

Buy, Keep or Sell: Economic Growth and the Market for Ideas

by

Ufuk Akcigit, Murat Alp Celik and Jeremy Greenwood

February 18, 2015

F Background on the Market for Patents—Supplemental Material

In this section additional background information on the market for patents is provided. The presentation starts with some historical evidence in Section [F.1](#) and then turns to more recent evidence in Section [F.2](#).

F.1 Historical Evidence

Patents constitute a property right over a technology the ownership of which can be transferred to a secondary party. This right was enacted by the Patent Act of 1836, which states:

“And be it further enacted, That every patent shall be assignable in law, either as to the whole interest, or any undivided part thereof, by any instrument in writing; which assignment, and also every grant and conveyance of the exclusive right under any patent, to make and use, and to grant to others to make and use, the thing patented within and throughout any specified part or portion of the United States, shall be recorded in the Patent Office within three months from the execution thereof, for which the assignee or grantee shall pay to the Commissioner the sum of three dollars.”

Since the 1836 Act, the U.S. Patent Office has recorded information on the ownership of all U.S. patents. Many patents have been sold in the market. Unfortunately, despite its importance and wide use, the empirical studies on the market have been limited due to the lack of systematic data [[Lamoreaux, Sokoloff, and Sutthiphisal \(2013\)](#)]. Recently, however, [Khan and Sokoloff \(2004\)](#) have gone through the *Dictionary of American Biography* and collected systematic data on “great inventors” of the 19th century. Their findings are striking: For inventors who started their own firms, it is seen that only one third of the patents in their patent portfolio were actually granted to them, which implies the remaining two thirds were acquired from others. Their study documents the size of the market. The fraction of patents that had a reassignment was between 16-44% during the second half of the 19th century. This number is found to lie between 14-22% for the period 1980-2000—see Figure 3 of the main text.

[Khan \(2014\)](#) argues that the market for patents in the U.S. developed very rapidly thanks to the effective patent and legal system in the country. She (p. 8) states “As a result, American inventors were able to benefit from patent markets to a far greater extent than in other countries. Intermediation enhanced their ability to divide and subdivide the rights to their idea, sometimes

with great complexity, across firms, industries and regions. Successful inventors were able to leverage their reputations and underwrite the research and development costs of their inventions by offering shares in future patents. This process also facilitated trade in patent rights and technological innovations across countries, and numerous American patentees succeeded in establishing multinational enterprises and dominating the global industry.”

This flexible environment and the possibility of selling their inventions provided many inventors, with great potential, the chance to flourish. For instance, Thomas Edison transferred the partial rights for 20 of the first 25 patents in his career [Lamoreaux, Sokoloff, and Sutthiphisal (2013)]. Overall, the existence of the market allowed the *democratization* of innovation. It provided small-scale garage inventors with access to the market for technology. The same is true for female inventors and Khan (2014) provides various examples on how they benefited, in particular, from the market. For instance, Maria Beasley reached an agreement in 1881 to transfer half of the rights for an uncompleted invention to James Henry of Philadelphia, in return for an advance of funds to complete the machine.

The market has been key for allocating important innovations to the right hands. For instance, Nicholas (2009) uses geo-coded data on the location of inventors and research labs to show that a significant fraction of the most valuable patents acquired by firms during the 1920s were most likely not generated in the firms’ research laboratories.

F.1.1 Intermediaries

Many inventors who tried to sell their inventions in the market, such as Rufus M. Porter who invented the alarm clock, washing machine, clothes dryer, and rotary plow, failed because they could not find interested assignees. This market has been associated with severe matching frictions. Khan (2014) argues that intermediaries have the ability to reduce the costs of search and exchange, to enhance liquidity, to improve market depth and breadth, and to increase overall efficiency. Lamoreaux and Sokoloff (1999) report that there were 550 such registered patent agents by 1880. Figure 13 depicts an example of a contract that was prepared around 1870 to transfer to the ownership rights of a patent.

Even during the 19th century, there were manuals for inventors which taught how to sell their patents more easily. Figure 13 shows the cover of one such manual prepared by William E. Simonds in 1871. This manual was advising inventors to advertise their inventions as much as possible. Advertising patents was key for finding a buyer. For instance, Elias E. Reis read an advertisement about a patent on electrical welding, invented by Elihu Thomson in 1886, and said it “immediately opened up to my mind a field of new applications to which I saw I could apply my system of producing heat in large quantities” [Lamoreaux and Sokoloff (1999, p. 23)].

One important observation made by Khan (2014) is as follows. Even though the popular media discusses patent intermediaries [using modern jargon: patent trolls or non-practicing entities (NPE)] as if they have emerged recently, such entities have been the norm in this market throughout the history. NPEs were the norm during the nineteenth century, and technology markets provide ample evidence that patentees who licensed or assigned their rights were typically the most productive and specialized inventors. NPEs did not produce anything with the patents that they purchased. They used their expertise and network to find the right users who could generate the largest expected economic return from these inventions. NPEs profited from intermediation, per se, without participating in either inventive activity or manufacturing.

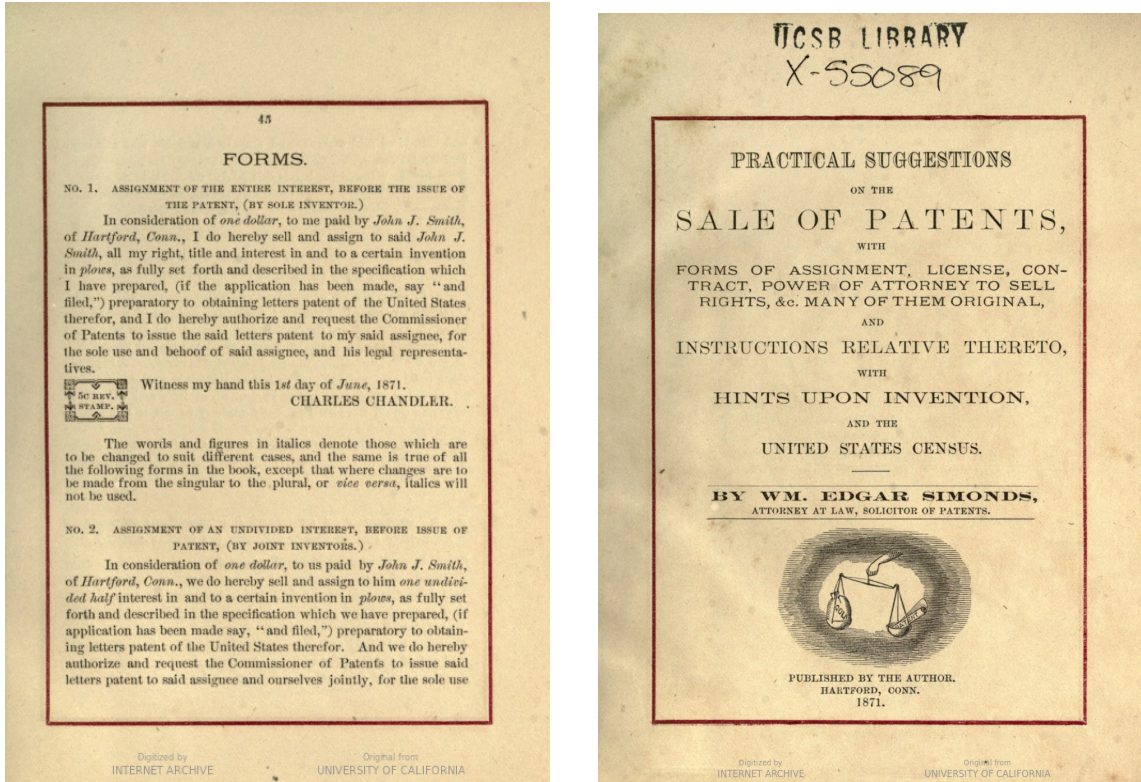


FIGURE 13: PATENT SALE CONTRACT AROUND 1870 (LEFT PANEL) AND THE COVER OF A PATENT SALE MANUAL BY EDGAR SIMONDS, 1871 (RIGHT PANEL).

F.2 More Recent Evidence

As described above, the historical evidence on patents shows that the market for patents has always been very sizable and important; the latter is especially true for small players in the market. A number of recent papers have attempted to estimate the monetary value of the overall volume of the market. Using figures from Internal Revenue Services, [Arora, Fosfuri, and Gambardella \(2001\)](#) estimate the size of the market for patents in the U.S. to be around \$32 billion in 2000. A McKinsey report estimates the same number to be \$100 billion in 2000 [[Elton, Shah, and Voyzey \(2002\)](#)]. In a European Commission (EC) report, [Gambardella, Giuri, and Mariani \(2006\)](#) report that the market for patents in Europe was €9.4 billion between 1994 to 1996 and went up to €15.6 billion in 2000 to 2002, which corresponds to 0.16 and 0.2% of GDP.

The same reports highlight the fact that even though many firms wanted to sell their technologies, they could not do so due to market frictions. For instance, [Gambardella, Giuri, and Mariani \(2006\)](#) estimate the potential market sizes for “sleeping patents” in 1994-1996 and 2000-2002 periods as €14.8 billion and €24.4 billion, which are larger than the actual market sizes. [Elton, Shah, and Voyzey \(2002, p. 2\)](#) report that while companies could potentially earn up to 10% of their operating income from utilizing their patents in technology sales, only 0.5% of patents are actually utilized currently. They conclude that this underutilization is mainly driven by managerial failures and informational asymmetries in the market for patents.

F.2.1 Serendipity

The European Commission report finds that 1/3 of European patents are not used for any industrial purpose. Why are there so many unused patents and why are they produced in the first place? The report states that half of these unused patents are “sleeping patents” that are typically by-product inventions in non-core technologies for which the inventing firm cannot foresee a potential use. Similarly, Sakka (2002) provides an interesting case study: Procter and Gamble (P&G) was commercializing only 10% of its patents and the rest were “sitting on their shelf.” Chesbrough (2006) argues that this huge underutilization of ideas in firms is due to the very decentralized process that determines which projects research staff work on and what discoveries are made in the firm. Many firms recruit R&D personnel by promising research freedom and often compete with universities. This process limits the coupling of research ideas with business ideas. Hence, firms can produce ideas that are not close to their core business activities and cannot foresee a potential use of these ideas either. Elton, Shah, and Voyzey (2002, p. 2) say that “Engineers at chemical companies, for example, aren’t likely to know that the materials and processes they use to separate atmospheric gases could help semiconductor manufacturers reduce the time and money needed to manufacture the high-value integrated circuits that use ceramic rather than plastic bindings. (Ceramic can withstand more heat than plastic and thus allows for smaller sizes and higher densities.) Yet one midsize chemical company, helped by an external network of technologists, discovered that its process could cut the production costs of these chips by up to 20 percent, or more than \$200 million.”

F.2.2 Policy Implications

This huge patent market has important policy implications. Some scholars have argued that despite the rapid growth in the potential of the market for ideas, industrial policies are not following this rapid change and hence are creating obstacles limiting better market allocations. Gambardella, Giuri, and Mariani (2006) call policymakers to action in order to increase the rate of utilization of patents. Similarly, Chesbrough (2006) argues that there is no information standard for intellectual property trade. Without these standards, it is very difficult to collect aggregate statistics on this trade and it becomes much harder for firms to know what technologies are available in the market. Indeed, according to a survey by Radauer and Dudenbostel (2013) one of the major obstacles that firms are reporting is the difficulty in identifying suitable partners in the market for ideas. Both economists and policymakers have emphasized the need for revising industrial policies in light of the presence of a market for ideas.¹

The main policy conclusions of these studies concern reducing informational frictions in the market through better intermediation. For instance, Gambardella, Giuri, and Mariani (2006) advocate policies that would simplify the formation of intermediaries. For interested readers, Tietze (2010) provides further details, as well as a detailed literature review on patent intermediaries.

References

ARORA, A., A. FOSFURI, AND A. GAMBARDELLA (2001): “Markets for Technology and Their Implications for Corporate Strategy,” *Industrial and Corporate Change*, 10(2), 419–451.

¹This is in the summary of a European Patent Office-OECD-UK Patent Office Conference, entitled “Patents: Realising and Securing Value” held on November 21, 2006. It can be accessed at: <http://www.oecd.org/science/scitech/37952293.pdf>.

- CHESBROUGH, H. (2006): “Emerging Secondary Markets for Intellectual Property: US and Japan Comparisons,” Research Report to National Center for Industrial Property Information and Training (INPIT), Lafayette, CA.
- ELTON, J. J., B. R. SHAH, AND J. N. VOYZEY (2002): “Intellectual Property: Partnering for Profit,” *McKinsey Quarterly*, 4, 59–67.
- GAMBARDELLA, A., P. GIURI, AND M. MARIANI (2006): “Study on Evaluating the Knowledge Economy—What Are Patents Actually Worth? The Value of Patents for Today’s Economy and Society,” European Commission, DG Internal Market, Tender No. MARKT/2004/09/E, Final Report for Lot 2.
- KHAN, B. Z. (2014): “Trolls and Other Patent Inventions: Economic History and the Patent Controversy in the Twenty-First Century,” *George Mason Law Review*, 21, 825–1093.
- KHAN, B. Z., AND K. L. SOKOLOFF (2004): “Institutions and Democratic Invention in 19th-Century America: Evidence from” Great Inventors,” 1790-1930,” *American Economic Review*, pp. 395–401.
- LAMOREAUX, N. R., AND K. L. SOKOLOFF (1999): “Inventors, Firms, and the Market for Technology in the Late Nineteenth and Early Twentieth Centuries,” in *Learning by Doing in Markets, Firms, and Countries*, ed. by N. R. Lamoreaux, D. M. G. Raff, and P. Temin, pp. 19–60. University of Chicago Press.
- LAMOREAUX, N. R., K. L. SOKOLOFF, AND D. SUTTHIPHISAL (2013): “Patent Alchemy: The Market for Technology in US History,” *Business History Review*, 87(01), 3–38.
- NICHOLAS, T. (2009): “Spatial Diversity in Invention: Evidence from the Early R&D Labs,” *Journal of Economic Geography*, 9(1), 1–31.
- RADAUER, A., AND T. DUDENBOSTEL (2013): “Patlice Survey - Survey on Patent Licensing Activities by Patenting Firms,” EUR 26114 EN.
- SAKKAB, N. Y. (2002): “Connect & Develop Complements Research & Develop at P&G,” *Research-Technology Management*, 45(2), 38–45.
- TIETZE, F. (2010): “A Typology of Technology Market Intermediaries,” Technology and Innovations Management Working Paper 60.