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***Sleepy Hollow* and the Arrovian Legend:
Is There a Generalizable Relationship Between
Concentration and Innovation?**

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“Big Techs and Start-Ups: Where is the Innovation?”*

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I. INTRODUCTION

Good evening! Many thanks to Concurrences and Nicolas Charbit for inviting me here today, to Frédérick Jenny for moderating, and to Isabelle de Silva for joining me in sharing thoughts on tonight's topic. Specifically, we've been asked to address "Big Techs and Start-Ups: Where is the Innovation?"¹ Given the growing focus on the acquisition of nascent competitors by large tech firms, the question is timely.

Before I begin, I must give the standard disclaimer: The views I express today are my own, and do not necessarily reflect the views of the U.S. Federal Trade Commission or any other Commissioner.

Many commentators assert that the acquisition of nascent competitors necessarily reduces competition. There are two strains of this argument. First, many today believe that small firms are inherently more innovative than large ones, so that the acquisition of a small firm by a large one necessarily reduces innovation.² A few others have argued that some famous corporate behemoths, like AT&T and IBM, were less innovative before they faced antitrust suits.³

¹ Of course, I am not the first sitting FTC Commissioner to consider the nature of innovation and its role in competition policy. See, e.g., Terrell McSweeney & Brian O'Dea, *Data, Innovation, and Potential Competition in Digital Markets – Looking Beyond Short-Term Price Effects in Merger Analysis*, CPI ANTITRUST CHRONICLE, Feb. 2018, at 7, https://www.competitionpolicyinternational.com/wp-content/uploads/2018/02/AC_February.pdf; J. Thomas Rosch, Comm'r, FTC, Remarks at the USC Gould School of Law 2010 Intellectual Property Institute, Promoting Innovation: Just How "Dynamic" Should Antitrust Law Be?, at 3, Mar. 23, 2010, available at https://www.ftc.gov/sites/default/files/documents/public_statements/promoting-innovation-just-how-dynamic-should-antitrust-law-be/100323uscremarks.pdf

² See, e.g., John W. Lettieri, Testimony before the U.S. Senate Committee on Small Business and Entrepreneurship, America Without Entrepreneurs: The Consequences of Dwindling Startup Activity, June 29, 2016, https://www.sbc.senate.gov/public/_cache/files/0/d/0d8d1a51-ee1d-4f83-b740-515e46e861dc/7F75741C1A2E6182E1A5D21B61D278F3.lettieri-testimony.pdf (arguing that a "startup slowdown" means "less innovation" and "less competition" and that "[w]ithout healthy competition [from startups], incumbents have less of a reason to innovate and more ability to raise prices"); David Dayen, *Bring Back Antitrust*, AMERICAN PROSPECT (Fall 2015), available at <https://prospect.org/article/bring-back-antitrust-0> (arguing that "economic concentration and novel abuses of market power" are "harming consumers, workers, and innovators" because, in part, "[t]he case of retractable technologies shows how monopolies can inhibit innovation, by preventing start-ups from getting products out" and noting that "[t]he New America Foundation found start-ups fell 53 percent between 1977 and 2010").

³ See, e.g., Jonathan Taplin, *Can the Tech Giants Be Stopped?*, WALL ST. J., July 14, 2017, available at <https://www.wsj.com/articles/can-the-tech-giants-be-stopped-1500057243> (arguing, among other things, that "[t]he

Second, some believe that more concentrated industries are as a rule less innovative than more concentrated ones, and therefore any acquisition that increases concentration necessarily reduces competition.⁴

Some trace these arguments to work by Kenneth Arrow, a Nobel Prize-winning economist. In what is commonly called the “Arrow vs. Schumpeter” debate, Schumpeter supposedly championed the opposing view that monopolists are more innovative.

Some commentators today claim that subsequent empirical research has unambiguously proven Arrow’s hypothesis that small firms are more likely to innovate, and disproven Schumpeter’s hypothesis to the contrary. Whether this claim is true could have significant implications for the hot button issue of killer acquisitions, and for that reason it is worthy of our time this evening.

A closer look at the evidence reveals that this narrative is actually more legend than fact. As I will explain tonight, folks often oversimplify both Arrow and Schumpeter’s arguments to create a stark dichotomy.⁵ This treatment unfortunately glosses over important assumptions, limitations, and qualifications that make their theoretical models poor metaphors for today’s markets. Characterizations of the empirical literature are likewise distorted. For that reason, and for simplicity, I will call the modern adaptation of Arrow’s work – espoused by Professor Tim Wu, Senator Warren, and others⁶ – the “Arrovian legend.”⁷

astonishing technological revolution of the past half-century would never have occurred without the impetus of three seminal antitrust prosecutions,” against AT&T (1956), IBM, and Microsoft, which distracted large firms or forced them to cede licenses or markets to new entrants).

⁴ See *infra* notes 11-12 and accompanying text.

⁵ See, e.g., Open Markets Institute, Innovation & Monopoly, <https://openmarketsinstitute.org/explainer/innovation-and-monopoly/> (last visited Sept. 12, 2019) (“Influenced by Joseph Schumpeter, these libertarians argued that monopolists would be the most innovative companies of all, because they could capture all of the profits from their new inventions without facing any competition.”).

⁶ See *infra* notes 11-12 and accompanying text.

⁷ To be clear, my quibble here is not with Arrow’s work, but rather with the oversimplified version of it we now hear in the modern debate surrounding the acquisition of nascent competitors.

Of course, legends are part of the landscape here in the United States. For example, Silicon Valley is home to real-life unicorns with names like Uber, Pinterest, and Peloton.⁸ The conquistador Ponce de Leon supposedly was convinced that the mythical Fountain of Youth could be found somewhere in my native Florida.⁹ And, about twenty miles north of where we sit tonight, the famous Headless Horseman of Sleepy Hollow haunts the hamlet of Tarrytown, New York.¹⁰

Unlike some of those tales, the Arrovian legend is of much greater practical importance. If we believe that startups and less concentrated industries are more innovative, then we should block many of the acquisitions we see in the digital sector. This belief also may cause us to second-guess decisions to approve earlier acquisitions in this industry. (As an aside, I am a big proponent of conducting retrospectives to analyze how previous enforcement decisions played out, with the goal of refining current enforcement approaches accordingly.)

Yet the reality is that economists cannot find a simple relationship between innovation and market structure. In fact, the studies are all over the map, finding that innovation is sometimes maximized by monopoly, other times by oligopoly, and yet other times by perfect competition. But these studies do consistently find that our ability to predict the relationship between innovation and competition improves significantly if we add other variables – namely, (i) innovation-level factors, (ii) industry-level factors, and (iii) firm-level factors. The clear

⁸ See, e.g., Justin Lahart, *Public Markets Expose the Myth of the Unicorn*, Wall St. J., May 23, 2019, available at <https://www.wsj.com/articles/public-markets-expose-the-myth-of-the-unicorn-11558627761> (defining unicorns as “venture-backed companies privately valued at \$1 billion or more”); Stephanie Stamm, *How Tech Unicorns Are Raking In Cash but Losing Big Money*, WALL ST. J., Mar. 29, 2019, available at <https://www.wsj.com/articles/how-tech-unicorns-are-raking-in-cash-but-losing-big-money-11553857200> (identifying Uber, Pinterest, Peloton, and several other firms as unicorns).

⁹ See, e.g., Willie Drye, *Fountain of Youth*, NATIONAL GEOGRAPHIC, <https://www.nationalgeographic.com/archaeology-and-history/archaeology/fountain-of-youth/> (last accessed Sept. 11, 2019).

¹⁰ WASHINGTON IRVING, *THE LEGEND OF SLEEPY HOLLOW* 1 (Project Gutenberg 2008) (1820) (setting the tale in “a small market town or rural port, which by some is called Greensburgh, but which is more generally and properly known by the name of Tarry Town”).

message is that when we're assessing innovation, we should conduct a holistic evaluation more closely tethered to the facts at hand.

II. TODAY'S ARROVIAN LEGEND

Despite this nuance, many in Washington believe the answer to tonight's question is obvious: Small firms *must* be more innovative than large ones. For example, Tim Wu recently testified before Congress that we could increase innovation in technology sectors by imposing greater regulations and stepping up antitrust enforcement because “[o]ver the last century, competitive, open sectors — ecosystems — have proved themselves superior to those monopolized or dominated by a ‘big three’ or ‘big four.’”¹¹

Wu is not alone. Senator Warren argues that breaking up Big Tech will increase the pace of innovation in digital markets.¹² Similarly, when serving as Chairman of the Council of Economic Advisors under President Obama, Jason Furman argued that “doing nothing” about increasing market concentration in technology markets “risks a slowdown in innovation.”¹³ And Lina Khan, who now staffs the Antitrust Subcommittee of the U.S House of Representatives, wrote that “monopolies and oligopolies produce a host of harms,” including “retard[ing] innovation.”¹⁴

I fear that some of these treatments gloss over the nuance we see in the empirical literature. Perhaps this oversimplification reflects a laudable instinct to synthesize the mass of

¹¹ Tim Wu, *Where New Industries Get Their Start: Rebooting the Startup Economy*, Testimony before the Committee on the Judiciary, at 4, July 16, 2019, *available at* <https://docs.house.gov/meetings/JU/JU05/20190716/109793/HHRG-116-JU05-Wstate-WuT-20190716.pdf>.

¹² Elizabeth Warren, Tweet, June 2, 2019, 5:12 PM, <https://twitter.com/ewarren/status/1135338528102133760> (“Google has too much power, and they’re using that power to hurt small businesses, stifle innovation, and tilt the playing field against everyone else,” which is why she has “a plan to break up Google and the other big tech companies.”).

¹³ Jason Furman, Note to the OECD Directorate for Financial and Enterprise Affairs, Competition Committee, Hearing on Market Concentration, DAF/COMP/WD(2018)67, at ¶ 22.

¹⁴ Lina M. Khan, *The Ideological Roots of America’s Market Power Problem*, YALE L.J. FORUM 960, 961 (June 4, 2018), *available at* <https://www.yalelawjournal.org/forum/the-ideological-roots-of-americas-market-power-problem>

empirical evidence into a simple, administrable rule. But, whatever the origin, the result is that we have created a legend, and one that grows with each retelling.¹⁵

Generally speaking, I am not in favor of sweeping policy proposals – but if we are going to deploy them, we should base them on sound theory and evidence. Therefore, in this context, if we seek to block acquisitions of nascent competitors as a means of promoting innovation, then we should be able to show two things – first, that these acquisitions slow innovation and second, that issuing a blanket prohibition on these types of acquisitions would necessarily hasten innovation. Similar theoretical and evidentiary burdens would apply to proposals to promote innovation by breaking up Big Tech.

III. DECONSTRUCTING THE LEGEND

In deconstructing this legend, we should first ask what the economic literature actually says. The theoretical literature, and particularly the foundational work by Schumpeter and Arrow, includes far more assumptions, qualifications, and limitations than the idealized version

¹⁵ For example, Khan argues that “a host of empirical evidence” favors the Arrovian view. For support, she cites two policy papers, one by Carl Shapiro and the other by Jon Baker. *See id.* at 969 n.41 (citing Shapiro and Baker generally, without pincites, as support). Yet Shapiro and Baker are themselves far more nuanced and modest in their claims. *See* Carl Shapiro, *Competition and Innovation: Did Arrow Hit the Bull’s Eye?*, in *THE RATE AND DIRECTION OF INVENTIVE ACTIVITY REVISITED* 361, 362-63 (Josh Lerner & Scott Stern eds., 2012) (describing his paper as “an audacious attempt to distill lessons from the huge and complex literature on competition and innovation that are simple and robust enough to inform competition policy,” noting that Schumpeter “emphasized that a great deal of innovation is attributable to large firms operating in oligopolistic markets,” “consciously oversimplifying” the Schumpeterian position as “[t]he prospect of market power and large scale spurs innovation,” and arguing “that the Arrow and Schumpeter perspectives are fully compatible and mutually reinforcing”); Jonathan B. Baker, *Beyond Schumpeter vs. Arrow: How Antitrust Fosters Innovation*, 74 *ANTITRUST L.J.* 575, 583-587 (2007) (conducting an abbreviated literature review, arguing that almost all of the reviewed studies are flawed or limited, and offering an alternative explanation for some empirical findings, but nonetheless concluding that “[t]aken as a whole, this empirical evidence highlights the importance of the second principle” that competition “encourages [firms] to innovate”).

Likewise, the theoretical literature may be oversimplified. For example, a scholar who argues “Schumpeter was right” claims he “advanced the now familiar hypothesis that large firms with market power accelerate the rate of innovation.” Tom Nicholas, *Why Schumpeter Was Right: Innovation, Market Power, and Creative Destruction in 1920s America*, 63 *J. ECON. HISTORY* 1023, 1023 (2003). Again, this approach may simply reflect an impulse to simplify a complex argument for exposition. But others take a more nuanced approach when characterizing Schumpeter’s thesis. *See, e.g.,* Shapiro, *supra*, at 363.

we commonly hear. And, contrary to what we often hear, the empirical literature finds no clear and robust relationship between innovation and market structure. Instead, it identifies a large number of factors that affect the pace and direction of innovation. In short, the evidence is far less clear-cut than many observers claim.

A. Theoretical Literature

Let's start at the beginning, with Arrow and Schumpeter's theoretical articles. Today, Arrow apparently stands for the proposition that atomistic markets are always more innovative than concentrated ones.¹⁶ If you read Arrow's seminal 1962 article,¹⁷ you will indeed find a passage in which he said that "the incentive to innovate is less under monopolistic than under competitive conditions."¹⁸ Yet immediately before this statement you will find two qualifications that the modern Arrowian legend ignores. First, Arrow explained that the "monopolistic" conditions he has in mind are those in which a firm enjoys significant barriers to entry and in which "only the monopoly itself can invent."¹⁹ I have practiced antitrust law for more than two decades, and I have yet to find a market in which only one firm can innovate. Second, in the same paragraph Arrow also said that "a situation of temporary monopoly, due perhaps to a previous innovation, which does not prevent the entrance of new firms with innovations of their own, is to be regarded as more nearly competitive than monopolistic for the purpose of this analysis."²⁰

In other words, Arrow would characterize most – if not all – of the industries that exist today as "more nearly competitive than monopolistic," and therefore presumably more

¹⁶ See Wu, *supra* note 11.

¹⁷ Kenneth J. Arrow, *Economic Welfare and the Allocation of Resources for Invention*, in THE RATE AND DIRECTION OF INVENTIVE ACTIVITY: ECONOMIC AND SOCIAL FACTORS 609 (1962).

¹⁸ *Id.* at 619.

¹⁹ *Id.*

²⁰ *Id.*

innovative than his hypothetical pure monopolist. But observers now routinely argue that today's tech firms are precisely the kind of monopolists Arrow had in mind.²¹

Sometimes good legends come in pairs, like Merlin and Excalibur. And so some have paired the Arrovia legend with a Schumpeterian one. Going back to the original work, Joseph Schumpeter's 1942 book,²² I can confirm that Schumpeter did say "the trail [of innovation] leads not to the doors of those firms that work under conditions of comparatively free competition but precisely to the doors of the large concerns" and that "a shocking suspicion dawns upon us that big business may have had more to do with creating the standard of life than with keeping it down."²³ Yet he also said that the "perennial gale" of "creative destruction" affects all firms, from "new concerns, methods and industries" to "old concerns and established industries."²⁴ And, perhaps even more to the point, he also said his theory "does not amount to a case against state regulation," but instead shows "that there is no general case for indiscriminate 'trust-busting' or for the prosecution of everything that qualifies as a restraint of trade."²⁵ So what Schumpeter actually said bears little resemblance to the caricature we sometimes hear today.²⁶

²¹ See, e.g., Tim Wu, *Taking Innovation Seriously: Antitrust Enforcement If Innovation Mattered Most*, 78 ANTITRUST L.J. 313, 318 (2012) ("In more recent times, we might ask if Google would have continued to improve its search engine or developed Google+ if not facing serious challenges from Microsoft or Facebook, respectively. As Kenneth Arrow pointed out long ago, absent an external threat, a monopolist often has less to gain from innovation, because it already controls the market.") (citing Arrow, *supra* note 17, at 619).

²² JOSEPH A. SCHUMPETER, *CAPITALISM, SOCIALISM AND DEMOCRACY* (3d. ed., 1962) (1942).

²³ *Id.* at 82.

²⁴ Schumpeter at 90 ("Our argument however extends beyond the cases of new concerns, methods and industries. Old concerns and established industries, whether or not directly attacked, still live in the perennial gale. Situations emerge in the process of creative destruction in which many firms may have to perish that nevertheless would be able to live on vigorously and usefully if they could weather a particular storm.").

²⁵ *Id.* at 91.

²⁶ Of course, some take an appropriately nuanced position. See, e.g., Alan Devlin, *Antitrust as Regulation*, 49 SAN DIEGO L. REV. 823, 844 (2012) (arguing that "[b]roadly speaking, the Schumpeterian view counsels a laissez-faire approach to antitrust policy with respect to dominant-firm unilateral behavior" and that, if "policymakers wish to promote dynamic over static innovation," then "interventionist antitrust policy aimed at fostering competition in monopolized markets may have undesirable results").

B. Empirical Literature

Having corrected the theory, let's now turn to the empirical literature, which is quite voluminous. RAND economist Wesley Cohen's literature review cites almost 450 economics papers on the relationship between market structure and innovation,²⁷ but acknowledges that many more exist. Because this body of literature is so vast, I am not surprised that folks can point to a study here or there that supposedly demonstrates that atomistic markets are more innovative. But the relevant question is whether there are any robust results that hold across a wide range of studies. Although there is a growing body of literature reviews that attempt this feat, for today's purposes I will focus on two – the Cohen one I just mentioned and another by UC-Berkeley Economics Professor Richard Gilbert.²⁸ These widely cited studies, published in leading peer-reviewed journals, reach similar conclusions.

First, neither study found robust evidence that small firms “punched above their weight,” so to speak, when it came to innovation. Gilbert finds that “[t]he empirical literature is generally consistent with the conclusion that R&D expenditures increase in proportion to business unit size above some threshold that varies across industries.”²⁹ Cohen likewise finds that large and small firms invest in R&D at similar rates.³⁰ Yet he also finds that large firms are better on some metrics and worse on others. He finds that “the number of innovations” – as opposed to R&D spending – “tends to increase less than proportionately with firm size, and the share of R&D

²⁷ See Wesley M. Cohen, *Fifty Years of Empirical Studies of Innovative Activity and Performance*, I HANDBOOKS IN ECONOMICS 129, 198-213 (2010) (References); see also *id.* at 131 (“Although the literature considered here is extensive, this survey examines only studies of innovation that fall under the rubric of industrial organization economics. Moreover, given a rapid growth in this literature since the 1995 review, the review of the more recent empirical literature will be selective.”).

²⁸ See *id.*; Richard Gilbert, *Looking for Mr. Schumpeter: Where Are We in the Competition-Innovation Debate?*, 6 INNOVATION POLICY AND THE ECONOMY 159 (2006).

²⁹ Gilbert, *supra* note 28, at 205.

³⁰ Cohen, *supra* note 27, at 137 (“[T]he robust empirical patterns relating to R&D and innovation to firm size are that R&D increases monotonically—and typically proportionately—with firm size among R&D performers within industries.”)

effort dedicated to more incremental and process innovations tends to increase with firm size,”³¹ but that larger firms also “appear to be better positioned to profit from the innovations they have in hand.”³² In other words, firm size does not appear to matter much in isolation, but may matter when combined with other variables.

Second, neither study found robust evidence that more competitive markets are necessarily more innovative. According to Gilbert, “neither theory nor empirical evidence supports a strong conclusion that competition is uniformly a stimulus to innovation” and “[t]here is little evidence that there is an optimal degree of competition to promote R&D.”³³ In a similar vein, Cohen concludes that “[p]erhaps one of the most basic lessons to emerge from the empirical literature is that, although testing loosely motivated hypotheses may yield empirical results, even robust ones, their interpretation can be challenging, and the insight that can be gleaned from such findings is often limited in the absence of underlying theory.”³⁴

So, to put it in more concrete policy terms, we cannot say that small firms always and everywhere are more innovative than large ones. Nor can we say that deconcentrating a market now dominated by a few large firms will necessarily result in more innovation.

IV. TOWARDS A MORE NUANCED APPROACH

So what can we say? Again, the empirical literature points the way. Cohen says “perhaps the most persistent finding concerning the effect of concentration on R&D intensity is that it depends upon other industry-level variables.”³⁵ “It depends” – how you hear those words depends on where you sit. To an outside lawyer who bills by the hour, it’s a dream come true.

³¹ Cohen, *supra* note 27, at 137.

³² *Id.* at 140.

³³ Gilbert, *supra* note 28, at 205-06.

³⁴ Cohen, *supra* note 27, at 198.

³⁵ *Id.* at 146.

To a business that pays by the hour, it's a nightmare. And to an academic, it's a clear path to tenure.

In the interests of time, I won't flesh out all of the variables upon which it depends.³⁶ But I will say they appear to fall into three broad categories.

The first category contains *variables specific to the innovation itself*. Much of the literature recognizes a distinction between incremental innovations and “radical,” or “leapfrog,” ones.³⁷ For example, the invention of the transistor represented a radical leap over the earlier vacuum tube technology. The literature also frequently distinguishes between “process” innovations, which allow firms to make the same good more cheaply, and “product” ones that create an entirely new type of good.³⁸ Process innovations may make horse-drawn carriages less expensive to produce, while Henry Ford's product innovation of the horseless carriage gave us a transformative new product. And finally, some scholars distinguish between “winner take all” innovations and “cumulative” ones, where others may build upon each other's inventions.³⁹

The second category contains *variables specific to the industry*, like consumer demand characteristics,⁴⁰ the level of intellectual property protection,⁴¹ which some refer to as

³⁶ For example, I do not here discuss in detail an alternative strain in the literature that focuses upon broader theoretical concepts like contestability, appropriability, and synergies. See, e.g., Shapiro, *supra* note 15, at 363-65. These concepts are also relevant but beyond the scope of the discussion this evening.

³⁷ Cohen, *supra* note 27, at 137 (“Though less explored than the relationship between firm size and innovations per R&D dollar due to limited availability of data (see below), scholars have also examined the relationship between firm size and the types of innovation pursued, focusing on the degree to which firm size is related to process versus product R&D, or to the generation of incremental versus more significant or “radical” (variously defined; see below) innovations.”); Gilbert, *supra* note 28, at 172-75.

³⁸ Cohen, *supra* note 27, at 137 (quoted immediately above); Gilbert, *supra* note 28, at 161 (“As a general conclusion, there is modest support for the proposition that process innovations, which tend to be used internally, are more profitable for large businesses, because the benefits of process innovations are proportional to the level of production to which the innovations apply. For product innovations, there is little evidence to support the Schumpeterian view that monopoly or highly concentrated market structures promote innovation, and some evidence supporting the conclusion that innovation thrives in more competitive markets.”).

³⁹ See, e.g., Gilbert, *supra* note 28, at 202 (describing branded pharmaceutical innovation as cumulative but noting that first movers enjoy a significant advantage over later entrants).

⁴⁰ Cohen, *supra* note 27, at 169-172.

⁴¹ Gilbert, *supra* note 28, at 192-93.

“appropriability,”⁴² the relative “maturity” of the industry,⁴³ and the inherent level of technological opportunities.⁴⁴ For example, Cohen suggests that innovation is greater in the pharmaceutical industry because the nature of small-molecule drugs makes it very difficult to “invent around” a patent, providing a patentee with a near-complete ability to exclude rivals.⁴⁵ In contrast, he believes that it is significantly easier to design around electrical or mechanical patents, which may cover only one of three or four different ways to accomplish a task.⁴⁶ Industry clustering may also explain why some industries are more innovative than others. The American semiconductor industry clustered in Silicon Valley; the global finance industry clustered in New York, London, Singapore, Frankfurt, and Zurich. Clusters may promote the development of specialized labor forces and the diffusion of new ideas among firms,⁴⁷ thereby increasing the pace of innovation and making more intensive use of the unpatented innovations that have already occurred.⁴⁸

The third category contains *variables specific to the firm*, like the firm’s culture, leadership, and inherent capacity to absorb and apply new innovations.⁴⁹ For example, Cohen hypothesizes that firms may have differential capacities to assimilate and use new technologies.⁵⁰

⁴² See Cohen, *supra* note 27, at 182-193; see also Shapiro, *supra* note 15, at 364.

⁴³ Cohen, *supra* note 27, at 139 n.9 & 140 (discussing Zoltan J. Acs & David B. Audretsch, *Innovation, Market Structure, and Firm Size*, 71 REV. ECON. & STAT. 567 (1987); NANCY S. DORFMAN, *INNOVATION AND MARKET STRUCTURE: LESSONS FROM THE COMPUTER AND SEMICONDUCTOR INDUSTRIES* (1987)).

⁴⁴ Gilbert, *supra* note 28, at 194-95.

⁴⁵ Cohen, *supra* note 27, at 183 n.71 (discussing Richard C. Levin et al., *Appropriating the Returns from Industrial Research and Development*, 1987 BROOKINGS PAPERS ON ECONOMIC ACTIVITY 783 (1987)).

⁴⁶ *Id.*

⁴⁷ See, e.g., EUROPEAN COMMISSION, DIRECTORATE-GENERAL FOR ENTERPRISE AND INDUSTRY, *EU CLUSTER MAPPING AND STRENGTHENING CLUSTERS IN EUROPE*, Europe Innova Paper No. 12, 2009, available at http://publications.europa.eu/resource/cellar/6f14c45f-7d6a-49c7-9bbf-785b313657d4.0001.02/DOC_1

⁴⁸ See, e.g., CHARLES R. MORRIS, *THE DAWN OF INNOVATION*, ch. 4 (2012) (describing the development of interchangeable parts and specialization of labor as first occurring among the arms manufacturers that clustered around the U.S. Armory in Springfield, Massachusetts in the early 19th century).

⁴⁹ See Cohen, *supra* note 27, at 195.

⁵⁰ *Id.* (“Thus, while one may assume that there is some latent technological opportunity that is uniform across firms within an industry, its effect for any given firm may be conditioned by whether the firm possesses the ability to evaluate, assimilate, and exploit the relevant knowledge. More generally, to understand how and to what degree

V. CONCLUSION

In recent years, we have seen the growth of a new legend. Using a highly stylized version of Arrow's work and aggressive claims about the empirical literature, some today argue that startups and less concentrated markets are more innovative than large firms and more concentrated markets. But the reality is far more equivocal and nuanced.

The empirical literature cautions that there is no good basis to assume that an acquisition of a nascent competitor by a large incumbent will necessarily reduce competition. It is true that some acquisitions of nascent competitors will slow innovation. But it may also be true that some acquisitions will accelerate innovation. How do we separate the two? Although the size of the merging parties and the structure of the market are important details, we also need information on the firms, the industry, and innovation in that sector before we can confidently predict how a particular transaction would affect innovation.

In other words, it depends – a legendary happy ending for the lawyers and academics.

industry-level factors exercise their effects, we need to know more about what conditions firm learning and information processing within and across industries.”).