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Assessing Unfair Pricing under China's Anti-Monopoly Law for Innovation-Intensive Industries

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Assessing Unfair Pricing under China's Anti-Monopoly Law for Innovation-Intensive Industries

*David S. Evans, Vanessa Yanhua Zhang, and Xinzhu Zhang**

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Abstract

China, like a number of other antitrust jurisdictions, has a law concerning unfair pricing. This article develops an economic framework for applying the unfair pricing law in China. The framework draws on the experience of courts and competition authorities in other jurisdictions and the writings of various commentators, particularly economists, on unfair pricing in those jurisdictions. It shows that virtually all jurisdictions have decided to consider unfair pricing claims only in exceptional circumstances, and rarely, if ever, in innovation-intensive industries. For those cases that pass this screen and receive consideration, the courts and competition authorities then, under the leading test, insist on substantial evidence that the price is significantly higher than cost *and* is unfair given the value provided to the buyer. This article shows that the exceptional circumstances screen and the rigorous unfair pricing test are motivated by a recognition, supported by substantial empirical evidence, that successful firms must have the assurance of receiving significant rewards to induce them to invest time and capital in highly risky innovation that is the source of economic growth and welfare. It concludes by showing that this approach is consistent with modern Chinese economic policy.

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I. INTRODUCTION

Article 17(1) of China's Anti-Monopoly Law (AML) prohibits dominant firms from "selling commodities at unfairly high prices or buying commodities at unfairly low prices."¹ Many jurisdictions have similar laws. The European Union, for example, prohibits dominant firms from "imposing unfair purchase or selling prices."² As a result there is an extensive body of decisions by courts and regulatory authorities that the NDRC and courts in China can draw on in considering how to shape the application of Article 17 in China. In addition, the United States, Canada, Australia and many other jurisdictions have chosen not to adopt unfair pricing laws. Their reasons for not doing so are informative as well.

Many jurisdictions have found that the thorniest issues concerning pricing by dominant firms arise in industries in which innovation is a significant driver of firm success and competitive dynamics. They have recognized that they must consider the impact of excessive pricing prohibitions on innovation. Moreover, economists have also found that determining whether prices are "too high" is a very complex question in innovation-intensive industries.

This article describes economic evidence that the NDRC and courts, as well as the parties before them, could consider in evaluating whether prices are too high under the AML and, in the case of the NDRC, to pursue an unfair pricing investigation in the first place.³ We focus on situations in which innovation has been or continues to be an important element of the dynamic competitive process. We take a broad view of innovation. It always begins with human ingenuity but often entails taking considerable personal and financial risk. Some innovative industries tend to rely on using intellectual property rights to protect their efforts. Others do not and sometimes cannot.

Our analysis synthesizes the learning of courts, competition authorities, and economists that have considered unfair pricing and its relationship to

¹ See Anti-Monopoly Law of the People's Republic of China, [2008] Presidential Order No. 68, August 30, 2007. The Chinese version is available at http://www.gov.cn/flfg/2007-08/30/content_732591.htm; an unofficial translation of the AML is available at http://www.americanbar.org/content/dam/aba/publishing/antitrust_source/Oct07_Bush10_18f.authcheckdam.pdf.

² See *Consolidated Version of the Treaty on the Functioning of the European Union* (TFEU), Article 102(a), Mar. 25, 1957, C 326/89.

³ Whenever we use the term "unfair price" in this article we are referring to an "excessive price" that is "too high." We therefore do not consider the other application of the unfair pricing law that concerns when prices are "too low" including the situation in which a firm with buyer power insists on "low prices."

innovation. It concludes that innovators take large risks *ex ante* because of the possibility for earning large rewards *ex post*. Robust involvement by antitrust regulators in adjudicating “unfair” or “excessive” prices can distort—or even eliminate—the very incentives that drive innovation to begin with. This provides sound economic justification for antitrust regulators’ traditional hesitation to interfere with the determination by markets of what constitutes a “fair” price.

We recognize that, as China develops its approach to excessive pricing cases under the AML, it will need to take into account the particular circumstances of China.⁴ Those circumstances support the application of the principles discussed above.

China has moved rapidly since the late 1970s towards relying on a decentralized market mechanism to drive the economy forward and improve the lives of consumers. Reforms in the last three decades have created a surge of entrepreneurship and innovation in various sectors in China. This includes entrepreneurs starting businesses, state-owned and private enterprises initiating innovation (encouraged and sponsored by the government), and foreign companies entering China and bringing in additional technology and know-how. This has resulted in part from policies which enable entrepreneurs to secure rewards for the risks they took by allowing them to charge what the market will bear for their product. As a result, China has been one of the most dynamic market economies in the world. Innovation by Chinese companies has grown significantly, and the Chinese economy is increasingly innovation-driven.⁵

In this environment the authorities have powerful reasons not to impose price regulation on innovation-intensive industries, since that would eliminate or reduce the incentive to innovate. In fact, recognizing this, China has, as a matter of government policy, decided to rely mainly on the market to determine prices and has, under the leadership of the NDRC, gradually eliminated most price regulation during the process of reforms. This policy is particularly critical for innovation-intensive industries for which price regulation would distort economic efficiency and eliminate or reduce the incentives to innovate, incentives which have been responsible for rapid economic growth in the past thirty years. Therefore, the specific situation in China implies that it should act consistently with international norms in rarely, if ever, using unfair pricing laws to impose price caps on

⁴ See generally, David S. Evans (2009), *Why Different Jurisdictions Do Not (and Should Not) Adopt the Same Antitrust Rules*, 10 Chi. J. Int’l L. 161.

⁵ See Juro Osawa and Paul Mozur, “The Rise of China’s Innovation Engine,” *Wall Street Journal*, January 17, 2014, available at <http://online.wsj.com/news/articles/SB10001424052702303819704579320544231396168>.

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firms in innovation-intensive industries.⁶

The article is organized as follows.

Section II describes the role of unfair pricing in competition policy in jurisdictions around the world. It shows that antitrust authorities, including all major ones, rarely if ever initiate unfair pricing cases and that the courts impose very stringent tests for the few unfair pricing cases that reach them. One of their primary concerns in adopting this approach is that regulating prices of dominant firms discourages the innovation and risk taking that is the key to economic progress.

Section III presents the economic rationales for competition authorities and courts taking this extremely cautious approach towards pricing by dominant firms. It documents the critical role of new products and technologies in economic growth. It shows that most of the firms which try to create new products and technologies fail and that limiting the rewards to the few entrepreneurs who succeed at innovation *ex post* reduces the number of entrepreneurs who make risky investments *ex ante*. Limiting the returns of the winners thereby depresses the flow of new products and technologies and slows economic progress.

Section IV summarizes the two-part test for unfair pricing that has been adopted by the EU and other jurisdictions. The first prong considers whether a price is high in the sense that it enables the seller to earn a supra-competitive profit. If it does, then the second prong considers whether a price is high relative to the value provided to the buyer. The courts and competition authorities have recognized that developing evidence for both prongs of the test entails many difficulties. This section shows that it is much more difficult to assess unfair pricing in innovation-intensive industries, thereby providing another significant reason for taking an extremely cautious approach towards unfair pricing by dominant firms in these industries.

Section V presents an economic framework for assessing excessive pricing claims in innovation-intensive industries in China. It suggests that the unfair pricing regulations⁷ adopted by the NDRC would encompass many pricing practices that are common in competitive markets and ultimately good for consumers, and that the NDRC should consider a more targeted approach similar to that used in other jurisdictions. As a special case it considers industries in which intellectual property rights are important. It argues that interventions in the context of excessive pricing concerning intellectual property should be limited to situations in which a

⁶ See Jean-Jacques Laffont and Claudia Senik-Leygonie, *Price Controls and the Economics of Institutions in China*, 1997.

⁷ Article 11 of the NDRC Anti-Price Monopoly Regulations, NDRC Order No. 7, December 29, 2010, available at http://www.gov.cn/flfg/2011-01/04/content_1777969.htm.

dominant firm uses intellectual property rights to eliminate or exclude competition, as required under Article 55 of the AML.

Section VI presents brief conclusions.

II. THE ROLE OF UNFAIR PRICING IN COMPETITION POLICY

We consider the European Union first. It has the most well developed body of law on unfair pricing by dominant firms. The law itself is more than half a century old. The European Court of Justice issued a seminal decision in 1978 that has influenced the decisional practice and court cases at the European Commission and at national competition authorities. We then turn to the United States that, at more than 120 years, has the longest history of antitrust enforcement. We conclude with a summary of a survey of 24 jurisdictions that participated in the OECD Roundtable concerning excessive pricing laws in 2011.⁸

A. European Union

The European Union has developed a notably cautious approach to unfair pricing claims. The 1957 Treaty of Rome, which is the original constitutional basis for the European Union, prohibited dominant firms from engaging in what are now termed “exclusionary abuses,” such as exclusive dealing, predatory pricing, and tying. It also prohibited them from engaging in “exploitative abuses,” such as unfair pricing and the imposition of unfair trading conditions.⁹ At the time, few countries outside of the United States, Australia, and Canada had antitrust laws.¹⁰ None of those countries prohibited unfair pricing and other exploitative abuses by dominant firms.¹¹

⁸ European Commission, “Article 102 and Excessive Prices,” in OECD Policy Roundtables: Excessive Prices (2011), 309-322, available at: <http://www.oecd.org/competition/abuse/49604207.pdf>.

⁹ *Consolidated Version of the Treaty on the Functioning of the European Union* (TFEU), Article 102(a), Mar. 25, 1957, C 326/89.

¹⁰ Xavier Vives (2009), “Competition Policy in Europe,” in Xavier Vives (ed), *Competition Policy in the EU: Fifty Years on from the Treaty of Rome*, at p. 1.

¹¹ The origin of the prohibition against unfair pricing in the Treaty is not known. The prohibition is, however, consistent with the influence of the German Ordoliberal School on the formation and early years of European Community competition law. The Ordoliberal School argued that dominant firms should be forced to behave “as if” they were competitive firms. One way of doing that, in the view of this school of thought, was to force these firms to charge the prices that competitive firms would charge. See Christian Ahlborn and Carsten Grave (2006), *Walter Eucken and Ordoliberalism: An Introduction from a Consumer Welfare Perspective*, 2 Competition Policy Int’l 197 and Michal Gal

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The European Commission decided to use its powers to regulate unfair pricing sparingly. By the early 1970s the European Commission had made it clear that “measures to halt the abuse of dominant position cannot be converted into systematic monitoring of prices.”¹² The Commission was more explicit in 1994. It indicated that:

The existence of a dominant position is not itself against the rules of competition. Consumers can suffer from a dominant firm exploiting this position, the most likely way being through prices higher than would be found if the market were subject to effective competition. However, the Commission in its decision-making practice does not normally control or condemn the high level of prices as such.¹³

Instead, the Commission said it would focus on regulating practices against competitors or new entrants taken by the dominant firm to preserve its position.¹⁴ The Commission explained its reasoning in a 2011 submission to the OECD,¹⁵

It is nonetheless important to recognise that high profits may often be the result of superior innovation and risk taking, which should not be penalised as this would work as a disincentive to innovate and invest.... [T]his does not mean that intervention against exploitative conduct should necessarily be totally excluded but it indicates that it may be better to tilt the balance in favour of addressing exclusionary conduct.

In the nearly 60 years since the adoption of a European competition law, the European Commission has held to this policy and brought few excessive pricing cases. It has reached only six formal decisions concerning excessive pricing between 1957 and 2013, barely one per decade.¹⁶ By way of

(2004), “Monopoly Pricing as an Antitrust Offense in the U.S. and the EC: Two Systems of Belief About Monopoly?” *Antitrust Bulletin* 49 343-384. The scientific understanding of how competition works to advance the economy and the role of antitrust in promoting competition (and how poor antitrust enforcement can hamper competition) has advanced considerably since the Treaty was written. The European Commission and courts, like authorities and courts in other jurisdictions, have adjusted their approach to competition issues in light of new learning.

¹² 38th Annual Report on Competition Policy (1975), paragraph 3.

¹³ XXIVth Annual Report on Competition Policy 1994.

¹⁴ *Id.*

¹⁵ European Commission, “Article 102 and Excessive Prices,” in OECD Policy Roundtables: Excessive Prices (2011), 309-322, available at: <http://www.oecd.org/competition/abuse/49604207.pdf>, at 311.

¹⁶ *Id.*, and Massimo Motta and Alexandre de Streel (2007), “Excessive Pricing in Competition Law: Never say Never,” in Arvid Fredenberg and Niklas Strand (eds), *The*

comparison, the Commission had reached 50 decisions concerning abuse of dominance by 2004.¹⁷

The European courts have also taken a skeptical view of the few unfair pricing cases that they have reviewed. According to Motta and de Streel, the European courts had rendered opinions in about 15 cases as of the mid-2000s.¹⁸ They note that most of these cases involved unfair prices that resulted in the exclusion of competitors and the remainder involved firms, such as the post office, which had legal monopolies or were dominant firms in regulated industries such as energy.¹⁹ The only case in which the European courts rendered an opinion on an excessive pricing abuse that did not have an associated exclusionary abuse *and* in which the firm did not have a legal or regulated monopoly was *United Brands*, in which the European Court of Justice found the Commission's evidence lacking.²⁰

Pros and Cons of High Prices, at 30. According to the 2011 report submitted by the Commission to OECD, Rambus is the only case considered by the Commission since 2007 that alleged excessive prices. In this case Rambus was accused of having engaged in deceptive practices during the standard setting process. This is therefore a case in which the excessive pricing abuse was accompanied by anticompetitive behavior. Rambus entered into a series of commitments with the Commission and the Commission did not render a final decision concerning whether Rambus had abused a dominant position. Commission Decision of 9.12.2009 Relating to a Proceeding under Article 102 of the Treaty on the Functioning of the European Union and Article 54 of the EEA Agreement (Case COM/38.636 - Rambus), OJ (2010) C 30/17.

¹⁷ Martin Carree, Andrea Gunster and Maarten Pieter Schinkel (2010), "European Policy 1957-2004: An Analysis of Commission Decisions," *Review of Industrial Organization*, 36 (2) at 110.

¹⁸ Motta and de Streel, op. cit. at 31. That number is greater than the number of Commission decisions because many of the cases considered by the European courts involved requests for guidance on the application of EU competition law from national courts of EU Member States.

¹⁹ As we discuss in more detail below, the focus on legal monopolies addresses situations in which a single company has government-established control over an entire industry; it does not refer to government grants of intellectual property. There is a consensus that unfair pricing law should generally not be applied to intellectual property except insofar as it is related to an exclusionary abuse.

²⁰ According to the European Commission, "The case law described above shows that the Commission and European Courts addressed the question of excessive prices only in markets with an entrenched dominant position where entry and expansion of competitors could not be expected to ensure effective competition in the foreseeable future. In *General Motors* and *Deutsche Post* there was a legal monopoly, in *Bodson* the dominant position was based on an accumulation of exclusive concessions which shielded a significant part of the market from competition, in *SACEM* a national monopoly based on network effects, in *Helsingborg* a kind of natural monopoly and in *Rambus* a dominant position based on a lock-in effect once an industry standard has been adopted. The only exception is the *United Brands* case, which concerned the market for (green) bananas, but in the end the Court did not find excessive prices in this case." European Commission, "Article 102 and Excessive Prices," in OECD Policy Roundtables: Excessive Prices, 309-322 (2011), available at:

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This review shows that the European Commission has used its discretion in rarely reaching decisions that find the dominant firms to engage in unfair pricing and that the European courts then uphold unfair pricing decisions only in special situations.

B. United States

Courts and antitrust authorities in the United States have gone even further than those of the European Union in seeking to protect market-driven innovation incentives from interference. The antitrust laws of the United States do not have any provisions that would limit the prices which firms with significant market power could charge their customers. From their inception in the late 19th century, the U.S. antitrust laws have permitted firms, including those with monopoly power, to charge prices that would enable them to earn significant, including arguably supra-competitive, profits.²¹ Writing in 1945 in *U.S. v. Alcoa*, Judge Learned Hand presented what has become the classic explanation for the U.S. approach.²²

[A] strong argument can be made that, although the result may expose the public to the evils of monopoly, the Act does not mean to condemn the resultant of those very forces which it is its prime object to foster: *finis opus coronat* [the end crowns the work]. The successful competitor, having been urged to compete, must not be turned upon when he wins.

The U.S. Supreme Court affirmed this view in its decision in *Verizon v. Trinko* in 2004. Writing for the unanimous Court, Justice Scalia noted,²³

The opportunity to charge monopoly prices—at least for a short period—is what attracts “business acumen” in the first place; it induces risk taking that produces innovation and economic growth. To safeguard the incentive to innovate, the possession of monopoly power will not be

<http://www.oecd.org/competition/abuse/49604207.pdf>, at 317. In the Rambus case, even the lock-in effect was not enough; Rambus was accused of engaging in deceptive practices which thereby distorted the competitive process of determining whether it would secure inclusion in a standard. Commission Decision of 9.12.2009 Relating to a Proceeding under Article 102 of the Treaty on the Functioning of the European Union and Article 54 of the EEA Agreement (Case COM/38.636 - Rambus), OJ (2010) C 30/17.

²¹ David S. Evans and Keith N. Hylton (2008), *The Lawful Acquisition and Exercise of Monopoly Power and its Implications for the Objectives of Antitrust*, 4 Competition Policy Int'l 203.

²² *United States v. Alcoa*, 148 F.2d 416 (2d Cir. 1945).

²³ *Verizon Communications Inc. v. Law Offices of Curtis V Trinko*, 540 U.S. 398, 407 (2004).

found unlawful unless it is accompanied by an element of anticompetitive *conduct*.

In summarizing the state of U.S. law on excessive pricing the U.S. Department of Justice in their submission to the OECD Roundtable noted,²⁴

U.S. antitrust law allows lawful monopolists, and *a fortiori* other market participants, to set their prices as high as they choose. This central tenet of U.S. antitrust law is well supported by court decisions that have held, for example, that “[a] pristine monopolist...may charge as high a rate as the market will bear” and that “[a] natural monopolist that acquired and maintained its monopoly without excluding competitors by improper means is not guilty of ‘monopolizing’ in violation of the Sherman Act...and can therefore charge any price that it wants,... for the antitrust laws are not a price-control statute or a public utility or common-carrier rate-regulation statute.”

According to the U.S. Department of Justice, “limiting the freedom to set prices may well conflict with the underlying premise of antitrust policy, i.e. promoting a robust competitive process that produces high-quality, innovative goods at low prices.”²⁵

C. Other Jurisdictions

Other jurisdictions have adopted a similar skepticism towards excessive pricing theories. Twenty-three countries plus the supra-national European Union made submissions to the OECD in 2011.²⁶ Four of those jurisdictions have competition laws that do not treat unfair pricing by dominant firms as a possible abuse: Australia, Indonesia, Mexico, and the United States. Nineteen of those jurisdictions have competition laws that do treat unfair pricing by dominant firms as a possible abuse. These include Brazil, Chile, India, Indonesia, Israel, Russia, South Korea, Switzerland, Chinese Taipei, and Turkey, as well as nine EU member states that apply EU law (Bulgaria, the Czech Republic, Denmark, Finland, Germany, Greece, Hungary, Lithuania, and the United Kingdom).

All of the countries that have excessive pricing prohibitions appear to take an “exceptional circumstances” approach based on their submissions to

²⁴ U.S. Federal Trade Commission and Antitrust Division of the U.S. Department of Justice, “Excessive Prices,” in OECD Policy Roundtables: Excessive Prices (2011), 299-308, available at: <http://www.oecd.org/competition/abuse/49604207.pdf>, at 299.

²⁵ *Id.*, p. 2.

²⁶ OECD Policy Roundtables: Excessive Prices (2011), available at: <http://www.oecd.org/competition/abuse/49604207.pdf>

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the OECD. They bring few cases, and only in special circumstances.²⁷ As the OECD notes, “In general, excessive price cases are conducted infrequently even within those jurisdictions that prohibit and enforce excessive price provisions.” Some, such as Brazil and India, have excessive pricing laws but have never brought a case.

III. THE ECONOMIC BASIS FOR THE EXCEPTIONAL CIRCUMSTANCES SCREEN FOR UNFAIR PRICING

There is a consensus among jurisdictions around the world that competition laws should rarely, if ever, limit the prices that dominant firms can charge their customers. Jurisdictions are reticent to use antitrust laws to impose price caps on dominant firms, as we have seen from the quotes in the previous section, primarily because of the impact that this would have on the incentives for individuals and firms to make the risky investments of time and capital that are the source of innovation and ultimately economic growth. They are also hesitant because the determination of prices through market forces has empirically proved more efficient than having the government set prices. All these concerns are heightened when it comes to innovation-intensive industries and especially those involving intellectual property.

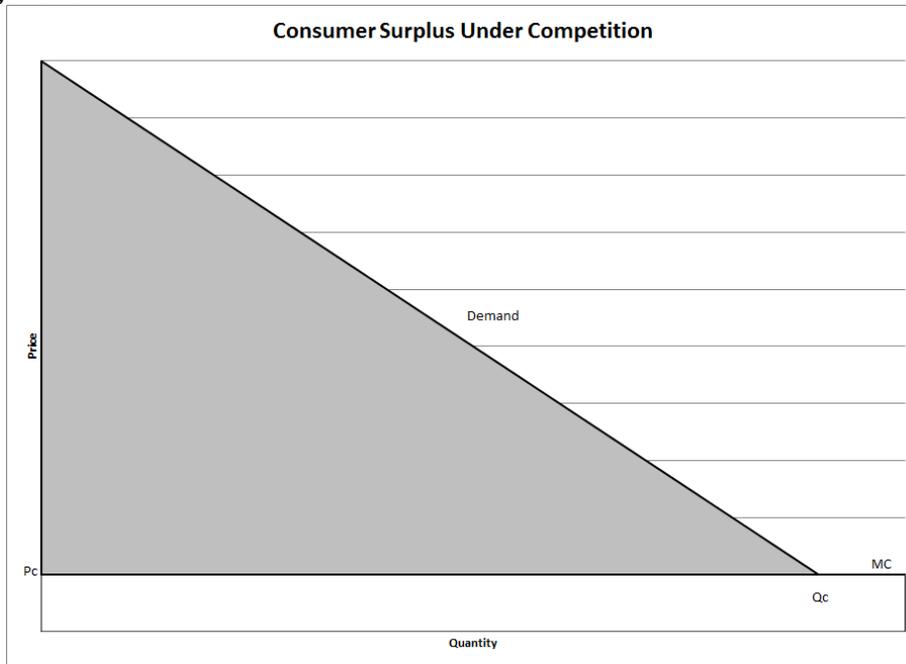
A. Consumer Welfare; Static Competition Models Are Unreliable

Economists have developed a simplified model to show how firms would set their prices in a hypothetical perfectly competitive industry and ignoring any dynamic aspects of competition. This model is sometimes cited as part of a justification for regulating the prices of dominant firms. It is therefore useful to explain this model and the assumptions behind it. As shown below, the model does not account for risk taking, innovation, and other dynamic behavior, which has rightly led competition authorities and courts to recognize that this elementary model does not provide a sound basis for the application of prohibitions on “excessive” or “unreasonably high” prices.

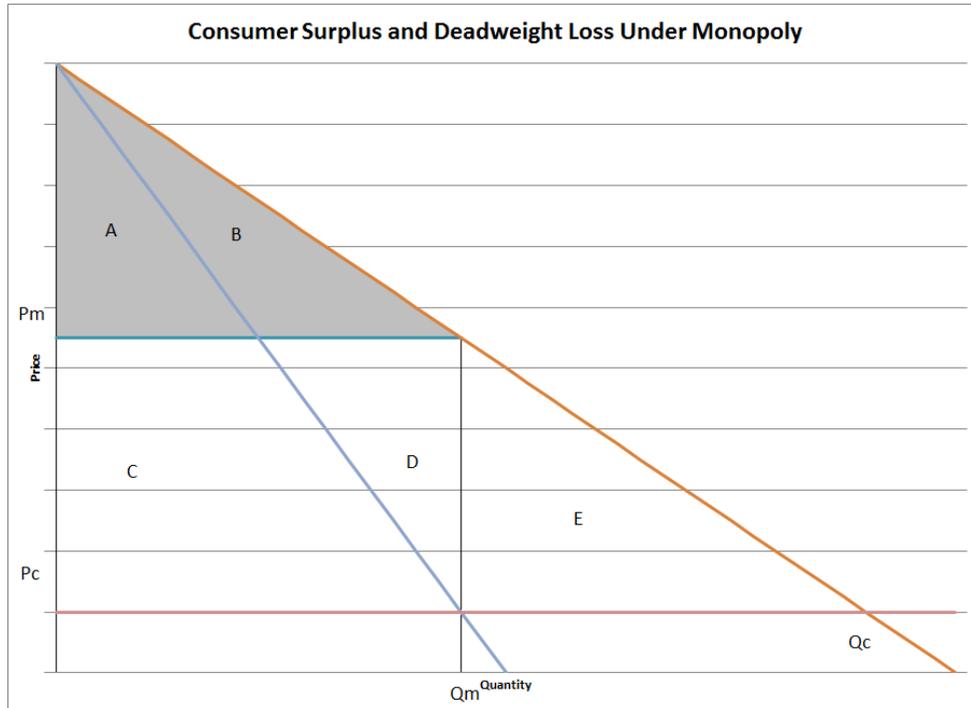
²⁷ For example, the competition authority in the UK, much like the European Commission, has had a policy of not pursuing excessive pricing cases except when the excessive pricing is associated with an exclusionary practice. See, for example, J Vickers, “How Does the Prohibition of Abuse of Dominance Fit with the Rest of Competition Policy?” (6 June 2003), available at: <http://www.ofc.gov.uk/NR/rdonlyres/660C15CB-6F9E-41F5-A370-61F6EE022CB3/0/spe0303.pdf>, (July 22, 2004).

According to the basic textbook model, shown in Figure 1, consumers get the greatest welfare when firms expand output to the point where price equals the marginal cost of production including a competitive rate of return. Welfare is measured by the large shaded triangle. In this basic model, competition generally drives firms to produce and price at that level.

Figure 1.



Firms with significant market power, however, can earn more profit by charging higher prices and producing less output. A monopoly, for example, would increase price and reduce output as shown in Figure 2. As a result consumers pay more for a smaller amount of output (and therefore lose the area shown by C+D) and do not get $Q_c - Q_M$ units of output that they valued by the amount shown by E. Under this simplified model consumers lose the areas C+D+E.

Figure 2

This textbook model of competition provides an obvious although highly simplistic definition of an excessive price. It would imply that any price greater than marginal cost—the competitive level that maximizes consumer welfare—is excessive and unfair to consumers.²⁸ If we could force dominant firms to lower price to marginal cost then consumers would get more welfare in this simple static model—at least on the blackboard.

Although this simplified model is useful for teaching basic concepts, it is not properly applied to determine if prices are “excessive.” That is because the emphasis on marginal cost fails to account for the critical reality that firms assume costs and risks in jumping into the competitive fray. Profits need to reward them for doing so and compensate for the fixed costs of setting up a business. Eliminating those profits takes away the incentives that firms have for participating in a battle that most will not survive as we document below. Market prices, moreover, are signals that

²⁸ A slightly more complex model would recognize that there are fixed costs and that the marginal firm must get a price at least equal to its average total cost inclusive of a competitive rate of return.

other firms consider when deciding whether to enter—either because there is demand or because they can operate more efficiently than existing firms. Competition authorities have resisted employing a competition policy that would set prices through marginal-cost pricing for the same reasons countries globally, including China, have moved from government to market-based price setting for virtually all goods and services.

B. *Innovation, Rewards, and Economic Progress*

There is considerable empirical economic support for this policy. First, there is substantial empirical evidence that economic progress and long-term social welfare are driven by innovation that leads to the creation of new products and services, new technologies that facilitate the introduction of new products and services, and the creation of more efficient ways to produce goods and services.²⁹ Second, there is substantial empirical evidence that this innovation results from dynamic competition in which most entrepreneurs, inventors and firms that try their hands at innovation fail to succeed.³⁰ Third, there is substantial empirical evidence that the process of innovation and dynamic competition that results in new products and technologies is driven by a reward structure in which the few that succeed get highly compensated and the preponderance that do not succeed get little, if anything.³¹

These three empirical findings have an immediate implication for government policies towards prices in innovation-intensive industries.³² Interventions that reduce the prices innovators may charge for their new inventions have the effect of reducing the incentives to undertake risky investments in innovation. These interventions thereby slow economic progress and reduce long-term social welfare.

²⁹ For a general discussion of the evidence on innovation and economic growth see Robert J. Barro and Xavier Sala-i-Martin (2004), *Economic Growth* (2nd ed.) at chapters 6-7.

³⁰ Gerben van der Panne, Cees van Beers, and Alfred Kleinknecht (2003), “Success and Failure of Innovation: A Literature Review,” *International Journal of Innovation Management*, 7(3), 309-338.

³¹ F.M. Scherer and Dietmar Harhoff (2000), “Technology Policy for a World of Skew-Distributed Outcomes,” *Research Policy*, 29, 559-566.

³² Although we focus on innovation-intensive industries these principles apply broadly to market economies since innovation can potentially disrupt any industry and in fact might be most likely to disrupt industries in which innovation is lethargic. Modern communication innovations such as IMS, SMS, and micro-blogging have, for example, created value by disrupting postal monopolies and monopoly or dominant firms in basic land-line telecommunications.

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1. New Products

The most well developed empirical work on the value of innovation concerns new products. We begin with the theory. Assume that a firm creates a new product. Consider the extreme case in which the firm has a monopoly over the new product. Figure 2, above, shows the standard monopoly pricing model in which, to maximize profit, the firm produces out to the point where marginal revenue equals marginal cost and charges what the market will bear for this amount. Before the firm introduced the new product, consumers obviously were not obtaining any consumer welfare from it. After the firm introduces the new product, consumers obtain consumer surplus shown by the difference between what they are willing to pay and the price the monopoly charges. That area is shaded in the diagram.

Economists have done many studies of the value generated by new products. These studies take into account the fact that new products substitute in part for existing products. They calculate the net increase in consumer welfare after accounting for this substitution.

The classic study in this area examined the value created when General Mills, which had produced an oat-based cereal called Cheerios since 1941, introduced Apple Cinnamon Cheerios in 1988. As the name suggests, General Mills added apple and cinnamon flavoring to their basic cereal. Professor Jerry Hausman found through a careful econometric study that this “new product” generated \$66.8 million per year of additional consumer value.³³ Subsequent studies have found that other new products generate significant consumer value.³⁴

³³ Jerry A. Hausman, “Valuation of New Goods Under Perfect and Imperfect Competition,” in *The Economics of New Goods*, ed. Timothy F. Bresnahan and Robert J. Gordon (Chicago: University of Chicago Press, 1996).

³⁴ Christian Broda and David E. Weinstein (2006), “Globalization and the Gains from Variety,” *Quarterly Journal of Economics*, 121(2) 541-585 (the value to U.S. consumers of the expanded import varieties between 1972 and 2001 was 2.6 percent of U.S. GDP); Abe Dunn (2012), “Drug Innovations and Welfare Measures Computed from Market Demand: The Case of Anti-cholesterol Drugs,” *American Economic Journal: Applied Economics*, 4(3) 167-189 (the introduction of new varieties of anti-cholesterol drugs between 1996 and 2007 in the U.S. led to a 27 percent drop in a constant-quality price index); Matthew Gentzkow (2007), “Valuing New Goods in a Model with Complementarities: Online Newspapers,” *American Economic Review*, 97(3) 713-744 (The existence of the online newspaper post.com generates \$45 million per year in consumer surplus); Austan Goolsbee and Peter J. Klenow (2006), “Valuing Consumer Products by the Time Spent Using Them: An Application to the Internet,” *American Economic Review*, 96(2) 108-113 (the consumer surplus from the Internet is equal to 2% of annual full-income in the U.S.); Austan Goolsbee and Amil Petrin (2004), “The Consumer Gains from Direct Broadcast Satellites and the Competition with Cable TV,” *Econometrica*, 72(2) 351-381 (in the U.S., direct broadcast satellites generate welfare gains of \$2.5 billion per year for consumers who

These empirical studies confirm and quantify what is obvious from our experience with innovation in our daily lives. New products and services such as smart mobile phones, micro-blogging, e-commerce, and search engines have provided tremendous value. In China, these new products and services in information communications and technology industries have promoted industrial upgrading and transformation, helping China's industrial structure change from labor-intensive to knowledge-intensive.³⁵

New technologies are extremely valuable because they facilitate the introduction of many new products. Consider mobile communication technologies. Those technologies have supported the creation of a vast array of projects ranging from the most basic mobile handset working on a 2G network to SMS communication methods, such as weibo, to mobile payments. Moreover, these technologies were the foundation of the hundreds of thousands of applications, many of which are themselves new products, that run on smart phones. China's Ministry of Industry and Information Technology (MIIT) found that in the first three years of its introduction the 3G technology standard used for smart mobile phones in China had created 1.23 million new jobs and RMB 211 billion in direct GDP growth.³⁶ Many other technologies, ranging from the Internet in recent

get television using them and an additional welfare gain of \$3 billion per year for cable TV subscribers who benefit from reduced prices due to competition from direct broadcast satellites); Jerry Hausman, "Mobile Telephone," in Martin E. Cave, Sumit K. Majumdar, and Ingo Vogelsang (2002), *Handbook of Telecommunications Economics, Vol. 1: Structure, Regulation, and Competition* (mobile phones in the U.S. generated consumer surplus of \$24.2 to \$49.8 billion in 1994 and \$52.8 to \$111 billion in 1999); Donghun Kim (2004), "Estimation of the Effects of New Brands on Incumbents: Profits and Consumer Welfare: The U.S. Processed Cheese Market Case," *Review of Industrial Organization*, 25(3) 275-293 (the introduction of three new brands of low-fat cheese in the U.S. between 1988 and 1992 led to an increase in consumer welfare of \$43.2 million in 1992); Ariel Pakes (2003), "A Reconsideration of Hedonic Price Indexes With An Application to PC's," *American Economic Review*, 93(5) 1578-1614 (if the U.S. price index for PC's is adjusted to reflect welfare gains from new model introductions, then U.S. PC prices declined by 15-19 percent per year over 1995-1999, rather than remaining basically the same); Amil Petrin (2002), "Quantifying the Benefits of New Products: The Case of the Minivan," *Journal of Political Economy*, 110(4) 705-729 (the introduction of minivans in the U.S. increased consumer welfare by a total of \$2.8 billion over 1984-1988); Manuel Trajtenberg (1989), "The Welfare Analysis of Product Innovations, with an Application to Computed Tomography Scanners," *Journal of Political Economy*, 97(2) 444-479 (the welfare gains for U.S. customers that bought CAT Scanners in 1974 from having the 1974 choice set rather than the 1973 set was \$9.8 billion in 1982 US\$).

³⁵ Ping Li, Feitao Jiang, and Hongwei Wang (June 2013), "Industrial Upgrading and Innovation in the Information Age," *Journal of Engineering Studies*, Vol. 5(2).

³⁶ MIIT Press Release, MIIT Explains the Issuance of 4G Operation Licenses, December 4, 2013, available at www.miit.gov.cn/n11293472/n11293832/n11293907/n11368223/15748225.html.

times to electricity long ago, have similarly provided the foundation for the creation of many valuable new products.

Let us return, though, to the simple new product example. One could argue that the monopoly is short-changing consumers because it is not producing at marginal cost and therefore imposing the losses shown in Figure 2. That comparison is wrong for two reasons. First, the economically correct comparison is between the welfare consumers had before the introduction of the new product and afterwards. Their welfare has improved by the shaded area. Second, taking away the reward for innovation would reduce the amount of investment and effort that go into innovation and thereby reduce future benefits consumers would receive from new products and technologies.

2. Success and Failure Rates for Innovation

A number of studies done in the United States show that creating new products, technologies, and other innovations, is similar to a lottery in terms of the reward structure. Innovators, entrepreneurs and firms compete in races to create new categories of products and services for consumers. Almost all of the participants in the competitive process fail. The few that survive often obtain significant rewards—the crown described by Judge Hand—for their efforts. Almost everyone else loses the capital they have invested as well as the opportunity cost of their time.

Gort and Klepper, for example, examined the development of industries for 46 new products in the United States.³⁷ They found that dozens (or in a couple of cases, hundreds) of firms entered these industries in the early years. Many of these firms imitated early innovators. Over time many of these firms exited the industries. The competitive process revealed the firms that could operate most efficiently and provide the greatest benefits to consumers.

Other studies have documented that most entrepreneurs that start businesses fail within four years. Recent studies for the United States have found that about half of all new businesses, weighted by employment, exit less than 4-5 years after entry.³⁸ Studies for other countries have reached

³⁷ Michael Gort and Steven Klepper (1982), “Time Paths in the Diffusion of Product Innovations,” *Economic Journal*, 92(367) 630-653.

³⁸ John Haltiwanger, Ron S. Jarmin, and Javier Miranda (2013), “Who Creates Jobs? Small Versus Large Versus Young,” *Review of Economics and Statistics*, 95(2) 347-361, at 358 (“...the cumulative employment weighted exit rate derived from figure 5 implies that about 47% of the jobs created by start-ups are eliminated by firm exits in the first five years.”). Note that this figure is employment-weighted. Since smaller firms are more likely to exit, the unweighted exit rate would be higher. Another study reported that only 44 percent of new businesses still existed after 4 years. Amy E. Knaup (2005), “Survival and

similar conclusions. A study of manufacturing startups in the Netherlands found that less than 70 percent had survived after three years.³⁹ A study of startups in the western states of Germany found that less than 65 percent survived after two years and that less than 50 percent had survived after five years.⁴⁰ Another study of startups in the German state of Baden-Württemberg found that 20 percent failed after two years and 40 percent had failed after five years.⁴¹

Hall and Woodward, to take another example, studied the experience of entrepreneurs who received venture funding between 1987 and 2008 in the United States. Venture capital firms invest in very few of the proposals that are presented to them.⁴² As a result, the entrepreneurs considered by these authors have already gone through a rigorous screening process. They found that over a third of ventures exited with a value of zero within five years. About 75 percent of entrepreneurs that exited before the end of their data (and about 50 percent of all entrepreneurs) received nothing from their efforts.⁴³ Figure 3 shows the distribution of exit values received by entrepreneurs. It reflects the common finding concerning innovation: the returns are highly skewed with most innovations earning nothing and a few earning a large amount.

Some studies have examined the success of R&D efforts by

Longevity in the Business Employment Dynamics Data,” *Monthly Labor Review*, 128(5), at 51-52.

³⁹ David Audertsch, Patrick Houweling and Roy Thurik (2000), “Firm Survival in the Netherlands,” *Review of Industrial Organization*, 16(1), at p. 5. The authors note that their data sample under-samples the smallest firms, and that this means that that survival times will be biased upwards. Id, at p. 3.

⁴⁰ Michael Fritsch, Udo Brixly and Oliver Falck (2006), “The Effect of Industry, Region, and Time on New Business Survival: A Multi-Dimensional Analysis,” *Review of Industrial Organization*, 28(3), at pp. 292-295. This study also found that manufacturing startups failed less frequently during the first few years than service startups, which may explain the lower survival rates than in the Dutch study.

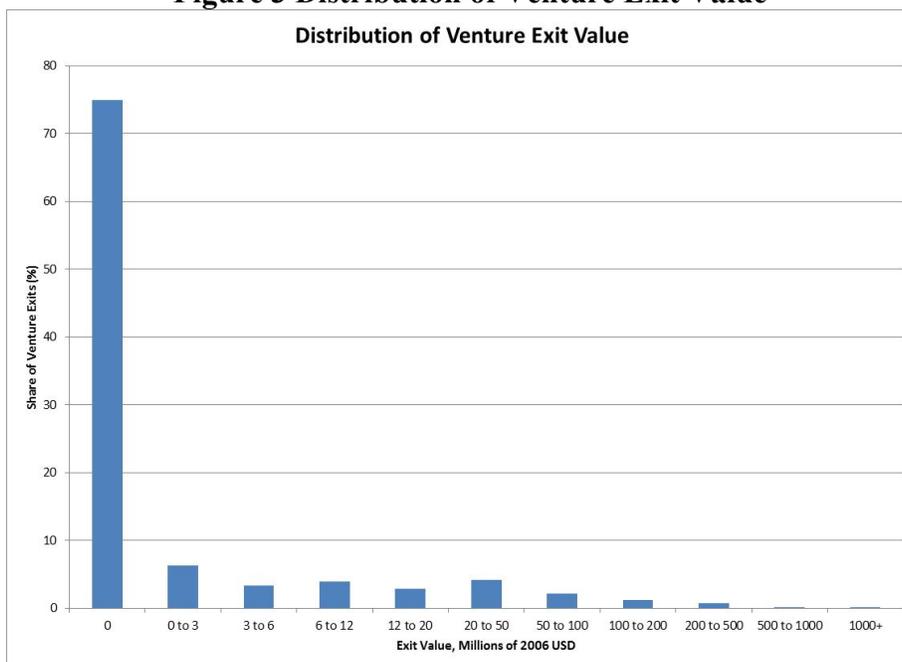
⁴¹ Harald Strotmann (2007), “Entrepreneurial Survival,” *Small Business Economics*, 28(1), at pp. 91-92.

⁴² Dixon (1989) surveyed UK venture capital funds and reported that 3.4 percent of proposals were funded. Robert Dixon (1989), “Venture Capitalists and Investment Appraisal,” *National Westminster Bank Quarterly Review*, 2-21. More recently, a Forbes column reported that venture capitalists finance 1-2 percent of proposals. Dileep Rao, “Why 99.95% Of Entrepreneurs Should Stop Wasting Time Seeking Venture Capital,” *Forbes.com*, July 22, 2013, available at <http://www.forbes.com/sites/dileeprao/2013/07/22/why-99-95-of-entrepreneurs-should-stop-wasting-time-seeking-venture-capital/>.

⁴³ These figures are likely to understate the rate of entrepreneurial failure for two reasons. First, at least some of the firms which had not exited with a zero value by the end of their data would have done so in the following years. Second, some of the ventures which exited with a positive value would have returned less than the amount invested in the startup, for an overall negative return.

pharmaceutical companies. These companies are interesting because they invest in large numbers of discrete chemical compounds every year. It is therefore possible to track the success of these bets.⁴⁴ In the United States, a chemical compound being investigated for possible medical use must undergo a series of tests before being approved.⁴⁵ In Phase I, researchers test the compound in a small group of people for the first time to evaluate its safety, determine a safe dosage range, and identify side effects. In Phase

Figure 3 Distribution of Venture Exit Value



Source: Robert E. Hall and Susan E. Woodward, “The Burden of the Nondiversifiable Risk of Entrepreneurship,” *American Economic Review*, 100(3) 1163-1194.

II, the compound is given to a larger group of people to see if it is effective and to further evaluate its safety. In Phase III, the compound is given to large groups of people to confirm its effectiveness, monitor side effects, compare it to commonly used treatments, and collect information that will allow it to be used safely. A drug can be rejected in any phase, and can only

⁴⁴ See Henry Grabowski, John Vernon and Joseph DiMasi (2002), “Returns for 1990s New Drug Introductions,” *PharmacoEconomics*, 20(3); Henry Grabowski and John Vernon (1994), “Returns to R&D on new drug introductions in the 1980s,” *Journal of Health Economics*, 13.

⁴⁵ U.S. National Library of Medicine, “FAQ: ClinicalTrials.gov – Clinical Trial Phases,” available at <http://www.nlm.nih.gov/services/ctphases.html>.

be approved for sale after passing Phase III.⁴⁶ One study tracking investigational compound success rates found only 71 percent of compounds that began phase I testing advanced to Phase II testing, only 31.4 percent of those that began Phase I testing advanced to Phase III testing, and only 15.2 percent of those that began Phase I testing were approved for marketing.⁴⁷ Another study found an even lower rate, with only 11 percent of chemicals beginning Phase I receiving approval.⁴⁸ Moreover, only a small fraction of new chemical compounds in which pharmaceutical companies invest research and development expenditures even make it to Phase I.

Finally, economists have examined the economic value of patents beginning with the classic work by Ariel Pakes.⁴⁹ Companies and individuals spend money on research and development to generate ideas that they patent. These studies find that few patents provide a significant return. Pakes' 1986 study found that the median patent in France was valued at less than US\$550 over its lifetime, and that the top 5 percent of patents accounted for more than 45 percent of total patent value. In the UK, the median patent was valued at just over US\$1,500 over its lifetime and the top 5 percent of patents accounted for more than 35 percent of total value. In Germany, the median patent was valued at just over US\$6,250 and the top 5 percent of patents accounted for over 30 percent of patent value. These results show that the returns to patents are highly skewed.

Individuals and firms would not willingly assume the risks of investing

⁴⁶ After the drug has been marketed, it may be subject to phase IV, in which further studies are done to gather information on the drug's effect in various populations and any side-effects associated with long-term use. U.S. National Library of Medicine, "FAQ: ClinicalTrials.gov – Clinical Trial Phases," available at <http://www.nlm.nih.gov/services/ctphases.html>.

⁴⁷ Joseph DiMasi, Ronald Hansen and Henry Grabowski (2003), "The Price of Innovation: New Estimates of Drug Development Costs," *Journal of Health Economics*, 22 at pp. 158, 162.

⁴⁸ Ismail Kola and John Landis (2004), "Can the Pharmaceutical Industry Reduce Attrition Rates," *Nature Reviews: Drug Discovery*, 3, 711-715, at p. 712.

⁴⁹ Ariel Pakes (1986), "Patents as Options: Some Estimates of the Value of Holding European Patent Stocks," *Econometrica*, 54(4) 755-784. See also Mark Schankerman and Ariel Pakes (1986), "Estimates of the Value of Patent Rights in European Countries During the Post-1950 Period," *Economic Journal*, 96, 1052-1076, at pp. 1067-1068; Mark Schankerman (1998), "How Valuable Is Patent Protection? Estimates by Technology Field," *RAND Journal of Economics*, 29(1), 77-107 at pp. 79, 93-94; Dietmar Harhoff, Francis Narin, F.M. Scherer, and Katrin Vopel (1999), "Citation Frequency and the Value of Patented Inventions," *Review of Economics and Statistics*, 81(3), 511-515, at p. 512; Dietmar Harhoff, Frederic M. Scherer, and Katrin Vopel (2003), "Exploring the Tail of Patented Invention Value Distributions," in Ove Granstrand (ed.), *Economics, Law, and Intellectual Property: Seeking Strategies for Research and Teaching in a Developing Field*, Boston: Kluwer, 279-310, at p. 302.

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in attempting to develop new products, services or technologies (or less costly means of providing existing products or services) if they believed that the prices they could charge for successful innovations would be subjected to artificial caps.

Table 1: Percentiles and Lorenz Curve Coefficients from the Distribution of Realized Patent Values

Percentile	France		United Kingdom		Germany	
	Value (USD)	Cumulative Value Share	Value (USD)	Cumulative Value Share	Value (USD)	Cumulative Value Share
25 th	75.23	0.544%	355.55	0.544%	1,999.60	2.249%
50 th	533.96	1.833%	1,516.84	3.247%	6,252.93	7.341%
75 th	3,731.35	8.087%	7,947.55	16.369%	19,576.26	25.288%
85 th	10,292.06	19.575%	15,357.09	31.721%	32,428.14	41.001%
90 th	17,423.11	31.261%	22,206.21	44.257%	44,241.87	52.672%
95 th	31,609.59	52.461%	34,740.07	62.960%	65,753.61	69.223%
97 th	42,905.78	65.514%	43,889.95	73.640%	78,299.01	78.348%
98 th	51,215.84	73.729%	51,277.22	80.072%	94,842.63	83.800%
99 th	66,515.40	84.011%	65,075.08	87.858%	118,354.78	90.330%
Maximum	259,829.27	-	374,028.70	-	419,217.55	-
Mean	5,631.03	-	7,357.05	-	16,169.48	-

Source: Ariel Pakes (1986), "Patents as Options: Some Estimates of the Value of Holding European Patent Stocks," *Econometrica*, 54(4) 755-784.

3. The Role of Rewards in Stimulating Investment and Effort at Innovation

Investing time and effort in innovation is therefore a gamble. To be sure, those engaged in innovation are not literally playing a game of chance. Their odds of success increase if, through their efforts, they can come up with a clever idea that results in new technologies, products, or savings in deploying or making existing technologies or products. Nevertheless, the analogy to a lottery helps explain the relationship between risk and reward.

Consider a lottery in which people pay 1 Yuan for an entry. Only one person wins. If the lottery sells 10 million tickets then, in order for a person to have fair odds when they purchase a ticket, the reward must be 10 million Yuan.⁵⁰ After the lottery selects a winner, 9,999,999 people will have spent a Yuan each with nothing in return. They have each lost 1 Yuan. One person wins 10 million Yuan and makes a profit of 9,999,999 Yuan after deducting the cost of the ticket.

This lottery example shows the impact of imposing *ex post* rules on *ex*

⁵⁰ We assume that people are risk neutral. If they are risk averse the reward must be great and if they like risk the reward could be smaller.

ante investments. Suppose people were just willing to spend 1 Yuan per ticket for the lottery described above. If the lottery reduced the payout to 9,000,000 Yuan, economically rational and risk-neutral people would not buy a ticket. Likewise if the government imposed a special “excessive lottery tax” of 50 percent on lottery earnings they would not buy tickets either. Any change in the amount of the reward has an impact on the willingness to participate in the lottery in the first place. *Ex post* regulation of the winners of the contest has a chilling effect on the *ex ante* incentives of those considering the next contest.

Human nature is no different in the case of investments in innovation. Entrepreneurs, venture capitalists, and companies all require the opportunity to earn an *ex post* reward sufficient to compensate them for the risk they bear *ex ante*. Consider, for example, the entrepreneurs in the Hall-Woodward study. On average these entrepreneurs probably did not recover the opportunity cost of their time. Slightly more than 2 percent of the entrepreneurs received more than \$100 million upon exit. Suppose there was a special tax of 50 percent on earnings of \$100 million or more from selling a startup. *Ex post*, that tax would have no effect since the entrepreneurs had already expended the effort. But if entrepreneurs expect that tax *ex ante*, then the overall returns to entrepreneurs would be reduced by approximately 43.5 percent since entrepreneurs with payouts of \$100 million or more accounted for 87 percent of the overall returns.

4. The Innovation Process and Price Regulation

The competitive process is built on rewards. Those rewards induce a massive amount of innovative effort by inventors, entrepreneurs, and firms. Investors often back those efforts with risk capital. Most everyone fails. They are quickly forgotten. Their efforts and the money behind them is all for nothing. A few succeed. They get the prize in the form of profits for their efforts. The public gets a prize too in the form of valuable new products and services that would not have existed but for these successful innovators.

It is easy, after the fact, to question the wealth obtained by the successful innovator. Sometimes people argue that the innovator would still have made his contribution with a smaller reward. That is like saying that a lottery winner would have bought the ticket for an even smaller reward. The claim is obviously true if the lottery winner knew he would win. It ignores, however, the incentives needed to motivate participation in the lottery in the first place because of the highly uncertain outcome. No one knows when entering a lottery whether they will win. Similarly no one knows whether an innovation they are pursuing will succeed in the marketplace. In fact, innovation is a large numbers game. Only by having many try will success

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emerge.

Competition authorities and courts throughout the world have avoided regulating the prices that emerge from the competitive process because doing so reduces the very rewards that induce the massive innovative effort that drives economic progress and thereby benefits consumers.

C. Prices, Signals and the Competitive Process

Modern economists and policymakers have come to recognize the critical role that prices play in guiding economies and promoting growth. The dynamic competitive process is highly decentralized. Businesses, investors, and consumers make individual decisions. These decisions are coordinated largely through the price system. Prices help ration the use of scarce resources and the products made from these resources to those who value those resources and products most highly. They signal businesses and investors to enter or expand production in various industries. More generally, they are the way in which knowledge about resource allocation issues gets diffused in society.⁵¹

In principle it would be possible to collect information centrally and then make decisions on production and allocation based on that. Many countries have attempted that approach to varying degrees at various points in their histories. The problem with that policy is that it seldom works in practice. The market relying on price signals has empirically proven to be capable of responding more nimbly and accurately to new information. Recognizing this, many market-oriented economies have reduced the role of price setting even further by virtually eliminating the small amount of price regulation that once existed. Most countries have dismantled large-scale price controls in the last two decades and have unleashed significant competition as a result.

Chinese policy makers realized that a broad regulation of pricing would not help improve citizens' living standards. They therefore initiated the gradual price reform process starting in 1979. The deregulation of prices accelerated following the adoption of the 1997 Price Law. By the end of 2005, less than 5 percent of the retail sales value of consumption goods was subject to price regulation.⁵² This price liberalization has been a significant

⁵¹ U.S. Federal Trade Commission and Antitrust Division of the U.S. Department of Justice, "Excessive Prices," in OECD Policy Roundtables: Excessive Prices (2011), 299-308, available at: <http://www.oecd.org/competition/abuse/49604207.pdf>; for the classic discussion of this point see also F.A. Hayek (1945), "The Use of Knowledge in Society," *American Economic Review*, 35 (4) 519-530.

⁵² The percentage of market-determined prices was 95.6 percent as measured by consumption goods retail sales amounts, 91.9 percent as measured by raw materials sales

driver of the rapid growth of China's economy and success of China's transition to a market-oriented economy.⁵³ The Plenary Session of the Communist Party recently affirmed this policy.⁵⁴

Perfect a mechanism where prices are determined by the market. Any price that can be affected by the market must be left to the market. Push ahead with price reforms of water, oil and natural gas, electricity, transportation and telecommunication. Areas in which the government sets prices will be confined to public utilities, public service and areas that are naturally monopolized.⁵⁵

The reluctance to regulate prices extends to competition authorities and courts. Summarizing the reactions of competition authorities to pursuing excessive pricing cases, the OECD noted:⁵⁶

More generally, the submissions for the Roundtable suggest that many competition authorities themselves harbour concerns with respect to aggressive competition law enforcement against excessive prices, premised on the belief that competition authorities are ill-equipped to function as price regulators: competition authorities seek to facilitate or preserve competition in the market, rather than dictate its terms.

The EU, the United States, and most market-oriented countries have therefore adopted antitrust laws to make sure that firms do not interfere in the competitive process by colluding to fix prices or to exclude rivals. They

amounts, and 97.7 percent as measured by agricultural procurement amounts. See Wentong Zheng (2010), "Transplanting Antitrust in China: Economic Transition, Market Structure, and State Control," *University of Pennsylvania Journal of International Law*, Vol. 32, No.2.

⁵³ See Jean-Jacques Laffont and Claudia Senik-Leygonie (1997), *Price Controls and the Economics of Institutions in China*, Development Centre Studies, OECD Development Centre, Paris.

⁵⁴ See the Decision of the CCCPC on Some Major Issues Concerning Comprehensively Deepening the Reform, November 12, 2013, available at http://www.china.org.cn/chinese/2014-01/17/content_31226494.htm; see also the Communique of The Third Plenary Session of the 18th Central Committee of the CPC, November 12, 2013, available at http://www.china.org.cn/chinese/2014-01/16/content_31213800.htm.

⁵⁵ The regulation of telecommunication prices focuses on basic telecommunication services. With vibrant, fresh and dynamic market competition, the prices of mobile communication services have been well below the price caps set by the NDRC.

⁵⁶ OECD Secretariat, "Excessive Prices: Background Paper by the Secretariat," in OECD Policy Roundtables: Excessive Pricing (2011), 9-196, available at: <http://www.oecd.org/competition/abuse/49604207.pdf>, at p. 10.

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otherwise rely on the competitive process to determine prices, and other terms of trade, except in rare cases. They have done so explicitly, as we showed in the previous section, because they recognize that this approach will result in the greatest long-run welfare.

D. The Exceptional Circumstances Screen

In light of the concerns over competition policy regulating prices, jurisdictions with antitrust laws that prohibit excessive pricing by dominant firms have adopted various kinds of “exceptional circumstances” screens to narrow the situations in which they intervene to rare cases. No matter the details of these tests, the practical result in all jurisdictions has been to allow the market to set prices for products, services and technologies and to limit the ability of dominant firms to set their own prices only in rare and extreme cases.

1. An Overview of Exceptional Circumstances Screens

According to the OECD’s review the “most prominent screen is the need for *high and non-transitory barriers to entry*” such as laws that establish monopoly industries like the post office or public utilities in some countries.⁵⁷ This criterion is substantially different than a firm having dominance in a market. Competition authorities generally do not pursue excessive pricing cases against dominant firms even though those firms often earn considerable profits. High and non-transitory barriers to entry involve circumstances in which one or a few entities are essentially entirely immune from any competition. That often entails the firm having a legal or regulated monopoly over a national industry. In these cases high prices cannot provide signals to induce investments in entry and innovation.

Several economists have also proposed specific “exceptional circumstances” screens for excessive pricing. Motta and de Streel proposed, as a starting point, a four-factor screen that was consistent with the European case law:⁵⁸

- 1) high and non-transitory barriers to entry leading to a monopoly or near monopoly;

⁵⁷ OECD Secretariat, “Excessive Prices: Background Paper by the Secretariat,” in OECD Policy Roundtables: Excessive Pricing (2011), 9-196, available at: <http://www.oecd.org/competition/abuse/49604207.pdf>, at 11.

⁵⁸ Massimo Motta and Alexandre de Streel (2007), “Excessive Pricing in Competition Law: Never say Never,” in Arvid Fredenberg and Niklas Strand (eds), *The Pros and Cons of High Prices*, at p. 14.

- 2) this (near) monopoly being due to current or past exclusive or special rights;
- 3) no effective means to eliminate the entry barriers; and,
- 4) no sector regulator being competent to regulate the excessive prices.

The authors then go on to limit intervention to cases in which competition authorities and courts are confident that the position was not the result of risky investment and innovation but was, instead, essentially bestowed on its holder by the government or happenstance. Moreover, the barriers contemplated by Motta and de Streel, and the degree of monopoly power bestowed by these barriers, go well beyond the ordinary notion of dominance. It must be close to super dominance, according to these authors.⁵⁹ They envision situations in which it is virtually impossible for entry to erode this super-dominant position. Then, even in the case in which a firm has close to a super-dominant position that was not the result of significant efforts on the part of the firm, Motta and de Streel would look for interventions to encourage entry before considering price regulation through antitrust.

Evans and Padilla advocate a more restrictive screen:⁶⁰

- 1) The firm enjoys a (near) monopoly position in the market.
- 2) The monopoly position is not the result of past investments or innovations.
- 3) The monopoly position is protected by insurmountable legal barriers to entry.
- 4) The prices charged by the firm widely exceed its average total costs inclusive of a return for risky investment.
- 5) There is a risk that those prices may prevent the emergence of new goods and services in adjacent markets.

Their reasoning is that using competition policy to regulate prices imposes a significant loss in dynamic efficiency and that excessive pricing cases should therefore be pursued only when the benefits are clear and significant. The new product prong of the test—which is similar to the European Court of Justice’s exceptional circumstances test for refusal to supply intellectual property—is designed to limit findings of excessive pricing to situations in which the prices deter the creation of a new market, which could be

⁵⁹ Id, p. 23.

⁶⁰ David S. Evans and Jorge Padilla (2005), “Excessive Prices: Using Economics to Define Administrable Legal Rules,” *Journal of Competition Law and Economics*, 1(1) 97-122, at p. 119.

immensely valuable for society.⁶¹

The details of the exceptional circumstances screen vary across jurisdictions, competition authorities, courts, and commentators. There appears to be a consensus, however, on the part of competition authorities that cases should be brought rarely and only in extreme situations. There also appears to be a consensus among the courts that firms should be found to have engaged in an abuse of dominance as a result of charging a high price only in very limited situations. There is considerable support for the view that antitrust law should not prevent firms in innovation-intensive industries from profiting from their risky investments except in the most extreme circumstances, and perhaps never.

2. Exceptional Circumstances Screen and Intellectual Property

That conclusion applies in particular to industries involving intellectual property such as patents and copyrights. The marginal cost of selling or licensing intellectual property is often small, and in the case of electronic distribution, essentially negligible.⁶² Yet it costs something—perhaps quite a bit—to invent. Creating intellectual property to make money is a gamble. Out of all that are created, only a few books, songs, movies, video games, and patents are successful. The top 20 percent of movies earn 80-85 percent of box-office revenue,⁶³ and more than 70 percent of movies generate negative returns at the box office.⁶⁴ At online bookstores, the top 5 percent of titles account for more than 60 percent of sales, and the distribution is even more skewed at bricks-and-mortar bookstores.⁶⁵ For music albums, the

⁶¹ Also see Amelia Fletcher and Alina Jardine (2007), “Toward an Appropriate Policy for Excessive Pricing,” in Claus-Dieter Ehlermann and Mel Marquis (eds.), *European Competition Law Annual 2007: A Reformed Approach to Article 82 EC*, at pp. 4-5; Lars-Hendrik Roller (2007), “Exploitative Abuses,” in Claus-Dieter Ehlermann and Mel Marquis (eds.), *European Competition Law Annual 2007: A Reformed Approach to Article 82 EC*, at pp. 2-3; Bruce Lyons (2007), “The Paradox of the Exclusion of Exploitative Abuse,” in Arvid Fredenberg and Niklas Strand (eds), *The Pros and Cons of High Prices*, at pp. 74-75.

⁶² For example, it used to cost a modest amount to stamp out a CD to distribute music or software; now is essentially costless to make music and software downloadable over the Internet.

⁶³ Alan Collins, Chris Hand, and Martin C. Snell (2002), “What Makes a Blockbuster? Economic Analysis of Film Success in the United Kingdom,” *Managerial and Decision Economics*, 23(6) 343-354; Arthur De Vany and W. David Walls (1996). “Bose-Einstein Dynamics and Adaptive Contracting in the Motion Picture Industry,” *Economic Journal*, 106(439) 1493-1514.

⁶⁴ W. David Walls (2010), “General Stable Models of the Rate of Return to Hollywood Films,” *Advances and Applications in Statistical Sciences*, 2(1) 19-36.

⁶⁵ Erik Brynjolfsson, Michael D. Smith, and Yu (Jeffrey) Hu (2003), “Consumer Surplus in the Digital Economy: Estimating the Value of Increased Product Variety at

first year sales of an album at the 90th percentile is more than ten times the first year sales of the median album.⁶⁶ The top 5 percent of patents account for 30 to 47 percent of total patent value.⁶⁷ These businesses therefore follow the economics of lotteries discussed earlier. Since most entries lose the few that win must receive ample rewards.

Competition authorities and courts have found excessive pricing involving holders of intellectual property rights very infrequently.⁶⁸ Indeed, several commentators have concluded correctly that the concept of excessive pricing is antithetical to the purpose of intellectual property rights, which are granted expressly under the laws of many countries for the purpose of providing firms and individuals with rewards for making risky investments in creativity. For example, Motta and de Streel conclude “any good or service protected by Intellectual Property Rights should in principle not be subject to an excessive prices action.”⁶⁹ Likewise Fletcher and Jardin conclude “There should be no intervention under Article 82 against the high prices of an innovative product within its patent period.”⁷⁰

Online Booksellers,” *Management Science*, 49(11) 1580-1596; Judith Chevalier and Austan Goolsbee (2003), “Measuring Prices and Price Competition Online: Amazon.com and barnesandnoble.com,” *Quantitative Marketing and Economics*, 1(2), 203-222.

⁶⁶ Ken Hendricks and Alan Sorensen (2009), “Information and the Skewness of Music Sales,” *Journal of Political Economy*, 117(2) 324-369.

⁶⁷ Ariel Pakes (1986), “Patents as Options: Some Estimates of the Value of Holding European Patent Stocks,” *Econometrica*, 54(4) 755-784.

⁶⁸ The main exception to this statement concerns excessive pricing cases involving music collecting societies. In some cases domestic legislation authorizes a single society to administer copyright licenses on behalf of music writers and publishers while in other cases a natural monopoly emerges. Music collecting societies are horizontal combinations of music writers and publishers. Unless authorized by law these combinations can function only with an exemption under Article 101(3) TFEU. In most countries there is a single music collecting society that represents all of the music writers and publishers. They are therefore industry-wide monopolies in most countries. See, for example, Ernst-Joachim Mestmäcker (2006) “Collecting Societies,” in Claus-Dieter Ehlermann and Isabela Atanasiu (eds.), *The Interaction between Competition Law and Intellectual Property Law*, Hart Publishing. The competition authorities and courts have heard a number of claims that these national music-collecting societies have charged excessive prices.

⁶⁹ Massimo Motta and Alexandre de Streel (2007), “Excessive Pricing in Competition Law: Never say Never,” in Arvid Fredenberg and Niklas Strand (eds), *The Pros and Cons of High Prices*, at p. 26.

⁷⁰ Amelia Fletcher and Alina Jardin (2007), “Towards an Appropriate Policy for Excessive Pricing,” Working Paper presented at the 12th Annual Competition Law and Policy Workshop, available at <http://www.eui.eu/RSCAS/Research/Competition/2007%28pdf%29/200709-COMPed-Fletcher-Jardine.pdf>. In discussing the problems with excessive pricing intervention they note that, “Intellectual property rights are specifically designed to provide innovating firms with a degree of market power, and to stimulate upfront R&D investment through the ‘prize’ of higher than normal future profits. Any reduction in future profits—or a greater

Consistent with this view, as we discuss below, Article 55 of China's AML exempts intellectual property rights from antitrust scrutiny except to the extent that they are abused in order "to eliminate or restrict market competition".

Quite unlike legal monopolies over industries there is significant competition for creating patents and copyrights. Nothing prevents firms from entering that race. That situation is unlike state-owned enterprises, for which competition is barred, and previously state-owned companies that are the beneficiaries to prior entry barriers together with significant network effects. Moreover, there is often competition among patents and copyrights. There are often numerous ways of creating products using alternative patents. And consumers can substitute between different music, books, videogames, and movies even though each is subject to a copyright.

That point is also true for Standard Essential Patents (SEPs). An SEP covers a technology that a Standard Setting Organization (SSO) has incorporated in a standard. One could argue whether competition authorities or courts should ever define an antitrust market that consists of an SEP given the static and dynamic competition among standards. But regardless of market definition SEPs do not establish permanent barriers to entry into an industry like a postal monopoly would. At any point in time different standards compete with each other. Over time innovation and entry displace standards. For example, in mobile communications technologies having an SEP on 2G does not protect the holder from competition from 3G; and having an SEP on 3G does not protect the holder from 4G competition. Further, standards are updated and modified on a continuing basis. Owning an SEP on 3G today does not mean that a company will own an SEP on a future version of 3G since a newer, better, or less costly technology may replace the company's technology. Firms compete to get their technologies incorporated into standards. The fact that certain of their technologies have been adopted for one standard does not mean that any of their technologies will be adopted for subsequent standards.

There is another reason for competition authorities and courts to abstain from regulating the prices for intellectual property. Economics provides some guidance for regulating industries in which there is a close relationship between prices and the cost of production. For example, regulators of basic telecommunications services can rely on elaborate models that show the prices that telecommunication providers need to receive to compensate them for costs and a competitive rate of return.

There is no such guidance for intellectual property. On the one hand, it is a virtually impossible task for economists, or for competition authorities

risk of these profits being regulated—could clearly jeopardize such incentives.”

and courts, to determine how much reward innovators should receive to promote the right amount of innovation. The competitive process, on the other hand, does this well. The few successful innovators get rewards. Those rewards induce more innovators to try and more entry to occur. This reinforcing process of innovation and reward is the engine behind economic progress.

IV. THE ECONOMIC FRAMEWORK FOR ASSESSING WHETHER AN UNFAIR PRICING ABUSE HAS OCCURRED

Competition authorities and courts have used the exceptional circumstances test to winnow the situations in which they consider whether a dominant firm has committed an unfair pricing abuse. For the rare cases they do consider, competition authorities and courts must then assess whether the dominant firm under consideration has, in fact, engaged in unfair pricing. This section considers the economics of analyzing whether a dominant firm has engaged in an excessive pricing abuse in the exceptional circumstances in which competition authorities and courts consider such abuses at all.

Competition authorities and courts around the world have largely rejected the simple static model in which any price that exceeds cost is deemed too high. The European Court of Justice has put forward the most influential economic approach for assessing unfair pricing claims. This approach is widely used of course by competition authorities and national courts in the European Union. Courts and competition authorities in other countries such as Israel and Turkey have also adopted this approach, and other countries such as South Africa have been influenced by it.⁷¹

The European Court of Justice in *United Brands* developed a two-prong economic test for whether the prices charged by a dominant firm are excessive.⁷²

⁷¹ Israel Antitrust Authority (2011), “Excessive Prices,” in European Commission, “Article 102 and Excessive Prices,” in OECD Policy Roundtables: Excessive Prices, available at: <http://www.oecd.org/competition/abuse/49604207.pdf>, at p. 261; Turkish Competition Authority (2011), “Excessive Prices,” in European Commission, “Article 102 and Excessive Prices,” in OECD Policy Roundtables: Excessive Prices, available at: <http://www.oecd.org/competition/abuse/49604207.pdf>, at p. 281; Mittal Steel South Africa Ltd & Macsteel International BV and Macsteel Holdings (pty) Ltd vs. Harmony Gold Mining Company Ltd and Durban Rooderpoort Deep Ltd, Case No. 70/CAC/Apr07, available at <http://www.comptrib.co.za/assets/Uploads/Case-Documents/70CACApr07.pdf>.

⁷² Case 27/76, *United Brands Company and United Brands Continentaal BV v. Commission of the European Communities*, 1978 E.C.R. 207. The Court said there could be other ways to determine excessive pricing and therefore did not exclude the possibility that other tests could be employed.

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The questions therefore to be determined are whether the difference between the costs actually incurred and the price actually charged is excessive, and, if the answer to this question is in the affirmative, whether a price has been imposed which is either unfair in itself or when compared to competing products.

The first prong is based on a “price-cost” test that essentially determines whether the dominant firm is marking its prices up over cost too much and thereby earning significant profits. The second prong is based on the “value” of the product or service to buyers, as we will explain below.

The European Court of Justice and other courts have observed that this test faces significant empirical and evidentiary challenges in practice. In fact, the European Court of Justice and national courts have often found that competition authorities have failed to meet their burden of proof that either prong is satisfied. These difficulties are most severe in innovation-intensive industries.

A. Price-Cost Test

The price-cost prong of the Court’s test would be straightforward if markets worked like the textbook model that underlies Figure 1. Under perfect competition firms should charge prices equal to marginal cost. Any price significantly greater than marginal cost is therefore “excessive”. Of course the textbook model is based on very special assumptions and applies in fact to few, if any, real-world markets. Moreover, if competition authorities and courts applied the textbook model they would find that prices exceed marginal cost for most firms in most industries regardless of whether the firms are dominant within the meaning of competition policy. Practical approaches try to introduce real-world considerations into the price-cost comparisons to make them more accurate. The extent to which this can be done in practice varies across industries and is most difficult in innovation-intensive ones.

1. Comparing Prices and Costs to Determine Excessive Pricing

The first difficulty with a straightforward comparison of price to marginal cost is that most firms incur fixed costs of operation. In the long run firms must be able to recover these fixed costs to remain in business and they must expect to be able to recover these fixed costs to enter a business. A price equal to marginal cost will not enable firms to recover these fixed costs. Consider a simple firm that has annual fixed costs of 10 million Yuan and marginal costs of 10 Yuan a unit. If it only charged 10 Yuan a unit it would not make enough profit to cover the 10 million Yuan fixed cost. One

way to address this issue in practice is to calculate the margin based on the difference between price and average total cost or to calculate the economic profits (the difference between total revenue and total economic costs) instead of margins.

The second issue concerns measuring the competitive rate of return. To attract capital, firms must secure at least a normal rate of return. In practice, most firms face varying degrees of risk in entering industries and in competing against known and unknown rivals. These firms and their investors need to be compensated for that risk. The degree of risk varies widely across firms and industries. Risk is greatest for inventing and then marketing completely new technologies and products. Risk is smallest for mature industries with routine production and well-developed business models. For example, a survey of the cost of capital for broad US industries shows that the cost of capital for a relatively high-risk industry such as semi-conductor equipment was about 2.5 times the cost of capital for a low-risk industry such as electric utilities.⁷³

The third and related issue is that a significant portion of the economy consists of businesses that are based almost entirely on intellectual property such as software, music, and patent licensing. The IP-based firms have low marginal costs of production and high fixed costs. Accounting for fixed costs is therefore important for them. More importantly, firms in IP-based industries encounter significant risk since the preponderance of creative efforts ultimately fail for all intents and purposes.

The fourth issue is that the price-cost relationship is not necessarily a meaningful indicator of excessive pricing for a considerable part of the economy. A large portion of modern economies consists of multi-sided platforms that serve multiple distinct groups of customers.⁷⁴ Economists have shown as a matter of theory and empirical fact that to coordinate the demands on the multiple sides of the platforms these firms may charge one customer group prices lower than marginal cost and other customers prices higher than marginal costs.⁷⁵ Newspapers, for example, often charge readers less than the marginal cost of printing and distributing the newspaper and charge advertisers more than the marginal cost of inserting ads. Many

⁷³ Aswath Damodaran (NYU Stern), "Cost of Capital by Sector," (January 2014), available at http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/wacc.htm.

⁷⁴ David S. Evans and Richard Schmalensee, "The Antitrust Analysis of Multisided Platform Businesses," in Roger Blair and Daniel Sokol (eds.), *Oxford Handbook on International Antitrust Economics* (forthcoming); David S. Evans (2013), "The Consensus Among Economists on Multisided Platforms and Its Implications for Excluding Evidence That Ignores It," *CPI Antitrust Chronicle* 6(1).

⁷⁵ Jean-Charles Rochet and Jean Tirole (2006), "Two-Sided Markets: A Progress Report," *RAND Journal of Economics*, 37(3) 645-667; Mark Armstrong (2006), "Competition in Two-Sided Markets," *RAND Journal of Economics*, 37(3) 668-691.

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Internet platforms provide services free to individuals and make all of their money from advertising.⁷⁶ For platforms, margin analysis must take into account the prices and costs for all customer groups for the platform and should not consider just one.

In principle economics can address each of these issues by incorporating fixed costs, risk, and multi-sided pricing into the analysis. In practice, data limitations make this difficult. Courts have often rejected cases brought by competition authorities because of their failure to produce reliable evidence of price-cost differences. That was the case, for example, with the *United Brands* case in the European Union, the *Attheraces* case in the United Kingdom, and the *Mittal* case in South Africa.⁷⁷

The issues we have described are most severe in innovation-intensive industries. These industries typically involve significant fixed-cost investments and high degrees of risk. That is particularly true for industries in which intellectual property rights are important. Moreover, many modern innovation-intensive industries, particularly those involving information communications and technology, involve multi-sided platforms.

2. Risk Adjusted Profits

The price-cost comparison discussed above is a rudimentary attempt at assessing whether a firm is charging more than the competitive level. A more sophisticated approach, though still problematic, involves examining whether a firm is earning a supra-competitive profit on its investments after accounting for risk. For a company as a whole, a common approach for measuring the profitability of investments is to compare the return on capital to the cost of capital. A firm makes an “above-normal” profit if the return on capital exceeds the cost of capital after adjusting for risk. However, this approach encounters several issues.

First, in measuring the return on capital economists have found that the typical accounting approaches for doing this—while perfectly suitable for the usual accounting and corporate governance purposes for which they are used—do not provide accurate or consistent measures of the economic rate of return that could be used for comparing different companies or against a

⁷⁶ David Evans (2013), “Attention Rivalry among Online Platforms”, *Electronics Intellectual Property, MIIT China*, vol. 9, 30-41(in Chinese).

⁷⁷ Case 27/76, *United Brands Company and United Brands Continentaal BV v. Commission of the European Communities*, 1978 E.C.R. 207; *Attheraces Ltd. v. British Horseracing Board Ltd.*, [2007] EWCA (Civ) 38, [2007] UKCLR (CA) 309; *Mittal Steel South Africa Ltd & Macsteel International BV and Macsteel Holdings (pty) Ltd vs. Harmony Gold Mining Company Ltd and Durban Rooderpoort Deep Ltd*, Case No. 70/CAC/Apr07, available at <http://www.comptrib.co.za/assets/Uploads/Case-Documents/70CACApr07.pdf>.

competitive benchmark. A key issue is that accounting methods for depreciating research and development, advertising, and other investments with future payoffs can lead to significant biases in the rate of return. Economists have proposed a number of methods for dealing with these problems.⁷⁸

Second, in assessing whether the firm is earning supra-competitive profits it is in fact not correct as a matter of economics to compare the rate of return to the cost of capital for the reasons we discussed earlier. *Ex post* successful firms will necessarily have rates of return on capital that exceed their risk-adjusted cost of capital. Unsuccessful firms will necessarily have rates of return on capital that are below their risk-adjusted cost of capital and often will have no return on capital at all.

Consider a competition to develop a new technology for gene splicing. There are 100 firms. Each invests 1 million Yuan a year over 10 years to develop the technology. Each firm therefore invests 10 million Yuan. Together over 10 years they have invested 1 billion Yuan. Only 1 firm succeeds. Thus, there is a 99 percent chance of failure and a 1 percent chance of success.

Let us suppose that to bear the risk—that there is a 99 percent chance of losing 10 million Yuan and a 1 percent chance of winning—each firm would need to expect at the beginning that they would earn 15 million Yuan or a 50 percent rate of return. In other words they would need to believe that they have a 1 percent chance of winning 15 million Yuan. The cost of capital is 50 percent since that is the minimum return that covers the risk. To participate in this technology contest, each firm must believe that the winner will earn 1.5 billion Yuan. That is, in order to have a 1 percent chance of winning 15 million Yuan, the prize must be 100 times 15 million or 1.5 billion Yuan. That 1.5 billion Yuan is therefore the minimum prize necessary for inducing these 100 firms to try.

Now consider the winner. Suppose the winner has earnings of exactly

⁷⁸ Franklin M. Fisher and John J. McGowan (1983), “On the Misuse of Accounting Rates of Return to Infer Monopoly Profits,” *American Economic Review*, 73(1) 82-97; Morris G. Danielson and Eric Press (2003), “Accounting Returns Revisited: Evidence of their usefulness in Estimating Economic Returns,” *Review of Accounting Studies*, 8(4) 493-530; Morris G. Danielson and Eric Press (2005), “When Does R&D Expense Distort Profitability Estimates?” *Journal of Applied Finance*, 15(2) 76-92; Paul A. Grout and Anna Zalewska (2007), “Measuring the Rate of Return for Competition Law,” *Journal of Competition Law and Economics*, 4(1), 155-176; Matthew J. Holian and Ali M. Reza (2011), “Firm and Industry Effects in Accounting Versus Economic Profit Data,” *Applied Economics Letters*, 18(6) 27-529; J.K. Kapler (2000), “Measuring the Economic Rate of Return on Assets,” *Review of Industrial Organization*, 17(4) 457-463; Michael A. Williams, Kevin Kreitzman, Melanie Stallings Williams, and William M. Havens (2010), “Estimating Monopoly Power with Economic Profits,” *U.C. Business Law Journal* 10(2) 125-150.

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1.5 billion Yuan. It incurred investment costs of 10 million Yuan. Its return is 150 times its investment and its rate of return is 15,000 percent. That is much higher than its cost of capital of 50 percent. Yet this is the competitive outcome. There is no excessive profit since if the winner earned less than 1.5 billion Yuan, none of the firms, if acting rationally, would have entered the race in this example. Accordingly, if firms knew in advance that authorities would apply excessive pricing laws to cap their profits below that level, no technology would have been created. Moreover, even if firms believed there was a *possibility* of such a ruling, that risk and uncertainty would discourage investment.⁷⁹

There is some information available to assess whether very high profits are truly greater than the returns necessary to attract risky effort and capital. Some venture capital lore indicates that VCs in the U.S. typically seek a 5 to 10 times return on their investment. That is, when they consider making an investment, they examine whether, if it is successful, they will be able to increase their investment 5 to 10 times.⁸⁰ They do not expect that each investment will return this amount. Rather, they insist on this upside to their investment because they recognize that most of their investments will return little if nothing.

Some companies approve investments in new initiatives only if there is a business case that they will recoup their investment in 3-7 years.⁸¹ That implies a significant rate of return. They require this because they are accounting for the fact that many of the investments they make will not work out.

In all these cases the “successful investments” appear to have high rates of return. For example, the compound annual rate of return on a \$10 million VC investment in year 1 that yields a payout of \$100 million in year 10 is nearly 26 percent a year. That is more than eight times higher than a risk

⁷⁹ This analysis does not mean that excessive profits are *never* possible in innovation-intensive industries. For example, the winning firm in the example we have just described could have earned 3 billion Yuan. It is possible, though not necessarily the case, that the excess of 3 billion Yuan over 1.5 billion Yuan could be, at least in part, a supra-competitive profit resulting from the unanticipated ability to erect entry barriers or to otherwise secure more market power than the competitors for winning this technology race anticipated. However, for the reasons we explain, making this determination, after the fact, is an extremely difficult exercise that carries substantial risk for reducing innovation and penalizing innovators.

⁸⁰ Dermot Berkery (2008), *Raising Venture Capital for the Serious Entrepreneur*, at p. 23, 70 (“the entrepreneur needs to convince the investors ... the opportunity is big enough for early investors to get a 10 to 20 times multiple return on their investment.” .. “While investors might be hoping for a 10 to 20 times multiple on an exit, they will not complain with a 3 to 5 times multiple.”).

⁸¹ Susanne Espenlaub, Arif Khurshed and Abdulkadir Mohamed (2010) “The Exit Behavior of Venture Capital Firms,” Working Paper, at p. 36.

free rate of return such as the 10-year US Treasury note (currently with an annual yield around 3 percent), which is a good proxy for the competitive rate of return for a perfectly competitive company that faces no risk. However, that 26 percent rate of return is not excessive because it was necessary in order to induce the venture capitalist to make investments in the many other ventures that failed.⁸²

To determine whether a firm has a rate of return that exceeds the competitive level after accounting for risk involves two major steps. The first step involves determining the rate of return that the firm has obtained for investments in the product in question. That involves collecting data on the time pattern of investments and returns and dealing with the economic biases resulting from the treatment of R&D, advertising, and other investments. If the firm has a rate of return that is less than its risk-adjusted cost of capital (50 percent in the example above) then it is clear that its return on capital has not even compensated it for the risk it occurred.

However, if a firm has a rate of return on capital that exceeds its cost of capital that does not imply that its returns are excessive for the reasons we have just discussed. In the context of an innovation race, the second step needs to determine whether the winners of the race have earned more than the minimum prize that the participants in the race required to enter the race in the first place.

As a practical matter, completing the second step of this analysis, and possibly even the first step, is likely to be quite difficult. That is the main reason that assessing excessive pricing in innovation-intensive industries is very difficult to conduct with any degree of reliability.

B. Economic Value and Unfair Prices

The second prong of the *United Brands* test is whether the price is “unfair.” A number of courts, authorities, and commentators have concluded that the Court intended the second prong of the test to account

⁸² Yet between 1987 and 2000 venture capitalists in the United States only had an annual return of 15 percent, which was slightly lower than the S&P 500 annual return of 15.9% over this same period. John Cochrane (2005) “The Risk and Return of Venture Capital” *Journal of Financial Economics*, 75(1) 3-52, at pp. 17-19. The explanation for the difference is straightforward. The high return on the occasional successful businesses compensates for the low returns on the many unsuccessful ones. Conceptually, this is the same as the lottery. The high earnings for the winner offset the lack of winnings for the vast number of unsuccessful ticket purchasers.

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for the value of the product to the buyer.⁸³ The European Court of Justice stated that a firm in a dominant position would commit an excessive pricing abuse if the price it charged bore “*no reasonable relation to the economic value of the product.*” One way to assess economic value is the cost of producing the product. That forms the first prong of the test. The other way to assess economic value is to the buyer. That, according to the European Commission in *Scandlines* and the UK Court of Appeal in *Attheraces*, is the purpose of the second prong.

Scandlines complained that the Port of Helsingborg was charging an excessive price. The Commission concluded that

even if it were to be assumed that there is a positive difference between the price and the production costs exceeding what Scandlines claims as being a reasonable margin (whatever that may be), the conclusion should not necessarily be drawn that the price is unfair, provided that this price has a reasonable relation to the economic value of the product/service supplied. The assessment of the reasonable relation between the price and the economic value of the product/service must also take into account the relative weight of non-cost related factors.

Attheraces complained that the British Horseracing Board (BHB) charged it excessive prices for certain horse racing information. BHB argued the “economic value of a product ... reflects the ‘revenue-earning potential to the person who acquires it’ .” The Court insisted that the price would have to be sufficiently high to interfere with the ability of Attheraces to compete.⁸⁴

We appreciate that this theoretical answer leaves the possibility of a monopoly supplier not quite killing the goose that lays the golden eggs, but coming close to throttling her. We do not exclude the possibility that this could be held to be abuse, not least because of its potential impact on the consumer. But Article 82 ... is not a general provision for the regulation of prices. It seeks to prevent the abuse of dominant market positions with the object of protecting and promoting competition. The evidence and findings here do not show [Attheraces’s] competitiveness

⁸³ Case COMP/A.36.750/D3, *Scandlines Sverige AB v. Port of Helsingborg* [2006] 4 CMLR 23; Nihls Wahl, “Exploitative High Prices and European Competition Law - A Personal Reflection,” in “The Pros and Cons of High Prices,” *Swedish Competition Authority* (Sweden: Lenanders Grafiska, 2007); *Attheraces Ltd. v. British Horseracing Board Ltd.*, [2007] EWCA (Civ) 38, [2007] UKCLR (CA) 309.

⁸⁴ *Attheraces Ltd. v. British Horseracing Board Ltd.*, [2007] EWCA (Civ) 38, [2007] UKCLR (CA) 309.

to have been, or to be at risk of being, materially compromised....

The Court found that, even if BHB took 50 percent of the profit that Attheraces earned from using BHB's information in the downstream market, BHB's price would not necessarily be unfair. The Court insisted that it would want further evidence that the price distorted competition in the downstream market.

These approaches do not lead to a bright-line economic test for the second prong. They do, however, suggest three screens for assessing excessive pricing claims that courts and competition authorities could use. These screens can be used to identify situations in which there is little reason to believe that prices are unfair and therefore help competition authorities and courts eliminate cases at an earlier stage, before having to reach the much more difficult inquiry concerning whether the situation involves one of the rare circumstances in which a price should be regulated under the antitrust law.

1. Significant Value Screen

The first screen is whether the buyer is obtaining a significant value from purchasing the product. In economic terms the surplus for the buyer is the difference between the most the buyer is willing to pay for a product (the buyer's willingness to pay) and the price the buyer actually does pay for a product. If a buyer were willing to pay 1000 Yuan for a product but only had to pay 700 Yuan, then the buyer has surplus of 300. There is no objective measure of "significant value" but one could argue that the price becomes less fair when it leaves little surplus for the buyer. The advantage of the significant value screen is that it ensures that the seller captures a significant portion of the surplus of the product as profit thereby providing an incentive for making risky investments while leaving something left over for the buyer. The court or competition authority would find unfair pricing only if the buyer is not receiving some meaningful value after paying for the product.

Several sources of empirical evidence can help assess whether the buyer is receiving significant value over and above the price it is paying. In the case of consumers it is possible to estimate their demand schedule, which incorporates their willingness to pay, from consumer surveys or from econometric estimates based on observed data over time or across geographic markets. In the case of businesses, it may be possible to assess the additional profit that the buyer earns from the input. The final type of evidence is the comparative evidence, discussed below, which can be used to determine how willing buyers and sellers ordinarily split the gains from

trade. The fact that other buyers have paid the price sought by the seller also confirms the value of the product.

One drawback of the significant value screen involves situations in which the buyer and seller cannot reach terms. In all markets, including highly competitive ones, some consumers decide they do not want to pay for a product. In a business-to-business market a business buyer may decide that an input costs too much because it cannot make enough profit at that cost. That may be because the buyer is not as efficient as other producers or for many other reasons. Therefore, while the significant value screen is useful for identifying cases in which the price is not excessive within the meaning of the unfair pricing law, it is not necessarily useful for identifying cases in which the price is unfair.

2. The Harm to Competition Screen

The second screen is whether the seller's price results in harm to competition in the same or a downstream market as a result of excluding rivals and thereby raising prices. There are some situations, for example, in which upstream firms may have incentives to extend their market power from an upstream market to a downstream market.⁸⁵ In these cases excessive prices could be part of an exploitative strategy, such as a margin squeeze⁸⁶ or a constructive refusal to deal,⁸⁷ designed to eliminate downstream competition. There could also be some situations in which an upstream firm may have an incentive to limit the emergence of downstream competitors because they could evolve into upstream competitors. Of course, these anticompetitive effects are only possibilities. Upstream firms have strong incentives to encourage competition in the downstream market. By encouraging lower overall prices and sales they can increase the size of the market for the input they supply.

The advantage of this second screen is that it limits excessive pricing cases to those in which there is a potentially significant economic benefit from limiting behavior that harms competition and destroys significant value for consumers. For example, excessive prices could be used to prevent the emergence of a new product which, as Evans and Padilla argue, could be one of the exceptional circumstances that could

⁸⁵ Dennis W. Carlton and Jeffrey M. Perloff (2005), *Modern Industrial Organization*, 4th edition, at 406-411; Massimo Motta (2004), *Competition Policy: Theory and Practice*, at 347-377.

⁸⁶ See Zhiguo Li (2009), "Margin Squeeze in Telecom Industry: New Trend in Determining Margin Squeeze in EU's Telecom Industry," *China Telecommunication Trade*, Vol. 12.

⁸⁷ See Yanbei Meng (2008), "Analyze the Issue of Refusal to Deal in Tying Conduct: the Kodak (1992) Case," *Journal of Renmin University of China*, vol. 6.

warrant intervention over excessive prices.⁸⁸

Without this screen, excessive pricing cases may merely result in the transfer of wealth between a buyer and a seller. Scandlines and Attheraces were simply looking for better prices for themselves. Ruling for them would have mainly increased their profits at the expense of their sellers without necessarily increasing consumer welfare.

There are well-developed methods in competition policy for examining whether these possible anticompetitive effects are likely to occur and outweigh any pro-competitive benefits.⁸⁹ Applying this screen brings excessive pricing into the mainstream of antitrust by focusing on those well-understood cases in which business practices have the potential of harming the competitive process.

3. The Normal Price Screen

The “normal price screen” considers whether the seller is charging the buyer a price that is similar to the price that it is charging other buyers, or prices that similar companies are charging other buyers for similar goods or services.⁹⁰ If many businesses are able to compete at the price being charged by the firm that is the subject of the unfair pricing inquiry for its input, then that suggests the input price is not interfering with competition and reflects the value of the product. These price comparisons are therefore useful for identifying situations in which a firm’s price is not unfair under the second prong of the tests.

The similarity requirement is critical. In the real world, companies sell products that are differentiated from each other. They try to do so in part to appeal to particular groups of customers that might prefer that particular combination. Consequently, the fact that a seller charges a higher price to one buyer than another is not sufficient evidence of unfair pricing. As a practical matter, it is difficult to compare prices across producers because there are many differences that need to be considered, including differences in the products and, even when the products are similar, differences in the buyers. These difficulties are compounded in considering the price for a technology in an innovation-intensive industry where alternative technologies may provide fewer benefits to the consumer, require higher

⁸⁸ See Evans and Padilla (2005), *op. cit.*

⁸⁹ See European Commission (2009), “Guidance on the Commission’s enforcement priorities in applying Article 82 of the EC Treaty to abusive exclusionary conduct by dominant undertakings” *Official Journal of the European Union*; Office of Fair Trading (2004), “Assessment of market power: Understanding competition law” *Competition Law Guideline*.

⁹⁰ In the next section we will see that the NDRC has adopted a version of the normal price screen as part of its guidelines for assessing unfair pricing abuses.

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costs of implementation by the manufacturer, or involve higher transactions costs in negotiating.

The courts that have suggested the possible use of price comparisons have themselves recognized the difficulty in applying them in practice. Those courts generally have not found excessive pricing based on simple price comparisons. For example, in *United Brands* the European Court of Justice did not find it persuasive by itself that United Brands charged less for bananas in Ireland than elsewhere.⁹¹ It is also important to note that it is routine business practice in a competitive market for commercial terms that a company negotiates with customers to differ significantly across customers for legitimate pro-competitive reasons.⁹²

C. *The Error Cost Framework and Excessive Prices*

Courts and competition authorities have taken an extremely cautious approach towards pursuing excessive pricing cases. The error cost framework helps explain why.⁹³ Suppose that courts and competition authorities could calculate exactly the benefits of lower prices today and the costs of discouraging risky investment in innovation over time from reducing rewards. Then it would increase economic welfare if the net benefits of pursuing excessive pricing cases exceeded the administrative costs of doing so.

As we have seen in this section, however, the courts and competition authorities have struggled to develop a sound definition of excessive pricing. They have also recognized that the various measures that could be considered for determining whether prices are excessive are quite difficult to implement accurately in practice. At the same time it is difficult to forecast the impact of forcing successful firms to charge lower prices on the incentives to make risky investments and therefore on the pace of innovation and economic progress.

In any particular case, courts and competition authorities could make two kinds of mistakes. They could find that a price is excessive even though the harm to long-run innovation outweighs the long-run benefits of

⁹¹ Case 27/76, *United Brands Company and United Brands Continentaal BV v. Commission of the European Communities*, 1978 E.C.R. 207, at 241-242.

⁹² It is well known that it is common in competitive markets to have price differences across customers. William J. Baumol and Daniel G. Swanson (2003), "The New Economy and Ubiquitous Competitive Price Discrimination: Identifying Defensible Criteria of Market Power," *Antitrust Law Journal*, 70(3) 661-685.

⁹³ Frank H. Easterbrook (1984), "The Limits of Antitrust", *Tex. L. Rev.* 63(1); Steven C. Salop & Craig R. Romaine (1999), "Preserving Monopoly: Economic Analysis, Legal Standards, and Microsoft", *Geo. Mason L. Rev.* 7 at pp. 617, 659.

lowering it. That is known as a “false positive” test result. Alternatively, they could find that a price is not excessive even though the benefits of lowering it would exceed the harm to long-run innovation. That is known as a “false negative” test result.

These mistakes are unlikely to balance out. The cost of a false positive can be quite significant. The reduced incentives to innovation could reduce the flow of new innovative technologies, new products and cost-savings innovations. Those innovations generate significant value as we saw earlier. The cost of a false negative is twofold. It causes some deadweight loss as a result of the dominant firm restricting output. And it causes a transfer of surplus from consumers to the dominant firm. In business-to-business transactions that transfer is from one producer to other producers.

The cost to society of false positives is almost certainly far greater than the cost to society of false negatives in innovation-intensive industries. False positives can prevent the emergence of new products and new technologies that support many new products. As we explained earlier, the value of these new products and technology to society is vast. False negatives result in some deadweight losses from underproduction; but such losses are much smaller than the losses from the suppression of new products and technologies as we discussed earlier.

It is difficult as a practical matter to put numbers on the magnitude of the costs imposed by these false positives and false negatives and the likelihood of their occurring under various alternative implementations of the excessive pricing test. However, courts and competition authorities that have considered this issue have generally reached two conclusions. The first is that they should find excessive pricing rarely because of the possible harm to innovation and economic progress. Their decision to seldom pursue excessive pricing cases is consistent with their having concluded that the cost of false positives is much higher than the cost of false negatives. The second is that they should be especially cautious because it is hard to identify excessive prices in practice. The likelihood of making mistakes is high because of the lack of a sound definition and the difficulty of developing accurate empirical information. They have also determined that the administrative cost of regulating the prices of dominant firms is very high.

V. IMPLEMENTING THE UNFAIR PRICING PROVISIONS OF THE AML FOR INNOVATION-INTENSIVE INDUSTRIES

In devising the AML, China looked around the world at the competition laws, policies, and institutions adopted by other countries including the United States and the European Union. Since then, Chinese judges and officials have made great efforts to study international best practices for

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competition policy. Of course, the Chinese competition authorities and courts are also making sure to develop antitrust policy that fits with the specific circumstances of China, which are unique in a number of dimensions. This section considers how to adapt what we have learned about the approaches towards excessive pricing to the unique circumstances of innovation-intensive industries in China.

A. Best Practices for Assessing Excessive Pricing in Innovation-Intensive Industries

In the previous sections we have described the standard international best practices concerning excessive pricing in innovation-intensive industries and have shown that, at a general level, these practices are consistent with sound economic analysis designed to promote economic growth and welfare. These best practices can be divided into two categories: (1) the circumstances under which investigation of unfair pricing claims should be considered for innovation-intensive industries and (2) evaluating whether an unfair pricing abuse has occurred for those cases that are considered. It is useful to provide a brief summary before we consider whether, and to what extent, China should adopt these international practices.

1. The Exceptional Circumstances Screen

Based on standard international best practices, unfair pricing cases should be brought rarely, if ever, against firms in innovation-intensive industries. The cost associated with chilling the creation of new technologies and products vastly outweighs the benefits of lowering short-run prices.

Moreover, holders of intellectual property rights should never be subject to an unfair pricing charge if that is the only claim of abuse. Any claims concerning pricing abuse should be related to an *exclusionary* abuse under which the intellectual property rights (IPRs) holder has excluded competitors from being able to participate in the market and thereby harmed competition. It is contrary to the purpose of intellectual property right grants to limit the reward that successful creators can receive. Moreover, it is also more difficult than in other cases—and practically impossible—to assess whether the prices charged by an IPR holder are excessive.

In considering both of these principles, it is important to recall that competition authorities and courts generally consider unfair pricing cases only in exceptional circumstances. The point above is that, relative to those exceptional circumstances, unfair pricing cases should hardly ever be brought in innovation-intensive industries and never as a pure unfair pricing

claim against firms that hold intellectual property rights.

2. Identifying an Unfair Pricing Abuse

The second issue concerns how competition authorities and courts should evaluate whether a dominant firm has committed an unfair pricing abuse in an innovation-intensive industry in those rare circumstances in which they consider these cases.

The standard test together with the economic analysis of the rewards for innovation show that there needs to be a determination that the price is excessive relative to the award that successful firms would need to receive in order to make socially desirable risky investments in innovation. In other words, the assessment of whether a price is excessive must take into account the many failures in such innovation-intensive industries and ensure that there are adequate rewards available for the few firms that are successful to motivate the many to try. This is a necessary condition for determining whether prices are unfair.

There then needs to be a further determination that the price is not consistent with the value received by the buyer. For innovation-intensive industries assessing this value requires considering the role of new technologies and products. In these cases, the buyer would not have been able to obtain any value in the absence of the innovation. The new technology or product would not even have existed. This makes “unfair” pricing claims particularly treacherous and farfetched in this context.

B. Applying Best Practices to the Specific Circumstances of China

China has already made a policy decision to deregulate prices and let most prices be determined by the market. Historically, China had a centrally planned economy in which prices were set by the central government. In 1992, at the 14th National Congress of the Communist Party of China, China officially set a market-oriented economy as the target of its economic reform.⁹⁴ As part of this process it gradually removed government control over most prices in favor of letting market forces determine prices.

The NDRC under the Price Law has used its discretion primarily to regulate the prices of certain commodities and services that are deemed essential to consumers. Table 2 lists the leading products and services subject to NDRC price regulation which was published in the NDRC Public Notice No.11.⁹⁵ Notably, the table shows that the NDRC normally regulates

⁹⁴ See Dan Zhu, “Historical Milestones: Socialism Market Economy,” *People Daily*, October 11, 2007, available at <http://cpc.people.com.cn/GB/104019/104740/8150356.html>.

⁹⁵ NDRC of People’s Republic of China Public Notice No. 11, Effective on August 1st,

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the prices of products and services only in areas where market mechanisms cannot achieve effective results. The NDRC has rarely regulated the prices of a product or service provided by what we would characterize as an innovation-intensive industry.⁹⁶

Having come to the policy conclusion that China should primarily rely on the market to determine prices it would be contradictory, and inconsistent with China's overall path towards economic growth, to use the AML to regulate prices except in unusual cases. Therefore, as a general matter China's economic history and policies reinforce the case for applying the unfair pricing law only in exceptional circumstances. Furthermore, the decision by Chinese policymakers to encourage innovation and permit entrepreneurs to earn significant rewards for their creations is consistent with not applying the unfair pricing law to innovation-intensive industries. There are no sound policy reasons for using antitrust to return to an intrusive, regulatory approach to pricing in industries where China has removed those controls.

China has no special situation that would suggest that it should apply the unfair pricing law to industries for which intellectual property rights are significant. As we have argued, the costs of reducing the ex-ante incentives to create intellectual property through *ex post* regulation are high—as a result of reduced benefits to consumers and slower economic growth. China in particular has benefited enormously from technologies based on intellectual property rights, ranging from mobile communications to internet, pharmaceutical, and biotechnology that have generated many new products that have produced massive social value.

Table 2: Products and services subject to NDRC price regulation

	Products and services
1.	Important central reserve materials
2.	State monopoly tobacco
3.	Salt and industrial blasting equipment
4.	Certain chemical fertilizers
5.	Certain important medicines
6.	Natural gas

2001, available at http://www.ndrc.gov.cn/zcfb/zcfbl/zcfbl2003pro/t20050707_27540.htm

⁹⁶ Government regulated prices do not necessarily mean simply controlling or reducing the price of products. In some industries in Table 2, prices are actually set jointly by government guidance and market mechanism. See State Planning Commission, "The Options to Reform the Price Management of Medical Services," July 20, 2000, available at <http://www.moh.gov.cn/zhuzhan/wsbmgz/201304/2565dbbdefeb4a5199c4fc7c8f9306b0.shtml>.

7.	Important specialized services including financial settlement and financial transaction services, engineering investigation and design services and certain intermediary services
8.	Electricity
9.	Military supplies
10.	Important transportation services
11.	Basic telecommunication service
12.	Basic postal service
13.	Water supply from state-run or interprovincial water projects

Source: NDRC (2001)

In theory, one could argue that, as a matter of economy policy, China could apply excessive pricing regulation to intellectual property rights because non-Chinese firms hold most of these rights. The argument would be that Chinese businesses and consumers could benefit from lower prices in the near term, while China would feel only a portion of the effects of reduced innovation since it provides only a partial source of the rewards. Such a policy would be short sighted. Chinese firms are rapidly becoming stronger in IP and may become world leaders in some industries.

Indigenous innovation is one of the main policy goals in the Twelfth Five-Year Plan.⁹⁷ Many Chinese companies have spent and will continue to spend heavily on R&D. Tremendous investment in R&D has fueled the rapid growth of China’s technology industry. R&D spending in China is expected to reach \$284 billion in 2014, up 22 percent from 2012. Compared with China, the growth forecast in the U.S. is just 4 percent to \$465 billion for the same period. China is expected to surpass Europe in R&D spending by 2018 and the U.S. by 2022. Imposing caps, particularly low ones, on what innovators may charge for their intellectual property would not only slow economic progress, but would also discourage Chinese innovators from participating in just this sort of research and development.

Moreover, as the size of China in world markets increases, Chinese policies that reduce the rewards from innovation will have a larger impact on China itself. China now accounts for 40 percent of the global smartphone market in 2013, and enjoys the highest shipment growth rate in the world.⁹⁸ China’s pharmaceutical market is expected to continue to grow

⁹⁷ See State Council Notice on Indigenous Innovation in the Twelfth Five Year Plan. The Chinese version is available at http://www.gov.cn/zwgc/2013-05/29/content_2414100.htm.

⁹⁸ See Gao Yuan, “China Now World’s Biggest Smartphone Market,” China Daily, November 6, 2013, available at http://www.chinadaily.com.cn/business/2013-11/06/content_17086026.htm.

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at a pace of more than 20 percent annually.⁹⁹ The biotech sector is expected to grow at an average annual rate of more than 20 percent from 2013 to 2015 as planned by the State Council.¹⁰⁰ If the rewards from innovation were to be discounted, the momentum of those R&D-intensive industries would significantly decrease. That will ultimately have a negative impact on the nation's employment rate and consumer welfare.

The drafters of the AML appear to have anticipated that the unfair pricing law—without more—would not apply to intellectual property rights. Article 55 of the AML says that

This Law does not govern the conduct of business operators to exercise their intellectual property rights under laws and relevant administrative regulations on intellectual property rights; however, business operators' conduct *to eliminate or restrict market competition* by abusing their intellectual property rights shall be governed by this Law. (Emphasis added.)

That is, the unfair pricing law applies to intellectual property only if the unfair pricing has an anticompetitive effect as a result of excluding competition and harming the competitive process.

In fact, the European Union has tended to limit the application of the unfair pricing law to situations in which there is just such an exclusionary effect. We believe NDRC and the courts should adopt that policy not just for intellectual property but for all innovation-intensive industries. As a matter of economic policy there are several reasons for restricting unfair pricing claims to cases where the unfair pricing is part of a strategy that includes abusive exclusionary behavior that would distort the competitive process and harm consumers. First, preventing the distortion of the competitive process is more likely to create benefits that would outweigh the adverse effect on innovation than shifting profit from seller to buyer. Second, without requiring an anticompetitive effect, it is possible that unfair pricing claims could be mainly employed by buyers to shift profits from sellers. That could result in rent-seeking behavior by businesses that would invest in trying to persuade courts and the NDRC to give them a better deal.¹⁰¹

⁹⁹ See IMAP, “Pharmaceuticals & Biotech Industry Global Report-2011,” available at http://www.imap.com/imap/media/resources/IMAP_PharmaReport_8_272B8752E0FB3.pdf.

¹⁰⁰ See Xinhua, “China to Boost Biotech Industry,” January 6, 2013, available at http://news.xinhuanet.com/english/sci/2013-01/06/c_132084198.htm.

¹⁰¹ This also presents the courts and the NDRC with a conundrum. Since unfairly low prices are also unlawful under Article 17 they would need to consider whether the buyer is using its market power, perhaps together with pursuing claims before the court and

C. The NDRC's Unfair Pricing Test

The NDRC has adopted guidelines for assessing unfair pricing that appear to differ from the standard test based on *United Brands* that is used in other jurisdictions. According to Article 11 of the Anti-Price Monopoly Regulations that the NDRC issued on December 29, 2010 and that took effect in February 2011,¹⁰²

in determining if prices are unfairly high or low, the enforcement agency must consider: (i) whether the sales price or purchase price is markedly higher or lower than the price at which other business operators sell or purchase the same type of commodities; (ii) where costs are essentially stable, whether the sales price was raised or the purchase price lowered beyond the normal range; (iii) whether the level of the price increase for the sale of commodities is markedly higher than the cost increase range, or whether the range of the price reduction for the purchase of commodities is markedly greater than the transaction counterparty's cost reduction range; and (iv) other related factors.

The first factor considered by NDRC focuses on price comparisons. As we discussed earlier, such price comparisons can be helpful for assessing whether the price charged is significantly greater than cost and whether it reflects economic value provided by the seller. However, it is common in competitive markets for prices to differ between firms for pro-competitive reasons.¹⁰³ That is particularly true in business-to-business markets for intermediate goods in which the parties engage in private negotiation and prices are not public. Such price differences are common in China.¹⁰⁴

regulator, to secure an unfairly low price.

¹⁰² See Anti-Price Monopoly Regulations, NDRC Order No. 7, December 29, 2010, available at http://www.gov.cn/flfg/2011-01/04/content_1777969.htm.

¹⁰³ See Massimo Motta (2004), *Competition Policy: Theory and Practice*, Cambridge, UK: Cambridge University Press, at pp. 493-498; see also Michael E. Levine (2002), "Price Discrimination without Market Power," *Yale Journal on Regulation*, 19, 1; William J. Baumol and Daniel G. Swanson (2003), "The New Economy and Ubiquitous Competitive Price Discrimination: Identifying Defensible Criteria of Market Power," *Antitrust Law Journal*, 70(3), 661-685.

¹⁰⁴ For example, large retail stores such as Walmart get discounts from suppliers which make it possible for Walmart to offer consumers lower prices and better quality in China. See Walmart Shopping Mall Ignite Business in Yanqing, Sina, September 1, 2009, available at <http://travel.sina.com.cn/news/2009-09-01/1007104419.shtml>. To take another common example parks and museums offer discounted prices to senior citizens, students and other special group of consumers. See China National Tourism Administration, 2012

Reliable price comparisons must compare like-to-like and therefore account for at least three sources of differences: (1) Price comparisons must consider differences between the products and services offered by different sellers. (2) Price comparisons should account for differences between buyers including size and bargaining power. (3) Price comparisons must account for differences in the terms of trade and contract details between different buyers, since some buyers may pay higher prices but either get greater value from the seller or impose more costs on the seller than other buyers.

In competitive markets, bargaining between buyers and sellers results in some buyers securing lower prices than other buyers. An antitrust policy that required the seller to extend the discount it is offering one firm to all other firms could prevent the seller from offering or agreeing to this discount for anyone. That could harm consumers. Suppose, for example, that a large buyer insists on a discount for the higher volume and the greater revenue certainty it brings the seller. An antitrust policy that required the seller to extend the same discount to the larger firm that it offers to other firms could prevent the seller from offering this discount, resulting in less production and higher consumer prices than is otherwise necessary. It could also give the seller additional negotiating power by arguing that government policy prevents it from offering a discount.

The second two factors focus on the relationship between price and cost. As we noted earlier, in many markets there is not a close correspondence between prices and costs, especially marginal costs. That is particularly true in innovation-intensive industries, those based on intellectual property, and those based on multi-sided platforms including many Internet-based companies. In those situations there are no competitive reasons why prices and costs should strictly follow each other.

The second two factors also do not consider the possibility that prices may change because of demand and the value that buyers place on the product. They therefore ignore two important aspects of the price system. First, prices help allocate scarce resources to their highest valued use. When demand increases without a corresponding increase in supply, prices rise so that the buyers who value the product most highly obtain the limited supply. Without the price increase there would be the queues and rationing that arose under certain centralized price settings. Second, prices provide signals for entry and innovation. Prices signal firms to enter and for innovators to consider substitute products and cost-saving innovations. If prices were not allowed to adjust, this signaling function of the price system would be lost.

The NDRC's regulations "prove too much" in the sense that they would find very common market pricing practices unfair. The NDRC has so far followed international practice in bringing few unfair pricing claims under the AML and has maintained the long-standing policy of letting markets decide prices. The NDRC's regulations could be improved, and made consistent with its overall reliance on markets, by explicitly incorporating the economic value prong of the *United Brands* test, acknowledging the importance of the demand side of the market in determining prices, and recognizing that the price comparisons must compare like-to-like (and therefore account for differences). The NDRC may intend to consider these issues, as well as the specific complications associated with innovation-intensive industries and the presence or absence of exclusionary conduct, under the final provision in the regulations addressing "other relevant factors".¹⁰⁵

D. Excessive Pricing Enforcement Under the AML

Thus far unfair pricing under the AML has made just two limited appearances on the antitrust stage in China. The decisions in both cases depart from the best practices followed in most leading antitrust jurisdictions.

The Guangdong Price Bureau, following the NDRC regulations and guided by it fined two companies that were under common ownership for charging unfairly high prices for "river sand."¹⁰⁶ River sand is a type of sand from riverbeds that is used for construction material such as plaster and mortar. The Guangdong Price Bureau compared the prices charged by these two companies with companies in other river sand markets and found that their prices were higher. It also found that they had increased their prices by almost three times their increases in costs (54.4 percent versus 20 percent).

¹⁰⁵ Article 26 of the NDRC's Anti-Price Monopoly Regulations reiterates the sensitivity to the exercise of intellectual property rights reflected in Article 55 of the AML. It states: "These Rules are not applicable to conduct of undertakings to exercise their intellectual property rights in accordance with the intellectual property laws and relevant administrative regulations however these Rules are applicable to monopolistic pricing conduct of undertakings that abuse their intellectual property rights *to eliminate or restrict market competition*" (emphasis added).

¹⁰⁶ NDRC, "Guangdong Punished Sea Sand Price Monopoly Case to Guarantee the Smooth Proceeding of National Important Project Construction", October 26, 2012 available at http://jjs.ndrc.gov.cn/gzdt/t20121026_510834.htm. The Guangdong Price Bureau's river-sand case is the only application of Article 17(1) of the AML by the Chinese price bureaus or by the NDRC itself that we have identified.

We do not have access to the Guangdong Price Bureau's decision or knowledge of its reasoning. Based on what is in the public record it does not appear that the "circumstances" identified by the Guangdong Price Bureau are "exceptional." It is common for dominant firms to charge more than other dominant firms in other markets. Dominant firms raise their prices more than increases in costs for a variety of reasons, including increases in demand. It would not seem that there are permanent barriers to entry into the business because of legal or regulatory reasons. The Guangdong Price Bureau may have focused on the river sand industry for general economic policy reasons and added the AML claim for emphasis or it may have had other reasons that we do not know about.

For our analysis of innovation-intensive industries *Huawei vs. InterDigital* is the more relevant matter.¹⁰⁷ InterDigital develops wireless technologies and licenses its patents on these technologies. The Shenzhen Intermediate Court heard two separate cases. There was an antitrust case in which Huawei claimed that InterDigital was offering a license to its Standards-Essential Patents (SEPs) at rates that were discriminatory and excessive, imposed unfair trading conditions, and engaged in tying and refusal to deal. There was also a contract case in which Huawei claimed that InterDigital breached its obligation to provide a fair reasonable and non-discriminatory (FRAND) license under its agreement with the relevant SSO.

The Shenzhen Intermediate Court ruled against InterDigital in both cases. The court did not publish its decisions because of confidential information but the judges who decided the case have published two articles that briefly summarize their analysis and findings. In the antitrust case the court found, among other things, that InterDigital had offered its patents at excessive prices to Huawei in violation of Article 17(1) and at discriminatory prices in violation of Article 17(6) of the AML.¹⁰⁸ In the FRAND case the court found that the appropriate FRAND rate was a small fraction of what InterDigital had asked Huawei to pay.¹⁰⁹ The antitrust and FRAND

¹⁰⁷ There were two decisions regarding the abuse of dominance claim and the FRAND claim respectively. The case involving the abuse of dominance claim is Shenzhongfazhiminchuzi No. 857 (2011), and the case involving the FRAND claim is Shenzhongfazhiminchuzi No. 858 (2011). Neither decision is public.

¹⁰⁸ See Ye Ruosi, Zhu Jianjun & Chen Wenquan (2013), "Determination of Whether Abuse of Dominance by SEP Owners Constitutes Monopoly: Comments on the Antitrust Lawsuit *Huawei v. InterDigital*," *Electronics Intellectual Property*, vol.3. See also the decision summarized in the InterDigital's annual report. InterDigital 2013 Annual Report filed Feb. 26, 2013, available at <http://ir.interdigital.com/secfiling.cfm?filingID=1405495-13-10&CIK=1405495>.

¹⁰⁹ See Ye Ruosi, Zhu Jianjun & Chen Wenquan (2013), "The Implementation of FRAND in the Litigations Involving SEP's Royalty Rates: Comments on SEP Royalty

decisions were both upheld by the Guangdong High People's Court.¹¹⁰ The parties settled the matter and there were no further appeals.¹¹¹

The InterDigital matter is the only Chinese court case to our knowledge that has involved an application of the unfair pricing law to an innovation-intensive industry. It is difficult to conclude much about the direction that the Chinese courts will take on the application Article 17(1) to IPR given that the unfair pricing claim was just one of several antitrust claims; much of the analysis of prices themselves occurred in the FRAND contract case; the decisions themselves have not been published; and the decisions have not been heard by the Supreme People's Court. Moreover, InterDigital does not seem to have submitted sufficient evidence about its licensing agreements to permit the court to make a fully informed analysis.

Subject to these caveats, one interesting aspect of the decision is that it does not appear to have expressly addressed Article 55 of the AML, which exempts the exercise of IPRs from antitrust scrutiny unless those rights are used to eliminate or restrict market competition. It may be that the court concluded that the extreme disparities it found in rates charged to different licensees had such an anticompetitive effect, but that is not clear from the information about the case that is publicly available.¹¹² If the court did not make such a finding, it would be hard to reconcile the decision with Article 55. In that case, the court's approach would also be inconsistent with the approach in most other jurisdictions of limiting excessive pricing cases regarding IPRs to situations in which a firm pursued an exclusionary strategy.¹¹³

Nevertheless, the judges for the Shenzhen Intermediate Court made a conscientious effort to address a set of difficult issues concerning negotiating FRAND royalty rates for SEPs. This Chinese court is not the first to find this topic challenging. We are therefore optimistic that the Chinese courts will find the approach towards unfair pricing followed in other jurisdictions, and in particular towards innovative-intensive industries, helpful in shaping the case law on the application of Article 17(1).

Lawsuit *Huawei v. InterDigital*," *Electronics Intellectual Property*, vol.4.

¹¹⁰ See Zhu Jianjun, "Determination of Whether Abuse of Dominance by SEP Owners Constitutes Monopoly: Comments on the Antitrust Infringement Case *Huawei v. InterDigital*," China Intellectual Property News, December 5, 2013, available at <http://www.cipnews.com.cn/showArticle.asp?Articleid=29779>.

¹¹¹ "InterDigital Settles with Huawei," WIPR, January 7, 2014, available at <http://www.worldipreview.com/news/interdigital-settles-with-huawei>.

¹¹² The existence of such disparities would not by itself, however, demonstrate that competition was eliminated or excluded in handset manufacturing.

¹¹³ InterDigital also did not have a monopoly over an entire industry like the post office. It was one of a number of entities that had SEPs over mobile wireless technologies.

VI. CONCLUSIONS

China is at the very beginning of developing the best way to apply its new antitrust laws to its economy. Chinese courts and regulators should certainly not simply parrot the practice of other countries, but China can learn from the many decades of experience and numerous cases considered by courts and competition authorities, particularly the large ones in the European Union and the United States. China carefully modeled its laws from elements of these jurisdictions, and the courts and competition authorities are looking at international practice. It therefore makes sense, in the case of unfair pricing, to consider how competition case law and policy has evolved in other jurisdictions. Both the practice of other jurisdictions and sound economic analysis recommends that China should rarely if ever apply the unfair pricing law to innovation-intensive industries unless the unfair pricing is related to an exclusionary practice that has an anticompetitive effect. For the same reasons, and as apparently required under Article 55 of the AML, the experience of other jurisdictions and sound economic analysis strongly suggests that the unfair pricing law should not apply to intellectual property except when the unfair price is part of an exclusionary abuse.

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