus, no mandatory licensing, either. Of course, it is sometimes the case that refusals to license IP simply do not harm competition. For example, in its *Punto-Flex* case, the Mexican competition authority found that a unilateral refusal to license had actually increased competition, so no action was taken against the IP holder.

- (9) *Most OECD countries recognise some version of a generally accepted principle that using a patented invention for purely experimental purposes is not patent infringement.*

The experimental use exemption is especially important in the biotechnology industry because research tools, upon which other inventions and potential inventions are dependent, make up a large proportion of the patents awarded. Furthermore, the exemption may ease the effects of any eventual anticommons by clearing a path through patent thickets for at least some follow-on research. In addition, the experimental use exemption can increase competition in countries where it is interpreted liberally, as it can allow companies to work with patented technologies to determine whether they might have other useful applications, or to ensure that generic drugs are available as soon as a patent expires. If applied too readily, however, the exemption may discourage innovation by depriving inventors of the full measure of reward from their inventions.

- (10) *The nature of the biotechnology industry creates unusual challenges for IP agencies, which have been criticised for issuing biotechnology patents too freely. Too many patents, in turn, may lead to the unnecessary creation of market power and a slowdown in innovation.*

The biotechnology industry is characterised by rapid growth, complexity, comparative youth, and a tendency for its participants to attach a high degree of importance to IP. In combination, these characteristics have created an industry that collectively submits a large and quickly growing number of difficult, highly technical patent applications, which makes it harder for patent examiners to pare down broad claims and weed out all of the application that do not meet statutory patentability criteria. Approving patent applications that should have been limited or rejected could, in some cases, reduce competition by providing patent protection to undeserving technologies. It could also retard innovation by making it more difficult for inventors to do their work without infringing or paying for someone else's technology.

- (11) *The nature of the biotechnology industry also presents competition agencies with substantial challenges and implies that an extra measure of caution may be warranted when contemplating intervention.*

The discussion revealed that a number of agencies consider themselves under-equipped to analyse this technologically advanced and quickly changing industry. While some agencies have begun to take steps to recruit personnel with expertise geared toward IP and/or biotechnology, others do not have sufficient funding to do so. In either case, considering how few competition cases have been brought in the biotechnology industry at this relatively early stage, participants recognised that it is sensible for them to proceed carefully in this field, so as to ensure that their actions do not have the unintended effect of discouraging innovation. The industry's rapid development has also led to situations in which enforcement officials have found that by the time they are ready to take action, the relevant companies have changed their behaviour or their ownership.

MERGER REVIEW IN HIGH INNOVATION MARKETS *

-- June 2002 --

Executive Summary by the Secretariat

Considering the discussion at the roundtable, the written submissions and the Secretariat's issues paper, a number of key points emerge:

- (1) *In many high innovation markets competition will tend to be more “for the market” than “in the market”.*

The Secretariat's issue paper contained the following list of prominent characteristics of innovation intensive markets:

- high R&D intensity and dependence on intellectual property rights (IPRs) coupled with a closely related heavy reliance on human instead of physical capital;
- a high degree of technical complexity;
- rapid technological change and short product cycles;
- increasing returns to scale;
- important network effects (i.e. buyers are better off the more buyers there are); and
- significant compatibility and standards issues.

The stronger these features, especially the latter three, the more competition may assume a “winner take all” character. High

* OECD (2002), *Merger Review in High Innovation Markets*, Series Roundtables on Competition Policy, No. 39, OECD, Paris. The full set of materials from this roundtable discussion is available at <http://www.oecd.org/daf/competition/mergers/2492253.pdf>

innovation markets will tend to have clear market leaders. At the same time, however, the position of market leader could be highly dependent on continued superiority in innovation, and “dominant” firms may be unable over the long run to make much in the way of supra-competitive profits.

- (2) *A special analytical framework is neither necessary nor desirable for merger review in innovation intensive markets.*

The traditional merger review analytic, as described in various countries’ merger guidelines can be used to assess the competitive effects of any merger because it organises and considers all the relevant factors and is flexible concerning the weight attached to each. In any case, a special approach to mergers in high innovation markets would require a formal definition of what constitutes such a market. Since such a definition would be very difficult to clearly set out and apply, the result could be a considerable increase in legal uncertainty.

Those promoting a special framework for merger review in high innovation markets tend to argue that the standard paradigm overly concentrates on market definition, market shares and derived predictions about price changes, all the while neglecting to pay sufficient attention to how a merger might affect innovation. While that critique is worth bearing in mind, it is also true that the empirical basis for a wholesale re-think is lacking.

Following Schumpeter’s work there has been a long and somewhat inconclusive debate on the relationship between innovation and market power. That debate indicates that some rather ill-defined level of market power is good for innovation (because it increases the chances that high development costs will eventually be recovered), but outright monopoly or unassailable dominance probably is not. This indicates that mergers to monopoly or mergers strongly increasing the probability of anticompetitive exclusion should be blocked. It also indicates the need for caution in assessing claims that the benefits of expected innovation should override concerns over increased market power. Less competition post-merger could translate into less pressure to innovate.

- (3) *Although competition officials attending the roundtable shared a consensus that the traditional merger review framework should be applied to innovation intensive markets, they also emphasised that doing so requires some customisation in approach.*

The need for customisation was particularly noted as regards: defining markets and assigning market shares; assessing the significance of changes in market structure; giving proper weight to benefits consumers reap through innovation; assessing the ability of merging parties to exclude or restrict competitors; and designing appropriate remedies.

- (4) *Market definition and assigning market shares are particularly challenging tasks in rapidly changing sectors.*

The data necessary to define markets based on substitutability may be very scarce in markets featuring complex, rapidly changing products. In addition, the traditional hypothetical monopolist approach to framing the substitutability issue may require re-thinking in the case of high innovation markets. That framework focuses on what consumers would do in response to small but significant non-transitory increases in prices (i.e. the SSNIP test). Customers may, however, be much more oriented towards comparing product performance than prices in highly product differentiated, innovation intensive markets. In addition, in an attempt to gain the whole market and thereby benefit from significant economies of scale and/or network effects, the merging parties may temporarily be engaging in very low pricing. Under such conditions, there could be a kind of inverse “cellophane fallacy” leading the SSNIP test to indicate an unduly narrow instead of overly broad market.

When it comes to assigning market shares, the problems only get worse. Competition authorities recognise that potential competition must be accounted for in determining how a merger could change market shares. But in the case of rapidly changing markets it is especially difficult to identify potential competitors and to estimate their ability to increase supply and thereby restrict supra-competitive pricing.

Related to the market definition and shares issue is what to do when the “market” most affected appears to concern the research and development lying behind new products. The US has sought to address this issue with the “innovation market” concept. As described in the 1995 United States Department of Justice and Federal Trade Commission, Antitrust Guidelines for the Licensing of Intellectual Property, an innovation market consists of the R&D directed to particular new or improved goods or processes and the close substitutes for that R&D. The US acknowledges that there appear to be very few cases where innovation markets are truly pertinent, and even in those instances a more traditional approach would probably produce the same result. Nevertheless, the innovation market concept is the closest competition authorities appear to have come to devising a special approach to merger review in innovation intensive markets.

- (5) *Even if they are accurately estimated, merger induced changes in market shares are probably poorer predictors of changes in durable market power in innovation intensive markets than they are in slower changing markets. Moreover, as previously noted, the effect of changes in market power on innovation are not well understood.*

Competition authorities generally take a close look at merger induced changes in market shares in order to form a preliminary view as to the merger’s likely competitive effects. As already noted, however, in many high innovation markets, there will be a clear market leader with or without the merger under review. At the same time, however, the identity of the market leader may be liable to quick changes as a result of successful innovation by a rival. In addition, many of the products in innovation intensive markets are, except for technological obsolescence, durable and that can have a significant effect on competition. A software supplier, for example, may have something approaching the entire market, yet be effectively constrained from raising price because potential buyers could opt instead to continue using their older, somewhat less sophisticated versions of the product.

In short, in innovation intensive markets estimated changes in market shares could have limited predictive value concerning the probability of post-merger anticompetitive pricing. The same holds true when it comes to making a link between market shares and innovation. As noted above, even the relationship between market power, for which

market share is an imperfect proxy, and innovation is somewhat uncertain.

Although there may well be a need to replace market shares as an initial screen for identifying potentially anticompetitive mergers, a suitable substitute has yet to be found. In its place there may be a growing tendency to adopt a “first principles” approach whereby attention is focused from the outset on how a merger might assist the parties to improve profitability in ways harming buyers. Attractive as such an approach might seem, it leaves largely unanswered the question of how to allocate a competition authority’s limited enforcement resources.

Instead of jettisoning the traditional initial screen based on market shares, it might be better to supplement it by considering other readily ascertainable data. That could include things like the degree of recent instability of market shares, the rate of growth of the market, and estimates of the rate of technological change. The higher these indicators, the greater the probability that the merger should be cleared without an in-depth analysis.

- (6) *Due to a high degree of product differentiation and the potential for leapfrogging based on radically new technology, mergers in high innovation markets may have little potential to produce anticompetitive co-ordination. The same cannot be said concerning their potential for anticompetitive unilateral effects especially as regards mergers joining complements (including standard vertical mergers). The ability and incentive to exclude or restrict rivals deserves prime attention in reviewing mergers in high innovation markets.*

Significant economies of scale and network effects in high innovation markets could translate into significant first mover advantages that can be enhanced through mergers. Some of these are straightforward efficiency advantages that normally benefit consumers. Others may be linked to increased ability to exclude or restrict rivals. Sometimes such ability may centre on the use of intellectual property rights and standards. On other occasions it may be based on “gatekeeper” power exercised through the terms on which competitors are granted access to hard to duplicate networks such as those found in fixed line

telephony. Finally the power to exclude or restrict rivals may be created through tying or bundling of complementary goods.

In rapidly changing high innovation markets, it might be very difficult to assess how a merger affects the power to exclude or restrain rivals. It nonetheless remains of critical importance in estimating the merger's competitive effects, especially since the power to exclude or restrict would likely affect both static and dynamic efficiency, i.e. the flow of future innovations.

- (7) *In dealing with anticompetitive mergers in high innovation markets, there is good reason to question the traditional preference for a structural as opposed to a behavioural remedy. Instead, a highly customised use of behavioural remedies, sometimes accompanied with a required divestment, may be the best way to address potential competition problems in such markets.*

Monitoring compliance with behavioural remedies is resource intensive and problematic, leading to a general preference for structural remedies in merger cases. But in high innovation markets, the most important productive resources are often human capital and IPRs. A transfer of such assets is inherently difficult and, at least in the case of IPRs, may well require an ongoing relationship between transferor and transferee. The same applies to remedies granting access to hard to duplicate networks. An ongoing relationship between transferor and transferee means the competition authority's remedy must include a monitoring and supervisory function. It would be highly unwise to assume that the transferor would overlook its self-interest and willingly continue to help strengthen a competitor.

However, monitoring and supervision of either a behavioural or structural remedy might not be required for a long period of time. Rapidly changing technology could readily cause the post-merger market to evolve in an unexpected direction rendering the remedy superfluous. Such reasoning lay behind the European Commission's remedy in the Vodafone case (i.e. mandated access to Vodafone's network was limited to three years), and the remedy applied in Brazil's Telesp/Nutec case (again a three year limit to mandated access).

In addition, the intent of a merger remedy is to undo the anticompetitive effect of the transaction. That is not the same thing, especially in rapidly changing markets, as ensuring that competition will continue at pre-merger levels. Such an evolution was not guaranteed in the pre-merger situation, and lies beyond what a merger remedy should properly aim for. This too argues in favour of time limited rather than indefinite behavioural remedies.

Behavioural remedies involving creative approaches to licensing and access arrangements are not the only kind of customisation one can imagine in dealing with potentially troublesome mergers in high innovation markets. There is also the possibility of ordering joint ownership by competitors of certain critical assets, or mandating conditions making joint ownership attractive to the merging parties (e.g. Spain's Movilpago case). It may also be possible, at least in some jurisdictions; to adjust for the high level of uncertainty involved in high innovation markets by adopting contingent structural remedies. Canada has apparently done this in a number of cases where parties agreed to divest certain crown jewel assets should competition problems develop within a certain period of time after a merger.

- (8) *Several delegates advocated reviewing merger decisions to see how things actually worked out.*

It was argued that such reviews would increase understanding of how markets function and would help elucidate and spread best practice, especially as regards remedial measures for anticompetitive mergers in high innovation markets.

- (9) *The complexity of mergers in high innovation sectors may require rethinking the merger review process (i.e. strict time limits), increasing sector specific expertise in competition authorities, and taking pro-active steps to prepare for mergers in high innovation markets.*

These points were especially stressed by the Netherlands. As a result of working with various regulatory bodies, the Netherlands Competition Authority was much better prepared to expeditiously review two high profile mergers in innovation intensive sectors.

BIBLIOGRAPHY *

- Aghion, Philippe; Bloom, Nick; Blundell, Richard; Griffith, Rachel & Howitt, Peter (2005) “Competition and Innovation: An Inverted-U Relationship,” 120(2) *The Quarterly Journal of Economics* 701
- Arrow, Kenneth (1962) “Economic Welfare and the Allocation of Resources to Invention” in Nelson, Richard (ed.), *The Rate and Direction of Economic Activity*
- Bessen, James & Hunt, Robert (2004) “The Software Patent Experiment” in OECD, *Patents, Innovation and Economic Performance*, Conference Proceedings
- Bower, Joseph & Christensen, Clayton (1995) “Disruptive Technologies: Catching the Wave,” 73 *Harvard Business Review* 43
- Cohen, Wesley; Nelson, Richard & Walsh, John (2000) “Protecting Their Intellectual Assets: Appropriability Condition and Why US Manufacturing Firms Patent (Or Not),” *NBER Working Paper* No. 7552
- DeSanti, Susan & Cohen, William (2001) “Competition to Innovate: Strategies for Proper Antitrust Assessment,” in Dreyfuss, Rochelle; Zimmerman, Diane & First, Harry (eds.) *Expanding the Boundaries of Intellectual Property*, Oxford University Press
- Jaumotte, Florence & Pain, Nigel (2005) “Innovation in the Business Sector,” OECD, [ECO/WKP\(2005\)46](#), Economics Department Working Paper no. 459 at 13
- Kamien, Morton & Schwartz, Nancy (1982) *Market Structure and Innovation*

* The general bibliography provided in the beginning is followed by individual roundtable bibliographies per topic.

- Langenfeld, James (2001) “Intellectual Property and Antitrust: Steps Towards Striking a Balance” 52 *Case Western Reserve Law Review* 93
- Lemley, Mark (2002) “Intellectual Property Rights and Standard-Setting Organisations” 90 *California Law Review* 1889
- Lemley, Mark (2005) “Property, Intellectual Property and Free Riding” 82 *Texas Law Review* 1031
- Levin, Richard; Klevorick, Alan; Nelson, Richard & Winter, Sidney (1987) “Appropriating the Returns From Industrial Research and Development,” 3 *Brookings Papers on Economic Activity* 783
- Martinez, Catalina & Guellec, Dominique (2004) “Overview of Recent Changes and Comparison of Patent Regimes in the United States, Japan and Europe” in OECD, *Patents, Innovation and Economic Performance*, Conference Proceedings
- OECD (2002), [Merger Review in Emerging High Innovation Markets](#)
- OECD (2004), [Intellectual Property Rights](#)
- OECD (2006), [Competition, Patents and Innovation \(I\)](#)
- OECD (2007), [Dynamic Efficiencies in Merger Analysis](#)
- OECD (2009), [Competition, Patents and Innovation \(II\)](#)
- OECD (2010), [Pro-active Policies for Green Growth and the Market Economy](#)
- OECD (2011), [The Regulated Conduct Defence](#)
- OECD (2012), [Competition in the Digital Economy](#)
- OECD (2005) “From Ideas to Development: The Determinants of R&D and Patenting” Florence Jaumotte & Nigel Pain, OECD, [ECO/WKP\(2005\)44](#), *Economics Department Working Paper* No. 457
- Ohana, Gil; Hansen, Marc & Shah, Omar (2003) “Disclosure and Negotiation of Licensing Terms Prior to Adoption of Industry Standard: Preventing Another Patent Ambush?” 24 *European Competition Law Review* 644

Scherer, F.M. (1967) “Market Structure and Employment of Scientists and Engineers” *57 American Economic Review* 524

Scherer, F.M. & Ross, David (1990) *Industrial Market Structure and Economic Performance*, 3rd ed., Boston: Houghton Mifflin

Schumpeter, Joseph (1942) *Capitalism, Socialism, Democracy*

Symeonides, George (1996) “Innovation, Firm Size and Market Structure: Schumpeterian Hypotheses and Some New Themes,” *London School of Economics, Economics Department Working Paper No.141*

1. The Digital Economy (2012)

Erik Brynjolfsson & Adam Saunders(2010), *Wired for Innovation: How Information Technology Is Reshaping the Economy*.

Joaquín Almunia (2010), “Competition Policy for an Open and Fair Digital Economy,” Speech before the Second NEREC Research Conference on Electronic Communications (Madrid, 29 October 2010).

Karine Perset (2010), “The Economic and Social Role of Internet Intermediaries”, OECD Digital Economy Papers, No. 171, available at <http://dx.doi.org/10.1787/5kmh79zszs8vb-en>

Kenji Kushida (2011), Jonathan Murray & John Zysman, “Diffusing the Cloud: Cloud Computing and Implications for Public Policy,” *11 Journal of Industry, Competition and Trade* 209.

Martin Kenney & Bryan Pon (2011), “Structuring the Smartphone Industry: Is the Mobile Internet OS Platform the Key?” *11 Journal of Industry, Competition and Trade* 239.

Michael Baye (2008), “Market Definition and Unilateral Competitive Effects in Online Retail Markets,” *4 Journal of Competition Law and Economics* 639.

Office of Fair Trading – UK (2010), “Online Markets: Discussion Paper” (July 2010), available at www.offt.gov.uk/shared_offt/market-studies/onlinemarketsdiscussionpaper

Timothy Wu (2010), *The Master Switch: The Rise and Fall of Information Empires*.

William Kovacic (2010), “The Digital Broadband Migration and the Federal Trade Commission: Building the Competition and Consumer Protection Agency of the Future,” 8 *Journal on Telecommunications and High Technology Law* 1.

2. The Regulated Conduct Defence (2011)

Amato G. and Laudati L.L., eds (2001), *The Anticompetitive Impact of Regulation*, Edward Elgar.

Antitrust Modernization Commission (2007), *Report and Recommendations*, available at http://govinfo.library.unt.edu/amc/report_recommendation/amc_final_report.pdf

Baldwin R. and Cave M. (1999), *Understanding Regulation: Theory, Strategy, and Practice*, Oxford University Press.

Barros P.P. and Hoernig S.H. (2004), *Sectoral Regulators and the Competition Authority: Which Relationship is best?*, C.E.P.R. Discussion Papers 4541.

Breyer S. (1982), *Regulation and Its Reform*, Harvard University Press.

Bundeskartellamt (2006), Notice 38/2006 of 15 September 2006 on the imposition of fines under Section 81(4) of the German Act against Restraints of Competition Guidelines on the Method of Setting Fines.

Bush D. (2006), “*Mission Creep: Antitrust Exemptions and Immunities as Applied to Deregulated Industries*”, *Utah Law Review* 3, 761-810.

Carlton D.W. and Picker R.C. (2007), *Antitrust and Regulation*, NBER Working Paper 12902.

Chalmers D., Davies G., Monti G. (2010), *European Union Law*, 2nd ed, Cambridge University Press.

- Competition Bureau of Canada (2010), Technical Bulletin on Regulated Conduct, 27 September.
- Cooper J.C. and Kovacic W.E. (2010), “U.S. Convergence with international competition norms: Antitrust law and public restraints on competition”, 90 *Boston Univ. Law Rev.*, 1555-1610.
- de Streel A. (2003a), “The Integration of Competition Law Principles in the New European Regulatory Framework for Electronic Communications”, *World Competition* 26, 489-514.
- Delacourt J.T. and Zywicki T.J. (2005), “The FTC and State Action: Evolving Views on the Proper Role of Government”, *Antitrust Law Journal* 72(5), 1091-1112.
- Elhauge E.R. (1991), “The Scope of Antitrust Process”, *Harvard Law Review* 104, 667.
- European Commission (1998a), Notice on the application of the competition rules to the postal sector and on the assessment of certain State measures relating to postal services, O.J. [1998] C39/2.
- European Commission (1998b), Notice on the application of the competition rules to access agreements in the telecommunications sector, O.J. [1998] C 265/2.
- European Commission (2001), Communication on the services of general interest in Europe, O.J. [2001] C 17/4.
- European Commission (2002), Guidelines on market analysis and the assessment of significant market power under the Community regulatory framework for electronic communications networks and services, OJ [2002] C 165/6.
- European Commission (2006), Guidelines on the method of setting fines imposed pursuant to Article 23(2a) of Regulation No 1/2003, O.J. [2006] C 210/5.
- European Commission (2009), Impact assessment Guidelines, 15 January.

- Federal Trade Commission, Office of Policy Planning (2003), Report of the State Action Task Force.
- Fox E.M. (2008), “An Anti-Monopoly Law for China - Scaling the Walls of Government Restraints”, *Antitrust L. J.* 75, 173.
- Garzaniti L. and O’Regan M. (2010), *Telecommunications, Broadcasting and the Internet: EU Competition Law and Regulation*, 3rd ed, Sweet & Maxwell.
- Geradin D. (2004), “Limiting the Scope of Article 82 of the EC Treaty: What can the EU learn from the U.S. Supreme Court’s Judgement in *Trinko* in the wake of *Microsoft*, *IMS*, and *Deutsche Telekom*?”, *Common Market Law Rev.* 41(6), 1519-1553.
- Geradin D. and Kerf M. (2003), *Controlling Market Power in Telecommunications: Antitrust vs Sector-Specific Regulation*, Oxford University Press.
- Geradin D. and Sidak J.G. (2005), “European and American Approaches to Antitrust Remedies and the Institutional Design of Regulation in Telecommunications”, in M. Cave, S. Majumdar, I. Vogelsang (eds), *Handbook of Telecommunications Economics v. 2*, North-Holland, 518-556.
- Gerard D. (2011), “State Action and the Limits of Competition – a Global Perspective”, in I. Lianos & D. Sokol (eds), *The Limits of Antitrust: a Global Perspective*, Stanford University Press, forthcoming.
- Hovenkamp H. (2005), *Federal Antitrust Policy: The law of competition and its practice*, 3rd ed, West Group.
- International Competition Network (2002), *Advocacy and Competition policy*, Report for Naples Conference.
- International Competition Network (2004a), *Antitrust Enforcement in Regulated Sectors Working Group – General introduction*, Report to the Third Annual Conference in Seoul.
- International Competition Network (2004b), *Antitrust Enforcement in Regulated Sectors Working Group – Subgroup 1: Limits and constraints*

facing antitrust authorities intervening in regulated sectors, Report to the Third Annual Conference in Seoul.

International Competition Network (2004c), *Antitrust Enforcement in Regulated Sectors Working Group – Subgroup 2: Enforcement experience in regulated sectors*, Report to the Third Annual Conference in Seoul.

International Competition Network (2004d), *Antitrust Enforcement in Regulated Sectors Working Group – Subgroup 3: Interrelations between antitrust and regulatory authorities*, Report to the Third Annual Conference in Seoul.

International Competition Network (2005), *Antitrust Enforcement in Regulated Sectors Working Group – Subgroup 2: Interrelations between antitrust and regulatory authorities*, Report to the Fourth Annual Conference in Bonn.

Katz M.L. (2004), “Antitrust or regulation? U.S. public policy in telecommunications markets”, in P. Buiges and P. Rey (eds), *The Economics of Antitrust and Regulation in Telecommunications*, E. Elgar, 243-259.

Laffont J.J. and Tirole J. (2000), *Competition in Telecommunications*, MIT Press.

Larouche P. (2006), *Contrasting Legal Solutions and Comparability of the EU and U.S. Experiences*, TILEC Discussion Paper 28.

Monti M. (2003), *Competition and Regulation in the new Framework*, Speech 15 July, available at http://ec.europa.eu/competition/speeches/index_speeches_by_the_commissioner.html

Odudu O. (2006), *The Boundaries of EC Competition Law*, Oxford University Press.

OECD (1997), [Report on Regulatory Reform](#).

OECD (2001), [Council Recommendation on Structural Separation](#).

OECD (2003), [Competition Law and Policy in South Africa](#).

- OECD (2004), “[Non-commercial service obligations and liberalisation](#)”, N.45 in the series on Roundtables in Competition Policy.
- OECD (2005a), Bringing Competition to regulated industries, [DAF/COMP/GF\(2005\)1](#).
- OECD (2005b), The relationship between competition authorities and sectoral regulators: Issue Paper, [DAF/COMP/GF\(2005\)2](#).
- OECD (2006), Telecommunication regulatory institutional structures and responsibilities, [DSTI/ICCP/TISP\(2005\)6](#).
- OECD (2011a), [Competition Assessment Toolkit: Principles](#), 2nd version.
- OECD (2011b), [Competition Assessment Toolkit: Guidance](#), 2nd version.
- OECD (2011c) [Report on the Implementation of the Council Recommendation on Structural Separation](#).
- OFT (2004), Guidelines on Concurrent application to regulated industries, December.
- OFT (2007), Guidelines on Completing competition assessments in Impact assessment, OFT 876.
- Peltzman S. (1976). “Toward a More General Theory of Regulation,” 19 *Journal of Law & Economics* 211.
- Peltzman S. (1989), “The Economic Theory of Regulation After a Decade of Deregulation,” *Brookings Papers on Economic Activity: Microeconomics* 1.
- Shelanski H.A. (2011), “The Case for Rebalancing Antitrust and Regulation”, 109 *Mich. L. Rev.* 683-732.
- Sokol D.D. (2009), “Limiting Anti-Competitive Government Interventions That Benefit Special Interests”, *GCLC Working Paper 02/09*.
- Stigler G. (1971), “The Theory of Economic Regulation,” 2 *Bell Journal of Economic and Management Science* 3.

Temple Lang J. (2004), “European Union law rules on State measures restricting competition”, in *Competition Law Yearbook 2003*, Mentula.

Temple Lang J. (2008), “European competition policy and regulation: Differences, overlaps, and constraints”, in Leveque and Shelanski (eds), *Antitrust and Regulation in the EU and U.S.: Legal and Economic Perspectives*, Edward Elgar.

Varney C. (2010), Antitrust Immunities, Speech June 24, available at <http://www.justice.gov/atr/public/speeches/262745.htm>.

Wainwright R. and Bouquet A. (2004), “State Intervention and Action in EC Competition Law”, in Hawk B. (ed), *Fordham Corporate Law Institute: Antitrust Law Policy*.

Whish R. (2008), *Competition Law*, 6th ed, Oxford University Press.

3. Pro-active Policies for Green Growth & the Market Economy (2010)

Anderson, M.S. (2001), “Economic Instruments and Clean Water: Why Institutions and Policy Design Matter,” Organization for Economic Cooperation and Development.

Barnett, A.H. (1980), “The Pigouvian Tax Rule under Monopoly,” *American Economic Review* 70(5): 1037–41.

Bernard, A.L., C. Fischer, and A.K. Fox (2007), “Is There a Rationale for Output-Based Rebating of Environmental Levies?” *Resource and Energy Economics* 29(2): 83-101.

Baumol, W.J., and W.E. Oates (1988), *The Theory of Environmental Policy*, 2nd edition. Cambridge: Cambridge University Press.

Biglaier, G., and J.K. Horowitz (1995), “Pollution Regulation and Incentives for Pollution-Control Research.” *Journal of Economics and Management Strategy* 3(4): 663–84.

Böhringer, C., and K.E. Rosendahl. Forthcoming. Green Promotes the Dirtiest: On the Interaction between Black and Green Quotas in Energy Markets. *Journal of Regulatory Economics*.

- Bressers, H.Th.A. and K.R.D. Lulofs (2004), “Industrial Water Pollution in the Netherlands.” in *Choosing Environmental Policy: Comparing Instruments and Outcomes in the United States and Europe*, ed. Winston Harrington, Richard D. Morgenstern, and Thomas Sterner (Washington, DC: Resources for the Future), 91.
- Buchanan, J.M. (1969), “External Diseconomies, Corrective Taxes, and Market Structure.” *American Economic Review* 59(1): 174–77.
- Buen, Jorund (2006), *Danish and Norwegian Wind Industry: The Relationship between Policy Instruments, Innovation and Diffusion*. *Energy Policy* 34(18): 3887–97.
- Carlson, C., D. Burtraw, M. Cropper, and K.L. Palmer (2000), “Sulfur Dioxide Control by Electric Utilities: What are the Gains from Trade?” *Journal of Political Economy* 108(6): 1292–326.
- Cato, S. (2010), “Emission Taxes and Optimal Refunding Schemes with Endogenous Market Structure.” *Environmental and Resource Economics* 46(3): 275–80.
- De Jonghe, C., E. Delarue, R. Belmans, and W. D’haeseleer (2009), “Interactions between Measures for the Support of Electricity from Renewable Sources and CO2 Mitigation.” *Energy Policy* 37(11): 4743–52.
- Dissou, Y. (2005), “Cost-Effectiveness of the Performance Standard System to Reduce CO2 Emissions in Canada: A General Equilibrium Analysis.” *Resource and Energy Economics* 27(3): 187–207.
- Ebert, U., and O. Hagen (1998), “Pigouvian Taxes Under Imperfect Competition if Consumption Depends on Emissions.” *Environmental and Resource Economics* 12(4): 507–13.
- Ekins, P., and S. Speck (1999), “Competitiveness and Exemptions from Environmental Taxes in Europe.” *Environmental and Resource Economics* 13(4): 369–96.
- EAA (2005), “Market-Based Environmental Policy Instruments in Europe.” Technical Report No. 8/2005. European Environment Agency.

- EU. n.d. “The Common Agricultural Policy Explained.” European Commission. Agriculture and Rural Development. PowerPoint. Accessed: October 1, 2010
- Farrell, A., R. Carter, and R. Rauffer (1999), “The NOX Budget: Market-Based Control of Tropospheric Ozone in the Northeastern United States.” *Resource and Energy Economics*.
- Fell, H., and R.D. Morgenstern (2010), “Alternative Approaches to Cost Containment in a Cap-and-Trade System.” *Environmental and Resource Economics*.
- Fischer, C. (2001), “Rebating Environmental Policy.” Discussion Paper 01-22. Washington, D.C.: Resources for the Future.
- Fischer, C. (forthcoming) “Market Power and Output-Based Refunding of Environmental Policy Revenues,” *Resource and Environmental Economics*.
- Fischer, C., and R. Newell (2008), “Environmental and Technology Policies for Climate Mitigation.” *Journal of Environmental Economics and Management* 55(2): 142–62.
- Fischer, C., and L. Preonas (2010), Combining Policies for Renewable Energy: Is the Whole Less than the Sum of Its Parts.” Discussion Paper 10-19. Washington, D.C.: Resources for the Future.
- Fullerton, D., and G.E. Metcalf (2001), “Environmental Controls, Scarcity Rents, and Pre-Existing Distortions.” *Journal of Public Economics* 80(2): 249-67.
- Gersbach, H., and T. Requate (2004), “Emission Taxes and Optimal Refunding Schemes.” *Journal of Public Economics* 88(3-4): 713–25.
- Gillingham, K., R.G. Newell, and K. Palmer (2004), “Retrospective Examination of Demand-Side Energy Efficiency Policies.” Discussion Paper 04-19. Washington, D.C.: Resources for the Future. Revised in September 2004.
- Goulder, L.H., and I.W.H. Parry (2008), “Instrument Choice in Environmental Policy.” *Review of Environmental Economics and Policy* 2(2): 152–74.

- Goulder, L.H., and R.N. Stavins (2010), “Interactions between State and Federal Climate Change Policies.” In D. Fullerton and C. Wolfram (eds.), *The Design and Implementation of U.S. Climate Policy*. National Bureau of Economic Research. Forthcoming.
- Goulder, L.H., I.W.H. Parry, and D. Burtraw (1997), “Revenue-Raising versus Other Approaches to Environmental Protection: The Critical Significance of Preexisting Tax Distortion.” *RAND Journal of Economics* 28(4): 708–31.
- Goulder, L.H., M.R. Jacobsen, and A. van Benthem (2009), “Unintended Consequences from Nested State and Federal Regulations: The Case of the Pavley Greenhouse-Gas-per-Mile Limits.” Working Paper. Stanford University and University of California–San Diego. Goulder, L.H., I.W.H. Parry, R.C. Williams III, and D. Burtraw. 1999. “The Cost-Effectiveness of Alternative Instruments for Environmental Protection in a Second-Best Setting.” *Journal of Public Economics* 72(3): 329-60.
- Hahn, R.W., and R.N. Stavins (1991), “Incentive-Based Environmental Regulation: A New Era from an Old Idea?” *Ecology Law Quarterly* 18(1): 1–42.
- IEA (2008), *Deploying Renewables: Principles for Effective Policies*. Paris: Organisation for Economic Co-operation and Development and International Energy Agency.
<http://www.iea.org/w/bookshop/add.aspx?id=337> (March 5, 2010).
- Jaffe, A.B., and K. Palmer (1997), “Environmental Regulation and Innovation: A Panel Data Study.” *Review of Economics and Statistics* 79(4): 610–19.
- Johnstone, Nick, Ivan Haščič, and David Popp (2010), *Renewable Energy Policies and Technological Innovation: Evidence Based on Patent Counts*. *Environmental and Resource Economics* 45(1): 133–55.
- Kelman, S. 1981. *What Price Incentives? Economists and the Environment*. Boston: Auburn House.
- Keohane, N.O., R.L. Revesz, and R.N. Stavins (1998), “The Choice of Regulatory Instruments in Environmental Policy.” *Harvard Environmental Law Review* 22: 313-67.

- Kerr, S., and R.G. Newell (2003), “Policy-Induced Technology Adoption: Evidence from the U.S. Lead Phasedown.” *Journal of Industrial Economics* 51(3): 317–43.
- Klaassen, Ger, Asami Miketa, Katarina Larsen, and Thomas Sundqvist. (2005), The Impact of R&D on Innovation for Wind Energy in Denmark, Germany and the United Kingdom. *Ecological Economics* 54(2–3): 227–40.
- Kling and Rubin (1997), “Bankable Permits for the Control of Environmental Pollution.” *Journal of Public Economics* 64(1): 101-15.
- Levin, D (1985), “Taxation within Cournot Oligopoly.” *Journal of Public Economics* 27(3): 281–90.
- Li, Shanjun, Joshua Linn, and Elisheba Spiller (2010), Evaluating “Cash-for-Clunkers”: Program Effect on Auto Sales, Jobs and the Environment. RFF Discussion Paper 10-39 (August 2010). Washington, DC: Resources for the Future.
- Milliman, S.R., and R. Prince. 1989. “Firm Incentives to Promote Technological Change in Pollution Control.” *Journal of Environmental Economics and Management* 17(3): 247–65.
- Millock, K., and T. Sterner (2004), “NOx Emissions in France and Sweden: Advanced Fee Schemes versus Regulation.” In W. Harrington, R.D. Morgenstern, and T. Sterner (eds.), *Choosing Environmental Policy: Comparing Instruments and Outcomes in the United States and Europe*. Washington, D.C.: Resources for the Future Press, 117–32.
- Mulder, Arjen (2008), Do Economic Instruments Matter? Wind Turbine Investments in the EU(15). *Energy Economics* 30(6): 2980–91.
- Newell, R.G., and R.N. Stavins (2000), “Cost Heterogeneity and the Potential Savings from Market-Based Policies.” Discussion Paper 00-10. Washington, D.C.: Resources for the Future.
- Oates, W.E., K. Palmer, and P.R. Portney (1993), “Environmental Regulation and International Competitiveness: Thinking about the Porter Hypothesis.” Discussion Paper 94-02. Washington, D.C.: Resources for the Future.

- OECD (1972), [Recommendation on Guiding Principles Concerning International Economic Aspects of Environmental Policies](#). C(72)128.
- . (1992) “[The Polluter-Pays Principle: OECD Analyses and Recommendations](#).” OCDE/GD(92)81.
- . (1997) “The Political Economy of Environmentally Related Taxes.” Policy Brief. Organisation for Economic Co-operation and Development.
- . (1998) Improving the Environment through Reducing Subsidies: Part I: Summary and Conclusions; Part II: Analysis and Overview of Studies. OECD Publishing.
- . (2000) Improving the Environment through Reducing Subsidies: Part III: Case Studies. OECD Publishing.
- . (2007a) Instrument Mixes for Environmental Policy. OECD Publishing.
- . (2007b) “Instrument Mixes Addressing Emissions to Air of Mercury.” In Instrument Mixes for Environmental Policy. OECD Publishing.
- . n.d. Database on Instruments Used for Environmental Policy and Natural Resource Management. European Environment Agency. <http://www2.oecd.org/eoinst/queries>.
- Parry, I.W. 1995. “Pollution Taxes and Revenue Recycling.” *Journal of Environmental Economics and Management* 29(3): S64-77.
- Parry, I.W., R.C. Williams III, and L.H. Goulder. 1999. “When Can Abatement Policies Increase Welfare? The Fundamental Role of Distorted Factor Markets.” *Journal of Environmental Economics and Management* 37(1): 52-84.
- Pigou, A.C. (1932) *The Economics of Welfare*, 4th edition. London: MacMillan.
- Pizer, W.A. (2002) “Combining Price and Quantity Controls to Mitigate Global Climate Change.” *Journal of Public Economics* 85(3): 409–34.
- Porter, M.E. (1991) “America’s Green Strategy,” *Scientific American* 264(4).

- Requate, T. (1993) “Pollution Control in a Cournot Duopoly via Taxes and Permits.” *Journal of Economics* 58(3): 255–91.
- Schmalensee, R. (1994) “The Costs of Environmental Protection.” In M.B. Kotowski (ed.), *Balancing Economic Growth and Environmental Goals*. Washington, D.C.: American Council for Capital Formation, Center for Policy Research, 55–75.
- Sijm, J. (2005) “The Interaction between the EU Emissions Trading Scheme and National Energy Policies.” *Climate Policy* 5(1): 79–96.
- Simpson, R.D. (1995) “Optimal Pollution Taxes in a Cournot Duopoly.” *Environmental and Resource Economics* 6(4): 359–69.
- Söderholm, Patrik, and Ger Klaassen. (2007) *Wind Power in Europe: A Simultaneous Innovation-Diffusion Model*. *Environmental and Resource Economics* 36(2): 163–90.
- Statistics Sweden. (2003) “Environmental Subsidies: A Review of Subsidies in Sweden between 1993 and 2000.” *Statistics Sweden Rapport 2003*: 4.
- . n.d. *System of Environmental and Economic Accounts*.
http://www.scb.se/Pages/Product_38175.aspx
- Stavins, R. (2000) “Market-Based Environmental Policies” In P.R. Portney and R.N. Stavins (eds.), *Public Policies for Environmental Protection*. Washington, D.C.: Resources for the Future Press, 31–76.
- . (2003) “Experience with Market-Based Environmental Policy Instruments.” In K.-G. Mäler and J. Vincent (eds.), *Handbook of Environmental Economics, Volume I*. Amsterdam: Elsevier Science, 355–435.
- Tietenberg, T.H. (1990) “Economic Instruments for Environmental Regulation.” *Oxford Review of Economic Policy* 6(1): 17–33.
- Unger, Thomas, and Erik O. Ahlgren (2005) *Impacts of a Common Green Certificate Market on Electricity and CO₂-emission markets in the Nordic countries*. *Energy Policy* 33(16): 2152–63.
- Valsecchi, C., P. ten Brink, S. Bassi, S. Withana, M. Lewis, A. Best, F. Oosterhuis, C. Dias Soares, H. Rogers-Ganter, and T. Kaphengst. (2009)

Environmentally Harmful Subsidies: Identification and Assessment, Final report for the European Commission's DG Environment. November 2009.

Weitzman, M.L. 1974. "Prices vs. Quantities." *Review of Economic Studies* 41(4): 477–91.

4. Competition, Patents and Innovation (2009 /2006)

Béatrice Dumont & Peter Holmes (2002), "The Scope of Intellectual Property Rights and Their Interface with Competition Law and Policy: Divergent Paths to the Same Goal?," *11 Economics of Innovation & New Technology* 149

Bronwyn Hall (2005), "[Exploring the Patent Explosion](http://emlab.berkeley.edu/users/bhhall/papers/BHH_MansfieldJune04.pdf)," *30 Journal of Technology Transfer* 35, available at http://emlab.berkeley.edu/users/bhhall/papers/BHH_MansfieldJune04.pdf

Bronwyn Hall (2006), "The Global Nature of IP Protection: Discussion," in *Intellectual Property and Innovation in the Knowledge-Based Economy* (Toronto: Industry Canada), available at http://emlab.berkeley.edu/users/bhhall/papers/BHH01_Toronto_Maskudiscussion.pdf

Carl Shapiro (2004), "Patent System Reform: Economic Analysis and Critique," *19 Berkeley Technology Law Journal* 1017, available at <http://faculty.haas.berkeley.edu/shapiro/patentreform.pdf>

Chang-yang Lee (2005), "A New Perspective on Industry R&D and Market Structure," *53 Journal of Industrial Economics* 101.

Christopher Leslie (2008), "Patents of Damocles," *83 Indiana Law Journal* 133, available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1291423

Daniel Rubinfeld & John Hoven (2001), "Innovation and Antitrust Enforcement," in *Dynamic Competition and Public Policy: Technology, Innovation, and Antitrust Issues*, Jerry Ellig, ed. (Cambridge University Press), available at www.law.berkeley.edu/faculty/rubinfeldd/Profile/publications/Hoven_Rubinfeld.pdf

- David Encaoua & Roger Guesnerie (2006), “Politiques de la concurrence,” Conseil d’Analyse Économique (6 June 2006), disponible sur www.cae.gouv.fr/rapports/dl/060.pdf
- David M. Hart (2001), “Antitrust and Technological Innovation in the US: Ideas, Institutions, Decisions, and Impacts, 1890–2000,” 1286 Research Policy 1, available at http://mason.gmu.edu/~dhart/antitrust_paper.pdf
- Deborah Platt Majoras (2005), “Competition Policy, Patent Law, and Innovation,” speech before the Patent Reform Conference, Washington, D.C. (9 June 2005), available at www.ftc.gov/speeches/majoras/050609comppolicy.pdf
- Dietmar Harhoff, et al. (2007), “The Strategic Use of Patents and its Implications for Enterprise and Competition Policies,” Report ENTR/05/82 for DG Enterprise, European Commission, available at <http://www.en.inno-tec.bwl.uni-muenchen.de/research/proj/laufendeprojekte/patents/stratpat2007.pdf>
- European Commission (2008), Pharmaceutical Sector Inquiry, Executive Summary and Preliminary Report (28 November 2008), available at <http://ec.europa.eu/competition/sectors/pharmaceuticals/inquiry/index.html>
- F.M. Scherer & D. Harhoff (2000), "Policy Implications for a World with Skew-Distributed Returns to Innovation," 29 Research Policy 559-566.
- F.M. Scherer (1992), “Schumpeter and Plausible Capitalism,” 30 Journal of Economic Literature 1416.
- F.M. Scherer (2001), "The Innovation Lottery," in Rochelle Dreyfuss et al., eds., *Expanding the Boundaries of Intellectual Property* (Oxford University Press), pp. 3-21.
- F.M. Scherer (forthcoming), "Technological Innovation and Monopolization," forthcoming in Wayne Dale Collins, ed., *Issues in Competition Law and Policy* (American Bar Association), available at www.antitrustinstitute.org/recent2/431.pdf
- Giovanni Dosi, Luigi Mareng, Corrado Pasquali, and Marco Valente (2008), “Patents, Appropriability and Competition in Complex Products

- Industries: An Evolutionary Model,” draft paper (September 2008), available at www.gredeg.cnrs.fr/Documents/2008/pat_model.pdf
- Hedlund, Julie (2007), “Patents Pending: Patent Reform for the Innovation Economy,” Information Technology & Innovation Foundation Working Paper, available at: <http://ssrn.com/abstract=1004512>
- Ishtiaq Mahmood & Chang-yang Lee (2004), "Business Groups: Entry Barrier-Innovation Debate Revisited," 54 Journal of Economic Behavior and Organizations 513
- Joachim Henkel & Florian Jell (2008), “Alternative Motives to File for Patents: Defensive Publishing in the Patent System,” Working Paper, available at: <http://ssrn.com/abstract=1271242>
- Joseph Farrell and Carl Shapiro (2004), “Intellectual Property, Competition, and Information Technology,” University of California, Berkeley, Competition Policy Center Working Paper No. CPC04-45, available at <http://iber.berkeley.edu/cpc/pubs/Publications.html>
- Justin Hurwitz (2008), “The Value of Patents in Industry Standards: Avoiding License Arbitrage with Voluntary Rules,” 36 American Intellectual Property Law Association Quarterly Journal 1.
- Kazuyuki Motohashi (2003), "[Japan's Patent System and Business Innovation: Reassessing Pro-patent Policies](http://ideas.repec.org/e/pmo187.html)," Discussion paper 03020, Research Institute of Economy, Trade and Industry (RIETI), available at <http://ideas.repec.org/e/pmo187.html>
- Krishna Sankaran (2000), “Patent Flooding in the United States and Japan,” 40 IDEA 393.
- Nancy Gallini & Suzanne Scotchmer (2002), “Intellectual Property: When Is It the Best Incentive System?,” in *Innovation Policy and the Economy*, vol. 2, Adam Jaffe, Joshua Lerner & Scott Stern, eds., (Cambridge, Massachusetts: MIT Press).
- OECD (2004), [Intellectual Property Rights](#), DAF/COMP(2004)24.
- OECD (2006), [Competition, Patents and Innovation](#), DAF/COMP(2007)40.

- Tony Calabrese, Joel Baum & Brian Silverman (2000), “Canadian Biotechnology Start-Ups, 1991–1997: The Role of Incumbents’ Patents and Strategic Alliances in Controlling Competition,” 29 *Social Science Research* 503.
- U.K. Office of Fair Trading (2002), “Innovation and Competition Policy,” Economic Discussion Paper No 3, Part I: Conceptual Issues and Part 2: Case studies, (March 2002), available at www.offt.gov.uk/NR/rdonlyres/F2F29154-6575-4980-B957-CD197C4B7606/0/oft377Part1.pdf and www.offt.gov.uk/NR/rdonlyres/429D9406-2740-43E9-995F-0B226724BA2C/0/oft377Part2.pdf
- U.S. Department of Justice and U.S. Federal Trade Commission (2007), “Antitrust Enforcement and Intellectual Property Rights: Promoting Innovation and Competition,” available at www.usdoj.gov/atr/public/hearings/ip/222655.pdf and www.ftc.gov/reports/innovation/P040101PromotingInnovationandCompetitionrpt0704.pdf
- U.S. Federal Trade Commission (2003), “To Promote Innovation: The Proper Balance of Competition and Patent Law and Policy”, available at www.ftc.gov/os/2003/10/innovationrpt.pdf
- U.S. Federal Trade Commission (2003), “To Promote Innovation: The Proper Balance of Competition and Patent Law and Policy”, available at www.ftc.gov/os/2003/10/innovationrpt.pdf
- William Baumol (2002), *The Free-Market Innovation Machine* (Princeton, New Jersey, US: Princeton University Press)
- WIPO (2009), Standing Committee on the Law of Patents, 13th Session, “Standards and Patents,” (March 23 to 27), available at www.wipo.int/edocs/mdocs/scp/en/scp_13/scp_13_2.pdf

5. Dynamic Efficiencies in Merger Analysis (2007)

- A Nevo (2003), “New Products, Quality Changes, and Welfare Measures Computed from Estimated Demand Systems,” 85 *Review of Economics & Statistics* 266.

- A Petrin (2002), “Quantifying the Benefits of New Products: The Case of the Minivan,” 110 *Journal of Political Economy* 705.
- C Luescher (2004), “Efficiency Considerations in European Merger Control - Just Another Battle Ground for the European Commission, Economists and Competition Lawyers?” 25 *European Competition Law Review* 72.
- CW Conrath and NA Widnell (1999), “Efficiency Claims in Merger analysis - Hostility or Humility?” 7 *George Mason Law Rev* 685.
- F Jenny et al. (2003), “Substantive Standards for Mergers and the Role of Efficiencies” in BE Hawk (ed) *International Antitrust Law & Policy: Annual Proceedings of the Fordham Corporate Law Institute* (Juris Publishing Inc., Huntington).
- GJ Werden (1997), “An Economic Perspective on the Analysis of Merger Efficiencies,” 11 *Antitrust* 12.
- JF Brodley (1987), “The Economic Goals of Antitrust: Efficiency, Consumer Welfare, and Technological Progress,” 62 *NYU Law Review* 1020.
- JF Brodley (1996), “Proof of Efficiencies in Mergers and Joint Ventures,” 64 *Antitrust Law Journal* 575.
- M Walker (2005), “The Potential for Significant Inaccuracies in Merger Simulation Models,” 1 *Journal of Competition Law & Economics* 473.
- MAA Warner (1993), “Efficiencies and Merger Review in Canada, the European Community, and the United States: Implications for Convergence and Harmonization,” 26 *Vanderbilt Journal of Transnational Law* 1059.
- ML Katz & HA Shelanski (2007), “Mergers and Innovation,” 74 *Antitrust Law Journal* 1.
- O Williamson (1968), “Economies as an Antitrust Defense: The Welfare Tradeoffs,” 58 *American Economic Review* 217.
- OECD (1996), “Competition Policy and Efficiency Claims in Horizontal Agreements” OCDE/GD(96)65.

- OECD (2002), “Merger Review in Emerging High Innovation Markets”
DAFFE/COMP(2002)20.
- PD Camesasca (1999), “The Explicit Efficiency Defence in Merger Control:
Does it Make the Difference?” 20 *European Competition Law Review* 14.
- RJ Gilbert and SC Sunshine (1994), “Incorporating Dynamic Efficiency
Concerns in Merger Analysis: The Use of Innovation Markets,” 63
Antitrust Law Journal 569.
- WJ Kolasky and AR Dick (2003), “The Merger Guidelines and the Integration
of Efficiencies into Antitrust Review of Horizontal Mergers,” 71
Antitrust Law Journal 207.

6. Intellectual Property Rights (2004)

- Australian Law Reform Commission (2003), *Gene Patenting and Human
Health*, Issue Paper 27, available at
<http://www.austlii.edu.au/au/other/alrc/publications/issues/27/>
- Bharat Anand & Alexander Galetovic (2000), *Weak Property Rights and Holdup
in R&D*, 9 *Journal of Economics & Management Strategy* 615-642.
- Carl Shapiro (2001), *Navigating the Patent Thicket: Cross Licenses, Patent
Pools, and Standard Setting*, in 1 *Innovation Policy and the Economy*
119-1150 (Adam Jaffe, Josh Lerner, Scott Stern, eds.).
- Daniel J. Gifford (2002), *The Antitrust/Intellectual Property Interface: An
Emerging solution to an Intractable Problem*, 31 *Hofstra Law Review* 363.
- David McGowan (2001), *Innovation, Uncertainty, and Stability in Antitrust
Law*, 16 *Berkeley Technology Law Journal* 729.
- Edmund W. Kitch (1990), *Property Rights in Inventions, Writings, and Marks*,
13 *Harvard Journal of Law & Public Policy* 119.
- Edmund W. Kitch (2000), *Elementary Errors in The Economic Analysis of
Intellectual Property*, 53 *Vanderbilt Law Review* 1727, 1729-38.

- F. M. Scherer (2002), *The Economics of Human Gene Patents*, 77 *Academic Medicine* 1348.
- Federal Trade Commission (2003), *To Promote Innovation: The Proper Balance of Competition and Patent Law and Policy*, available at <http://www.ftc.gov/reports/index.htm>
- Frank H. Easterbrook (1990), *Intellectual Property Is Still Property*, 13 *Harvard Journal of Law & Public Policy* 108, 109.
- Herbert Hovenkamp et al. (2003), *Anticompetitive Settlement of Intellectual Property Disputes*, 87. 1719.
- Herbert Hovenkamp, Mark D. Janis & Mark A. Lemley (2004), *IP And Antitrust: An analysis of Antitrust Principles Applied to Intellectual Property Law*.
- John H. Barton (2002), *Antitrust Treatment of Oligopolies with Mutually Blocking Patent Portfolios*, 69 *Antitrust Law Journal* 851.
- John P. Walsh, Ashish Arora, & Wesley M. Cohen (2003), *Effects of Research Tool Patents and Licensing on Biomedical Innovation*, in *Patents in the knowledge-based Economy* 285-340 (Wesley M. Cohen and Stephen A. Merrill, eds.).
- Josh Lerner & Jean Tirole (forthcoming), *Efficient Patent Pools*, *American Economic Review*, Available online at <http://www.people.hbs.edu/jlerner/publications.html>
- Josh Lerner & Robert P. Merges (1998), *The Control of Technology Alliances: An Empirical Analysis of the Biotechnology Industry*, 46 *Journal of Industrial Economics* 125-156 (June).
- Linda R. Cohen & Roger G. Noll (2001), *Intellectual Property, Antitrust and the New Economy*, 62 *U. Pittsburgh Law Review* 453.
- Louis Kaplow (1984), *The Patent-Antitrust Intersection: A Reappraisal*, 97 *Harvard Law Review* 1813, 1818 & n.10.
- Mark R. Patterson (2000), *When is Property Intellectual? The Leveraging Problem*, 73 *S. California Law Review* 1133.

- Michael A. Carrier (2002), *Unraveling the Patent-Antitrust Paradox*, 150 U. Pennsylvania Law Review 761.
- Michael A. Heller & Rebecca S. Eisenberg (1998), *Can Patents Deter Innovation? The Anticommons in Biomedical Research*, 280 Science 698 (May 1, 1998)
- OECD (2002), *Genetic Inventions, Intellectual Property Rights and Licensing Practices: Evidence and Policies*, available at: <http://www.oecd.org/sti/sci-tech/2491084.pdf>
- OECD (2004), *Patents and Innovation: Trends and Policy Challenges*, available at <http://www.oecd.org/science/sci-tech/24508541.pdf>
- Peter C. Grindley & David J. Teece (1997), *Managing Intellectual Capital: Licensing and Cross-Licensing in Semiconductors and Electronics*, 39 California Management Review 8-41.
- R. Hewitt Pate, *Antitrust and Intellectual Property* (2003), Address before the American Intellectual Property Law Association Mid-Winter Institute (Jan. 24, 2003) at 2, at <http://www.usdoj.gov/atr/public/speeches/200701.htm>
- Richard Gilbert & Carl Shapiro (1998), *Antitrust Issues in the Licensing of Intellectual Property: The Nine No-No's Meet the Nineties*, in *Brookings Papers on Economic Activity, Microeconomics: 1997*, 323 (Martin N. Baily et al., eds.).
- Richard J. Gilbert & Willard K. Tom (2001), *Is Innovation King at the Antitrust Agencies?, The Intellectual Property Guidelines Five Years Later*, 69 *Antitrust Law Journal* 43, 47 n.8.
- Robert C. Lind & Paul Muysert (2004), *The European Commission's Draft Technology Transfer Block Exemption Regulation and Guidelines: A Significant Departure from Accepted Competition Policy Principles*, 25 *European competition law review* 181 (April).
- Robert P. Merges & Richard R. Nelson (1990), *On the Complex Economics of Patent Scope*, 90 *Columbia Law Review* 839, 860-861.

Robert P. Merges (1999), *Institutions for Intellectual Property Transactions: The Case of Patent Pools* (August) at 25, at <http://www.law.berkeley.edu/institutes/bclt/pubs/merges/pools.pdf>

Robert Pitofsky (2001), *Antitrust and Intellectual Property: Unresolved Issues at the Heart of the New Economy*, 16 Berkeley Technology Law Journal 535.

Steven C. Carlson (1999), Note, *Patent Pools and the Antitrust Dilemma*, 16 Yale Journal on Regulation 359, 379.

Valentine Korah (2002), *The Interface Between Intellectual Property and Antitrust: The European Experience*, 69 Antitrust law journal 801.

7. Merger Review in High Innovation Markets (2002)

Ahn, Sanghoon (2002) “Competition, Innovation and Productivity Growth: A Review of Theory and Evidence”, OECD Economics Department Working Papers No 317 (January)

Baer, William (1998) “Antitrust Enforcement and High Technology Markets”, prepared remarks for presentation to the American Bar Association Sections of Business Law, Litigation, and Tort and Insurance Practice, San Francisco, California, November 12, 1998 – downloaded from: <http://www.ftc.gov/speeches/other/ipat6.htm>

Balto, David and Robert Pitofsky (1998) Antitrust and high-tech industries: the new challenge”, *The Antitrust Bulletin*, Vol. 43, Nos. 3-4, (Fall-Winter), pp. 583-607

Evans, David S. and Richard Schmalensee (2001) “Some economic aspects of antitrust analysis in dynamically competitive industries”, *NBER Working Paper Series*, Working Paper 8268, downloaded from <http://www.nber.org/papers/w8262> on March 5, 2002

Fazio, Catherine and Scott Stern (2000) "Innovation Incentives Compatibility, and Expropriation as an Antitrust Remedy: The Legacy of Borland/Ashton-Tate Consent Decree", *Antitrust Law Journal*, Vol. 68, Issue 1, pp. 45 – 71

- Geroski, Paul (2002), "Competition for Markets", in Finnish Competition Authority (2002) Workshop on Market Definition - Compilation of Papers from the 4th Nordic Competition Policy Conference, Helsinki, Finland - 5 October 2001 (Helsinki: Finnish Competition Authority), pp. 62-80
- Gilbert, Richard J. and Willard K. Tom (2001) "Is innovation king at the antitrust agencies? The intellectual property guidelines five years later", *Antitrust Law Journal*, Vol. 69, Issue 1, pp. 43-86
- International Journal of Industrial Organization, Vol. 19, No. 5 (April 2001) – contains a series of articles on competition policy and innovation
- Lind, Robert C., Paul Muysert and Mike Walker (2002) "Innovation and Competition Policy", Office of Fair Trading, Economic Discussion Paper 3, A report to the Office of Fair Trading prepared by the Charles River Associates (March)
- McKenzie, Richard B. and Dwight R. Lee (2001) "How digital economics revises antitrust thinking", The Antitrust Bulletin, Vol. 46, No. 2 (Summer), pp. 253-298
- Monti, Mario (2001a) "European Competition for the 21st Century", Fordham International Law Journal, Vol. 24, No. 5, pp. 1602-1614
- Monti, Mario (2001b) "Defining the boundaries [of] competition policy in high tech sectors", Speech to the UBS Warburg Conference Europe, Barcelona, 11 September (Speech/01/375)
- Muris, Timothy (2001) "Antitrust Enforcement at the Federal Trade Commission: In a Word - Continuity", Prepared remarks [for speech] before the American Bar Association, Antitrust Section Annual Meeting, Chicago, August 7th
- Porter, Michael E. (2001) "Competition and antitrust: toward a productivity-based approach to evaluating mergers and joint ventures", The Antitrust Bulletin, Vol. XLVI, No. 4 (Winter), pp. 919-958
- Rubinfeld, Daniel L. (1998) "Antitrust enforcement in dynamic network industries", The Antitrust Bulletin, Vol. 43, Nos. 3-4, (Fall-Winter), pp. 859-882

- Salop, Steve (2000) "The first principles approach to Antitrust, Kodak, and Antitrust at the Millenium", Antitrust Law Journal, Vol. 68, Issue 1, pp. 187-202
- Sheremata, Willow A. (1998) "New" issues in competition policy raised by information technology industries", The Antitrust Bulletin, Volume 43, No.3-4 (Fall-Winter), pp.547-582
- Teece, David J. and Mary Coleman (1998) The meaning of monopoly: antitrust analysis in high-technology industries", The Antitrust Bulletin, Vol. 43, Nos. 3-4, (Fall-Winter), pp. 801-857
- Vickers, John (2001) "Competition Policy and Innovation", A speech to the International Competition Policy Conference, Oxford – 27 June
- Weller, Charles D. "Harmonizing antitrust world-wide by evolving to Michael Porter's dynamic productivity growth analysis", The Antitrust Bulletin, Vol. XLVI, No. 4 (Winter), pp. 879-917