GREAT FORTUNES OF THE GILDED AGE

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ABSTRACT

This paper explores the origins of the great fortunes of the Gilded Age. It relies mainly on two lists
of millionaires published in 1892 and 1902, similar to the Forbes magazine list of the 400 richest Americans.
Manufacturing, as might be expected, was the most important source of Gilded Age fortunes. Many
of the millionaires, moreover, won their fortunes by exploiting the latest technology: Alfred D. Chandler's
"continuous-flow production." A more surprising finding is that wholesale and retail trade, real estate,
and finance together produced more millionaires than manufacturing. Real estate and finance, moreover,
were by far the most important secondary and tertiary sources of Gilded Age fortunes: entrepreneurs
started in many sectors, but then expanded their fortunes mainly through investments in real estate
and financial assets. Inheritance was also important, especially in older regions

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1. A New Gilded Age?

There has been increasing attention paid in recent years to the "Gilded Age" (1870-1899)[1] and the claim that America has entered a "new Gilded Age" has become something of a cliché. What draws economists and historians to the Gilded Age is the combination of rapid income growth and rising inequality, and particularly the rise of great fortunes. This was the era famous for the capitalists known to their critics as the "Robber Barons."[2] Then as now, economists debated whether the Robber Barons's vast accumulations were the necessary price of economic progress. In this paper, I attempt to shed some additional light on this issue by exploring the origins of the fortunes of the Gilded Age.

This paper is based mainly on two lists of millionaires published in 1892 and 1902. They are similar to the *Forbes* magazine lists of the 400 richest Americans. The latter are still used by economists to explore wealth inequality, despite the availability of rich alternative sources of quantitative data, because the *Forbes* lists provide some unique information on the people at the very top of the wealth pyramid and their sources of wealth. Examples of recent use of the *Forbes* lists include Cagetti and De Nardi

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[1]There is no precise set of years that constitute the "Gilded Age." Most historians date it from somewhere in the 1870s to "around" the turn of the century.

[2]Matthew Josephson (1934) popularized the use of the term "Robber Baron". However, the term was already in use during the Gilded Age (Clark 1891, 68; Jenks 1894, 501).

(2006), Kopczuk and Saez (2004), Klevmarken, Lupton, and Stafford (2003), Poterba (2000), Broom and Shay (2000), and Canterberry and Nosari (1985). The lists explored here are even more important for the Gilded Age because the range of alternative sources is more limited.

I am not the first to utilize this data. In 1907, the American Economics Association published George P. Watkins's "The Growth of Large Fortunes," which relied in part on the same lists. My main advantage over Watkins is not the century of study of the era by economic historians, nor important developments in economic theory that allow me to analyze the data with new ideas, but rather my ability to sort the data with an electronic spreadsheet. It was relatively easy for me to match individual entrepreneurs across lists, to analyze subsets of data, to examine secondary and tertiary sources of wealth, and so on. Watkins might have wanted to do these things, but it would have been time consuming.

The parallels between the Gilded Age and today's economy, although far from exact, are striking. Technological progress was rapid in the Gilded Age. Possibly by 1900, certainly by 1910, the United States had passed Britain to become the world's leading industrial economy. America's leadership was based partly on the natural resource endowment of the United States, more than Americans have usually been willing to acknowledge (Wright 1990). However, it was also based on the exploitation of those resources with new mass-production techniques. In itself, this is a positive story, but when we look at this era we also see some of the negative trends we see today.

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Perhaps the most effective voice in drawing comparisons between the Gilded Age and our own day has been Paul Krugman. Krugman (2007) stresses the similarity in the trends in the inequality of income in our era and in the Gilded Age. However, he is not concerned much with why inequality rose in the Gilded Age, but rather why liberals, to use the modern term, were frustrated in their attempts to reverse it.[3] Krugman's point, as I understand it, is simply that absent government-financed redistribution the capitalist process may, or perhaps he would argue will, produce inequality. My goal in looking at the Gilded Age is somewhat different: to try to uncover the forces that were generating rising inequality.

The story, to anticipate the conclusions, will be that many of the great fortunes of the Gilded Age were the result directly or indirectly of the diffusion of the new manufacturing technology. However, other forces were at work, especially the potential for the investors and entrepreneurs of the Gilded Age to make or increase their fortunes through investments in booming real estate and financial markets.

The remainder of the paper is structured as follows. Section 2 sets the stage by exploring the major trends in wealth, income, and technology. Section 3 presents the new tables on the sources of Gilded Age fortunes. Section 4 explores in greater detail the role of finance and real estate in making and extending fortunes. Section 5 compares and contrasts the origin of fortunes in Boston and Chicago. Section 6 discusses the key

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[3]At the time, they would have been referred to as Populists or Progressives depending on their politics.

elements of the macroeconomic framework that encouraged the formation of great

fortunes. Section 7 summarizes the main findings.

2. Key Economic Features of the Gilded Age

Real GDP per capita grew a robust 2.50 percent per year during the Gilded Age

(Table 1). A somewhat different measure of aggregate economic activity, real national

income per capita, put together some years ago by Milton Friedman and Anna J.

Schwartz, grew at an annual rate of 1.81 percent (Table 1). Growth, however, slowed

during the Progressive Era; growth of real GDP per capita slowed to just 0.12 percent per

year, and real national income per capita to .89 percent. If we extend our comparison into

the 1920s, the real GDP growth rate figures for the Gilded Age and the era that followed

become more comparable. The rate during the Gilded Age, in any case, compares

favorably with the 1.81 percent rate of increase in real GDP per capita achieved in recent

years (Table 1 and Figure 1). In terms of real wage growth, the Gilded Age again looks

the best. Real Wages of unskilled labor rose 1.43 percent per year during the Gilded Age,

0.56 percent per year during the Progressive era, and only .44 percent per year from 1990

to 2006 (Table 1).

It is not entirely clear what accounts for the relative retardation of the Progressive

Era and for the gap between our era and the Gilded Age. Differences in total factor

productivity, which grew at 1.78 percent per year during the Gilded Age, .67 percent per

year during the Progressive era, and .71 percent per year during our era (Table 1, line 13), may be part of the story. True, total factor productivity growth is not always highly correlated with real income growth; Alexander Field (2003) showed that the economy experienced its greatest surge in productivity growth during the Great Depression. Nevertheless, part of the explanation for the relatively strong performance of the Gilded Age may be the technological changes described below.

The aspect of the economy of the Gilded Era that is most often compared with our own was the rise in the inequality of wealth. Changes in the distribution of wealth during the Gilded Age are not as well documented as in today's economy. One reason is that there was no national income tax, or for most of the time, estate tax, to provide the data. The best data is for Massachusetts (Steckel and Moehling 2001). As Table 2 shows, the distribution of wealth, to judge by Massachusetts, was already highly unequal in 1870. Nevertheless, the share of total wealth held by the wealthiest people increased by a substantial amount during the Gilded Age. Between 1870 and 1900, the share of taxable wealth held by the top 5 percent of male households in Massachusetts rose from 57 percent to 70 percent and the share held by the top 1 percent rose from 27 percent to 37 percent. From 1900 to 1910, the first two thirds of the Progressive Era, there was little change.

More recent estimates of the share of wealth held by the top 1% have been made by Wojciech Kopczuk and Emmanuel Saez (2004, Table B1). The earliest estimate by Kopczuk and Saez, 38.12% in 1916, does not differ much from the Steckel-Moehling

estimate for Massachusetts for 1910, 35.0%, or even the Steckel-Moehling estimate for 1900, 37.2%. The Kopczuk and Saez series declines sharply during the Great Contraction and World War II and remains on a plateau thereafter. Their series does not reveal the sharp increase in the share held by people at the top that might be expected based on concerns about a new Gilded Age, perhaps because the series ends in 2000.

To explain the strong performance of the Gilded Age economy in terms of growth – despite frequent financial crises – it is natural to look to technological change. The most important source of technological progress in the Gilded Age was the diffusion of "continuous flow production." This idea was described and developed by Alfred D. Chandler (1977, 1994), the leading historian of technological change during the Gilded Age. Rather than produce a final product batch-by-batch, factories were arranged so that raw materials could flow continually into and through the machines that turned them into final products.

The Gilded Age is often described as the Second Industrial Revolution because of the rapid diffusion of this new industrial paradigm. The First Industrial Revolution was based on the factory system. Large numbers of workers were brought together in one building so that each worker could increase his productivity through specialization – Adam Smith's pin factory. However, materials moved fitfully through the early factory. Workers often carried raw materials or semi-finished goods from place to place. In the second industrial revolution, materials moved steadily through the factory, perhaps on conveyor belts or by flowing through pipes.

A few examples will illustrate the idea and show how widely this innovation diffused. The cigarette industry in which machines continuously turned raw tobacco and rolls of paper into finished cigarettes overtook the cigar industry, where individual workers sitting at their benches rolled cigars one by one. The great Chicago meat packers who produced slaughtered meat on continuously moving assembly (disassembly?) lines replaced the local butcher or slaughterhouse. Chicago, the poet Carl Sandburg wrote, became "hog butcher for the world." In Cincinnati, Dov Behr Manischewitz, a recent immigrant from Lithuania, mechanized the production of Matzo, a religious food, which for thousands of years had been baked by hand (Alpern 2008). Perhaps most important, Henry Ford began producing his famous Model T's on a fast moving assembly line in 1908. The day of the custom-built automobile was over.

Eventually, electricity became crucial to mass production, but the technology took time to evolve and diffuse. It was not until the 1920s that electrification and Ford's production-line innovations began to have a major impact on productivity (David and Wright 2003). In addition, as Chandler stressed, vertical integration of firms was a necessary part of the diffusion of this new technology. High velocity throughput required carefully managed supplies of raw materials so that production machinery never remained idle and careful management of output so that unsold inventories of finished products never piled up. The need to keep his cigarette machines filled with tobacco led James Buchanan Duke to contract directly with farmers, bypassing the traditional wholesale tobacco auctions. It led him, moreover, to brand, advertise, and distribute his

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cigarettes nationwide. The need to keep their slaughterhouses supplied with animals led the Chicago meat packers to rely on the huge Chicago stockyards and to develop a network for distributing chilled meat nationwide with especially constructed railroad cars.

The question for us, then, is what connections were there between the rise of the great fortunes and the remarkable pace of industrial innovation during the Gilded Age.

3. Sources of Fortunes in the Gilded Age

Chester McArthur Destler's, "Entrepreneurial Leadership among the "Robber Barons: A Trial Balance" (1946) remains one of the best-balanced and most thorough studies of the Robber Barons. Destler examined 43 of the most famous Robber Barons. Three, he admitted, had been genuinely innovative, Cyrus McCormick (farm machinery), Henry H. Rogers (oil), and George Pullman (railroad sleeping cars). Six others he identified as having "improved technology or processes in industry and railroading:" James B. Duke (cigarettes), Benjamin B. Hutchinson (meat packing), Gustavus Swift (meat packing), Phillip D. Armour (meat packing), Charles A. Pillsbury (milling), Cornelius Vanderbilt Sr. (railroads), and Andrew Carnegie (steel). Others made innovations in business methods, advertising, and finance. Although Destler was far from being a fan of the Robber Barons, he found that 38 of his Robber Barons, 88 percent, had

made some contribution that could be identified as "innovative."[4]

We can go further than Destler and examine the millionaires as well as the billionaires (so to speak) by exploring what appear to be impressively documented lists of "millionaires" and the sources of their fortunes published in the *New York Tribune* in 1892 and the *New York World Almanac* in 1902. Sidney Ratner (1953) reproduced these lists in full, along with a detailed introduction. Public concerns about growing inequality of wealth, and about whether high tariffs and long-lived patents may have been contributing to the growth in inequality, motivated the construction of the lists. Apparently, these publications surveyed local correspondents asking about the millionaires in their community. The *Tribune* list in particular seems to have been comprehensive. Although there are many places the compilers of the lists might have gone wrong, scholars have generally been impressed with the effort put into constructing the lists and the accuracy of the results.

A million in assets meant something very different then than it does now. Using the consumer price index as the inflator, $1,000,000 in 1892 would be worth close to $23.5 million today (2007). Since the average wealth of these individuals was about $3 million, we are considering people worth about $70.5 million in today's money. The equivalent today might be someone whose annual earnings topped a million. Using nominal GDP per capita as the inflator (to get an idea of where the millionaire stood

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[4]Destler preferred to see the glass as half (well 12 percent) empty: five had done nothing innovative.

relative to his fellows), $1 million in 1892 would be the equivalent of about $182.2 million today (2007), more than half a billion for the average "millionaire" on the list.[5]

The *Tribune* listed each millionaire by name and residence, and briefly described how he made his fortune. For example, the entry for millionaire John W. Stoddard of Dayton Ohio reads simply "Made in manufacturing agricultural implements, protected by patent" (Ratner 1953, 43).[6] J.C. Tullis of Cincinnati Ohio made his fortune "Largely in the manufacture of the rebounding ball; in part by speculation in horses during the war [presumably the Civil War], and real estate investments."[7] Even John D. Rockefeller rated only three sentences. "Has made one of the largest fortunes in the United States, in the development of the Standard Oil Company and the Standard Oil Trust. He was president of the Trust, which recently dissolved. His enormous profits have been invested in the best paying securities, and developing various important and useful business interests" (Ratner 1953, 77). As the last entry should make clear, the most important weakness of the list is that it does not give amounts; indeed, it does not even rank the millionaires. A second potential weakness is that it is unclear whether the

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[5]Samuel H. Williamson, "Five Ways to Compute the Relative Value of a U.S. Dollar Amount, 1790 - 2006," MeasuringWorth.Com, 2007.

[6]A major concern of the *Tribune* was whether the millionaire had made his fortune in an industry protected by the tariff, and so it systematically distinguished those fortunes from others.

[7]Also cited in Lebergott (1972, 142).

Tribune's correspondents were making a determined effort to separate gross assets from net assets. This may have been especially important in real estate where it was possible to accumulate a large but highly leveraged fortune.

The list published by the *New York World Almanac* in 1902 listed fewer millionaires, and gave shorter descriptions. Tullis is not included in the *World Almanac* list. Stoddard is listed simply as a manufacturer, and Rockefeller is listed simply (and perhaps sufficiently) as "Standard Oil." In part, the *World Almanac* list may be shorter because the depression of the 1890s knocked some people out of the millionaire category, but it is also possible that the *World Almanac* list was less complete.

Table 3 is based on the *Tribune* list. It shows how 4,050 millionaires made their fortunes. This was about the top .03 percent of all households, a very select group (*Historical Statistics* 2006, series Ae79). I reclassified the sources of fortune using a modern industrial classification (North American Industry Classification System) and then sorted the data.

Manufacturing was the number one source of millionaires, accounting for about 25 percent of the total in 1892. The list includes the usual suspects: James B. Duke; "Manufacturing tobacco, President of the American Tobacco Company"; Philip D. Armour, "Has made a large fortune, as have also other members of the firm, in the wholesale provision and commission business, packing and speculation." Some of the men who eventually amassed great fortunes by exploiting the new continuous-flow methods of production are not listed because they had not yet made their fortunes. Milton

Hershey was still making caramels in Lancaster Pennsylvania. Henry Ford had not yet started his mass production of automobiles.

J. Bradford DeLong (1998) analyzed what he referred to as "billionaires:" entrepreneurs whose great wealth would be equal to about 20,000 times nominal GDP per capita. This cutoff leaves, according to DeLong, mostly entrepreneurs who built or financed railroads. The railroads were the internet of the day – binding the nation with steel rails rather than beams of electrons. The railroads, moreover, were intimately connected to the new technology. Lower transport costs integrated markets and made possible the large-scale production required by the new continuous-flow production processes. John D. Rockefeller needed the railroads to ship his petroleum to his refineries, at least until he could move to the more efficient pipeline. The Chicago meat packers needed the railroads to distribute their freshly slaughtered beef.

Our table goes further down the list of millionaires: the wealth of our entrepreneurs averaged about 12,000 times nominal GDP per capita. Many of these fortunes were connected indirectly to the new technology. The largest category after manufacturing and after inheritance (which was second with 20 percent) was Wholesale trade with 12 percent of the total. finance and real estate followed closely behind, each accounting for about nine percent of all millionaires.

Another striking feature of Table 3, one that also illustrates the close connection between wealth and the new technology, is the small role played by agriculture in the production of millionaires. This was especially noticeable in the South (Region 3) where

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one would expect agriculture to be important. Even in the South, however, agriculture with 18 millionaires was less important than manufacturing with 38. Of the 18 agricultural millionaires in the South, the *Tribune* explicitly identified only 10 with the great southern staple crops: four cotton millionaires, three sugar millionaires, and three tobacco millionaires.

The *Tribune* also listed supplementary sources of wealth. An entrepreneur, for example, might have started in manufacturing and then expanded into finance and real estate. Alternatively, an entrepreneur might start in the wholesale trade and then expanded "backward" into manufacturing. An example will make the nature of the data in the *Tribune* list clear. J.C. Ainsworth of Oakland California, according to the *Tribune*, made his fortune "Steamboating on the Columbia and Willamette rivers in partnership with R.R. Thompson and S.G. Read; real estate in Portland Ore, and in the State of Washington, and banking." We therefore coded transportation as J.C. Ainsworth's primary source of wealth, real estate as his secondary source of wealth, and finance as his tertiary source of wealth. It is clear from the discussion of the list in the *Tribune*, and from reading the entries for individuals where we have additional information, that this is the intended interpretation. Watkins (1907) did not make use of this facet of the data, possibly because sorting the data in this way would have been a time consuming task before the computer.

Table 4 sorts the data according to secondary and higher sources of wealth. For example, the secondary source of wealth (shown in the column marked 2) was available

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for 2,623 millionaires (4,050-1,427). Of these millionaires 727, about 28 percent, had expanded their wealth through investments in finance and about 52 percent had done so through investment in finance and real estate together. A tertiary source of wealth was listed for 1,155 millionaires (column 3). Of these 410, about 35 percent had expanded their wealth through investments in finance and about 61 percent through investments in finance and real estate together. Although other sources of wealth were important. It is clear that investments in finance and real estate were the major ways that capitalists of the Gilded Age expanded their fortunes after starting them in other sectors.

Table 5 is based on the *World Almanac* list for 1902. This source is not as helpful as the *Tribune's* list. Many estates are "not yet settled," and the most frequent listing is the unhelpful "capitalist." The *World Almanac* list, moreover, does not include supplementary sources of wealth. Overall, however, Table 5 reinforces the portrait of the Gilded Age millionaires derived from Tables 3 and 4. Again, manufacturing was the leading category (after "capitalist") accounting for 27 percent of all millionaires, 28 percent if we omit the unhelpful categories of capitalist and not available, something similar to what we found for 1892. While some of these fortunes were made in traditional industries, a reading of the *Almanac* list shows that many were the result of employing the new mass production techniques, for example Swift and Armour in meatpacking, and Adolphus Busch in brewing.

The 1902 list, like the 1892 list, also reveals the importance of real estate and finance. By 1902, real estate and finance had moved up to the positions right behind

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manufacturing. Indeed, the number of real estate millionaires amounted to more than 90 percent of the number of manufacturing millionaires, and together the number of millionaires in real estate and finance exceeded the number in manufacturing by a substantial margin.

One of the most severe contractions of the 19th century occurred in the 1890s. There was a severe banking panic in 1893 and a steep recession from January 1893 to June 1894 and, after a brief recovery, another recession from December 1895 to June 1897. How did our millionaires fare? Our data is not precise because of the impressionistic source of the data. Nevertheless, I was able to match 1,734 names between the two lists. A number of those missing in 1902 may have suffered a reversal of fortune. Table 6 summarizes the information on dropouts, additions, and matches (people on both lists). Again, Watkins (1907) did not pursue this question, perhaps because the cost of doing so was high in the days before computers.

The most surprising feature of Table 6 is the resilience in the real estate and finance categories. I had expected manufacturing to show the most staying power, and the speculators in real estate and finance to show the least staying power. However, this did not turn out to be the case. Real estate and finance were among the categories with the lowest dropout rates, while manufacturing was near the middle of the pack. Indeed, real estate had the smallest loss rate for any of the larger categories. Out of 473 real estate millionaires in 1892, 455 (96 percent) were still listed as millionaires in 1902.

4. Finance and Real Estate

Evidently, one of the most surprising features of the lists is the large number of millionaires who made or increased their fortunes through investments in financial or real estate markets. Many of the financial and real estate fortunes in place by 1892, moreover, survived the financial panic of 1893 and the depression of the 1890s.

Part of the reason for the importance of financial markets is easy to document. Figure 2 shows an index of the total return (capital gains plus reinvested dividends) in the Gilded Age, the Progressive Era, and the recent past. Although the Gilded Age did not experience a boom as large as the boom of the late 1990s, in the long run it produced similarly high returns. An investment in the stock market at the start of the Gilded Age would have increased, on average, by a factor of nine by the end of the era. This is the average. Investors with foresight, a taste for risk, and luck, would have done much better. The returns during the Progressive Era, by way of contrast, were mediocre.

The requisite national and regional series for real estate, as far as I am aware, do not exist. Shiller (2008) discusses the real estate boom in California in the 1880s, and there is some evidence for Chicago. Homer Hoyt's (1933) history of the Chicago real estate market explains why real estate investments created or added to so many Chicago fortunes. Between 1873 and 1891, the total value of land in all of Chicago rose from $575 million to $1,500 million, a rate of 5.33 percent per year. In the central business district, values increased from $1,000 per front foot in 1877 to $4,000 per front foot in

1891-92, a rate of 9.24 percent per year (Hoyt 1933, 184-85). Because the price level was falling over these periods, the real rates of return were one to one and one half percent higher.[8]

There is little doubt, moreover, that high returns in real estate and finance were on the minds of knowledgeable observers. The term "The Gilded Age" is usually traced to the novel of that name by Mark Twain and Charles Dudley Warner (1873); *The Gilded Age: A Tale of To-day*. Although the term "the Gilded Age" immediately brings industrialization to mind, the novel itself deals mainly with real estate. It satirizes a lust to get rich through real estate speculation, which runs through several generations and layers of society.

Another example of a writer preoccupied with real estate speculation is Henry George, the radical reformer and social critic, who advocated replacing all taxes with a single tax on land. He published his magnum opus, *Progress and Poverty,* in 1879. George began his career in San Francisco. It is interesting, therefore, to look at the sources of wealth in San Francisco. By 1892 there were 156 millionaires in San Francisco. The most important source, as might be expected, was mining with 33. Retail Trade was second with 23, and real estate was third with 18. Mining and real estate certainly conform to George's idea that economic growth tends to reward those who first establish ownership of "land." We need not agree with George's policy proposals, to

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[8]Lawrence H. Officer, "The Annual Consumer Price Index for the United States, 1774-2007" MeasuringWorth, 2008.

recognize that he was responding to a real aspect of the times and places in which he lived.

It was finance rather than real estate that most disturbed Thorstein Veblen, the best known of the late nineteenth-century radical American economists. In his classic, *The Theory of the Leisure Class* (1899), Veblen criticized the flagrant spending habits of the men who controlled the great fortunes, in the process adding the term "conspicuous consumption" to the language. In *The Theory of Business Enterprise* (1904), Veblen dismissed the economic contribution of the men who had amassed the great fortunes. They resembled the eighteenth century pirates or the ancient Viking raiders who obtained wealth by taking it, and contributed nothing to producing it. It was a message that he emphasized again in "On the Nature of Capital: Investment, Intangible Assets, and the Pecuniary Magnate" (1908), published in the *Quarterly Journal of Economics*, even then a prestigious journal. Veblen's pecuniary magnates created wealth by speculating, and that meant threatening firms and stirring up trouble, so that they could buy assets cheaply and then resell when the markets they had themselves disrupted returned to normal.

My finding that manufacturing was the main source of fortunes, would not have deflected Veblen. In his view, it was not the men who were actually winning fortunes in manufacturing who were responsible for economic growth. Rather, the engineers who designed the new products and the means for producing them deserved the credit, even if they did not have control of the firms for which they worked. The real answer to America's economic difficulties, in Veblen's view, was to junk the price system, and

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replace it with a "technocracy" run by the engineers.

Mainstream economists generally were concerned about growing inequality, but advocated moderate changes in the economy. The British economist Alfred Marshall, perhaps the leading economist of the day, believed that much could be accomplished by changing social norms. If the wealthy could be convinced of the need to display "economic chivalry" much of the distress in society could be relieved (Marshall 1907). Marshall's call for "economic chivalry" has much in common with the celebration of philanthropy today. Perhaps the way to deal with the new robber barons is to convince them to do what many of the old robber barons did: to give some of their great fortunes to charity. Just as Andrew Carnegie and John D. Rockefeller turned over their millions to foundations, Bill Gates, Warren Buffet, have been persuaded to follow suit.

George P. Watkins (1907), my predecessor, saw the growth of large fortunes mainly as the byproduct of the growth of large-scale enterprise. However, he also gave some weight to activities that he thought were not particularly wealth enhancing for the community as a whole. Large enterprises, Watkins argued, produced large cities, and the growth of large cities in turn produced real estate speculation, a source of many large fortunes. Rapid change in the structure of industry, moreover, gave rise to volatile stock and bond markets where speculation thrived, and fortunes were made. Speculation, Watkins understood could enhance welfare in some circumstances: speculation smoothed prices over time. However, he also argued that speculative markets were an important source of the great fortunes of his day (Watkins 1907, 110-121). Ultimately, Watkins

(1907, 170) concluded that the growing inequality of wealth "may come to need direct attention from the constituted agent of society."

Near the turn of the century, the Gilded Age gave way to the Progressive Era. The transition might be dated by the election of Theodore Roosevelt in 1902. The Progressive Era was in some ways a reaction to the excesses of the Gilded Age. Americans in the Progressive Era turned to reform, but not to radical reform. They did not try to stop the process of technological change that was reinventing their economy. However, they did try to ameliorate the negative consequences of rapid technological change, and booming real estate and financial markets. The great fortunes were attacked through the establishment of a progressive income tax, although to be sure, special interests, as is always the case, had a lot to do with the adoption of the income tax (Baack and Ray 1985).

Many American economists, moreover, called for redistribution of income in the form of old-age pensions, and other transfer programs based on the social welfare systems taking shape in Germany, Britain, France and on a limited basis in some progressive states. The Civil War Veterans pension, which supplied incomes to a significant percentage of households, also provided a model. The veterans' pension was financed by a variety of internal taxes, such as alcohol and tobacco taxes, and by the tariff on imported goods. As Southerners repeatedly pointed out, it was far from obvious that it was an efficient or fair way of financing an old age pension: the consumers who were hurt by the tariff were not necessarily wealthy, and the veterans who received the

pension were not necessarily poor. Still, as Theda Skocpol (1992) has shown, the veteran's pension was an important precedent for modern forms of social insurance.

5. Boston and Chicago

A richer understanding of the national trends can be acquired by exploring in more detail the differences between Boston, a long established city where inheritance was a prime source of fortunes and Chicago, an emerging city where manufacturing was most important.

As shown in Table 7, there were 216 millionaires in Boston in 1892. Real estate was the most important source of millionaires, even in staid old Boston, but inheritance was a close second, followed closely in turn by manufacturing.[9] The Boston millionaires were an extraordinarily diverse group. The "richest man in the city" was Frederick L. Ames who "Inherited a large fortune and has increased it. All made in railroads, real estate, telegraph lines and investments."[10] Some fortunes were based on innovation, such as that of the bicycle maker, Colonel Albert A. Pope. Thomas Wigglesworth's fortune, on the other hand, was "Made in East India trade and merchandising by his father." Professor Alexander Agassiz of Harvard "Made his fortune in the great Calumet and

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[9]This does not mean that inheritance played no role in the formation of real estate or manufacturing fortunes, for example by providing an initial stake. It just means that inheritance did not strike the *Tribune*'s correspondents as the main source of the fortune.

[10] The examples in this paragraph are drawn from Ratner (1953, 19-22).

Hecla copper mines at Lake Superior." Martin Brimmer "Inherited valuable real estate from his father of the same name. Family has been rich for several generations" – a real estate fortune from an earlier generation. Charles P. Bowditch's fortune was "Partly inherited from J. Ingersoll Bowditch. Made in the West India Trade and Bell Telephone" – an interesting combination of old wealth and new economy. Eben D. Jordan of Jordan, Marsh, & Co., was a millionaire by virtue of a "Large business in drygoods, and investments."

By 1902 inheritance had dropped to fourth place in Boston, accounting for only about 10 percent of all millionaires.[11] Real estate was still the number one source of fortunes in Boston; but manufacturing and retail trade had passed inheritance. Even in staid old Boston, coupon clipping had become a minor league sport.

Chicago provides a sharp contrast with Boston, but again suggests the importance of real estate and finance in producing and increasing fortunes. In 1892 Chicago, as shown in Table 8, boasted 280 millionaires, more than Boston, although Chicago was a much younger city. Chicago, in fact, was already second to New York in the number of millionaires.[12] Inheritance was relatively unimportant in Chicago, as might be expected in a newer city. The 1892 survey listed only seven millionaires by virtue of inheritance, 2.5 percent of the total. In the 1902 survey, inheritance accounted for less than 1 percent

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[11] I have excluded the millionaires listed simply as "capitalist" from the calculation. The percentage would be lower if they were included.

[12] In Table 8 I have abandoned the modern industrial classification in favor of a classification drawn from entries in the Tribune list, in order to provide a better sense of

of the total.

Manufacturing was the most important source of Chicago fortunes in both 1892 and 1902. Several of these fortunes, moreover, were the result of the new continuous-flow technologies. Meatpacking had produced 19 millionaires by 1892; and as we noted above, meatpacking was one of Chandler's prime examples of how the application of continuous-flow processes produced greatly increased productivity, and vertical integration (Chandler 1977, 391-402). Farm machinery had produced five millionaires by 1892. These were among the largest fortunes in the city because the McCormick Harvesting Machinery Company was located in Chicago. McCormick was also a pioneer in using vertical integration to maximize economies of scale (Chandler 1977, 305-06, 408-09). Other forms of manufacturing had produced another 52 Chicago millionaires by 1892. However, there were also many fortunes that resulted simply from the rapid growth of the city: in construction, the supply of lumber, wholesale trades of various sorts, and real estate. These activities benefited indirectly from the new technologies. The meat packers and the McCormick Harvesting drew labor to Chicago, which in turn increased the opportunities to make fortunes in merchandising, real estate, and related activities. Undoubtedly, Chicago would have grown a great deal, even if the new technologies had not added to the growth, simply because it served as a great entrepôt for the growing agricultural production of the Middle West (Cronon 1992). However, the role of technology in producing the great fortunes of the city is obvious.

how wealth-making worked in Chicago.

Entrepreneurs who started in one activity and then expanded into others made many of the fortunes in Chicago. The secondary sources in 1892 (in time, not necessarily in amount) included real estate (18 millionaires), banking (17 millionaires), and "speculation" mainly in commodity futures, mining stocks, and other securities (16 millionaires).

Previously, I mentioned Carl Sandburg's 1916 poem "Chicago." Here is the first stanza of his famous poem.

> Hog Butcher for the World,
> Tool Maker, Stacker of Wheat,
> Player with Railroads and the Nation's Freight Handler;
> Stormy, husky, brawling,
> City of the Big Shoulders:

All in all, a fair description of Chicago's economy.

6. The Macroeconomic Framework

The foregoing discussion of the sources of fortunes in the late nineteenth century suggests several factors that made the years from 1870 to 1900, the Gilded Age.

(1) It was possible for some entrepreneurs to amass great fortunes by exploiting the new manufacturing technology: Alfred D. Chandler's continuous-flow production. This does not mean, of course, that these entrepreneurs were simple technological wizards bringing inventions out of their basement labs. It often took, as I noted above, ruthless ambition and a willingness to break moral and legal constraints to succeed in

exploiting the advantages created by the new manufacturing technology. Many fully deserved the title of Robber Baron.

(2) Strong enforceable property rights encouraged investments in high-return markets. One could invest in land in Boston, as did Frank L. Ames, the "richest man in Boston," or in Michigan copper mines, as did Professor Alexander Agassiz of Harvard, and know that law protected one's ownership. Lawsuits and political manipulation might threaten individual investments. However, in general large-scale private development of housing, mining, and agricultural land was relatively easy in the Gilded Age. Property was protected, moreover, whether owned by American or foreign investors. Inflows of capital from abroad helped increase the number of American millionaires.

(3) The tax regime of the Gilded Age was favorable to the growth of large fortunes. There was no income tax at the federal level.[13] A federal income tax had been levied during the Civil War, but was allowed to expire in 1872. For the next two decades, the labor movement and the Populists pushed for a new income tax, but were frustrated by conservatives. Success was achieved in 1894, but in 1895 the Supreme Court ruled the new income tax unconstitutional. It would not be until 1909 that sufficient support would be mustered in Congress for a constitutional amendment allowing an income tax, and not until 1913 that the ratification process would be completed. Thus, whatever returns were earned in high-yield investments during the Gilded Age could be reinvested without

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[13] This paragraph is based on Baack and Ray (1985).

being subject to an income tax. A federal estate tax was passed in 1898, partly in response to the demands for revenue created by the Spanish-American War, and estate taxes were collected between 1899 and 1907. However, this tax came too late to have an impact on the accumulation of wealth during the Gilded Age.

The potential impact of low tax rates on the growth of large fortunes is easy to overlook. However, overtime the effect can be substantial, as a simple example will illustrate. A dollar invested at nine percent, the real return in the stock market in the Gilded Age (Table 1, line 10), doubled in 8 years. If the income had been subject to a 30 percent tax rate, the same investment would have taken about 12 years to double. Starting from any given point, and assuming the rich save a larger fraction of their income than the poor, higher rates of return and low tax rates will cause inequality of wealth and income to increase more rapidly.

(4) A shift from agriculture to industry, and the resulting urbanization, it has long been recognized, has the potential to produce rising inequality. This was one of the factors discussed at length by Simon Kuznets (1955, 12-18) in his classic paper on the relationship between economic growth and income inequality. In our lists of millionaires, we can see a particularly straight channel from urbanization to wealth inequality: the rise of great real estate fortunes in Boston, Chicago, and other American cities large and small. Today, immigration, suburbanization, and the shift of economic activity to the South and West provide similar opportunities to win or augment fortunes.

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7. Conclusions

Lists of millionaires published in 1892 and 1902 help illuminate the origins of the great fortunes of the Gilded Age. The increase in wealth inequality was produced, first, by industrialization. Many of the richest capitalists of the Gilded Age – the "Robber Barons," as their critics knew them – gained their initial edge from the new technology of mass production; Alfred D. Chandler's "continuous-flow production." The Robber Baron was seldom the individual who invented a new technology, nor the first to apply it, but rather the first to use a new technology to achieve a decisive advantage in costs.

When we move down a notch from the most famous fortunes of the Gilded Age to look at smaller fortunes, we find many based on merchandising and investments in real estate and financial markets as well as manufacturing. Real estate and finance, moreover, were the most important ways that fortunes initially begun in other sectors were expanded. In retrospect, this makes sense: an economy in which people of means can find investment vehicles that pay high returns is likely to experience rising inequality. The idea that in recent years Americans became wealthy by making investments in real estate or financial markets, but that in the old days they became wealthy by making "things" is more myth than reality. Even in the Gilded Age, there were many paths to wealth.

The chart shows three series plotted from index points 1 to 30, with y-axis from 50.00 to 200.00. Labels on the chart read: "1870-1899, Gilded Age", "1990-2006, Contemporary", and "1900-1915, Progressive Era".
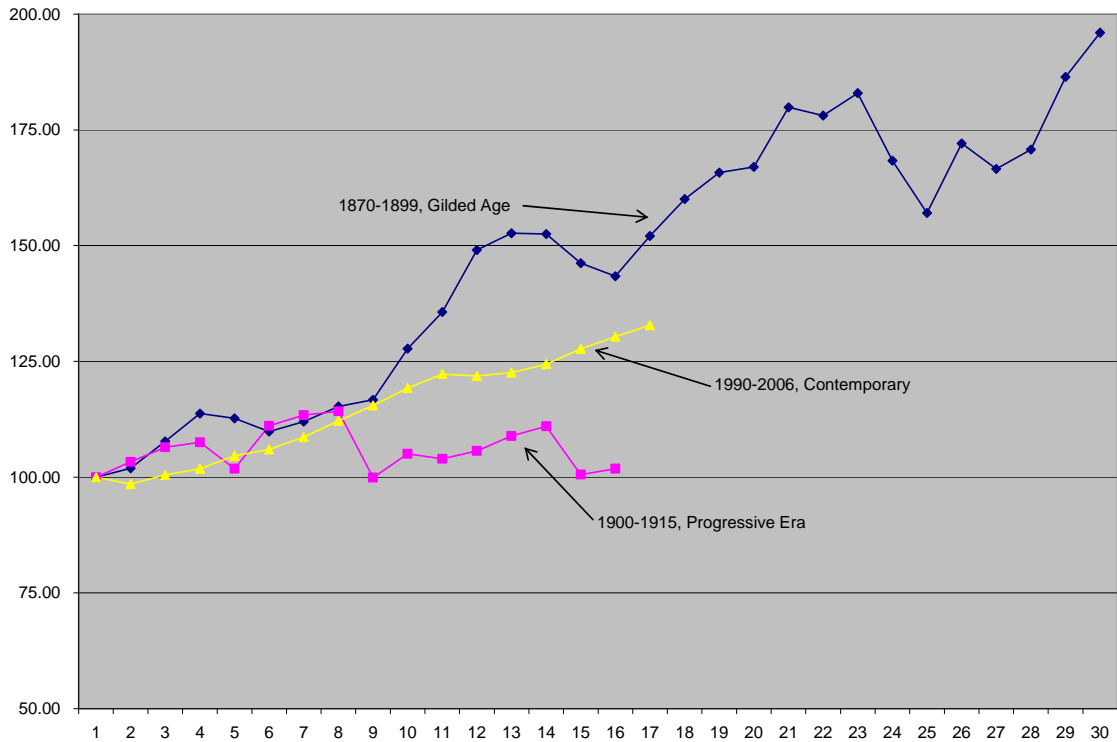
Figure 1. Real Income Per Capita in the Gilded Age, the Progressive Era, and the Contemporary Era

Real GDP grew most rapidly during the Gilded Age, less rapidly but more steadily in our era until the recent crisis, and stagnated during the Progressive Era.

Source. Johnston and Williamson (2007).
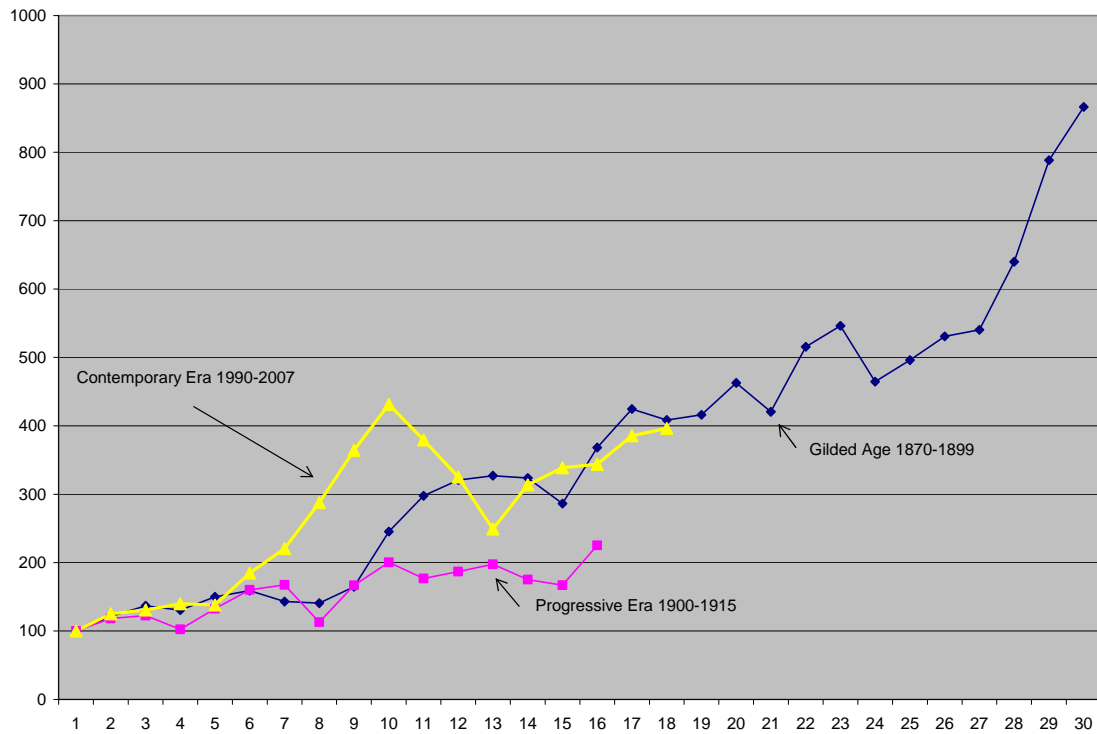
Figure 2. The Total Real Return in the Stock Market in the Gilded Age, the Progressive Era, and the Contemporary Era

The stock market provided high real returns in the Gilded Age.

Source. "S&P 500 Total Return Index," WWW.Globalfinancialdata.com.

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Table 1. Growth Rates of Key Variables; the Gilded Age, the Progressive Era, and the Contemporary Era

	Growth Rates (Percent per year)	Gilded Age	Progressive Era	Contemporary Economy
		1870-1899	1900-1915	1990-2006
		A	B	C
1	Real GDP	4.59	2.00	2.95
2	Population	2.09	1.88	1.14
3	Real GDP per Capita	2.50	0.12	1.81
4	Real National Income per Capita	1.81	0.89	n.a.
5	Cost of Living	-1.55	1.20	2.71 (1990-2005)
6	Wage of Unskilled Labor	-0.12	1.76	3.15 (1990-2005)
7	Real Wage of Unskilled Labor	1.43	0.56	0.44 (1990-2005)
8	Total Nominal Stock Returns	7.20	5.07	7.65
9	Total Real Stock Market Returns	8.75	3.87	4.94
10	Private Nonfarm Output	5.71 (1874-1899)	3.54	3.33 (1990-2001)
11	Labor Input	3.52 (1874-1899)	2.51	1.55 (1990-2001)
12	Capital Input	5.18 (1874-1899)	3.80	1.77 (1990-2001)
13	Total Factor Productivity	1.78 (1874-1899)	0.67	0.71 (1990-2001)

Sources by Row and Column. (1) - (3), all columns, Johnston and Williamson (2007), accessed Nov. 3, 2007. (4), all columns, Friedman and Schwartz (1982, 122-23). (5) - (7), all columns, www.measuringworth.com (accessed Oct. 1, 2007). (8), all columns, Standard and Poor's 500, total return, www.globalfinancialdata.com. (9), all columns, row (8) less row (5). (10) – (13), columns A and B, Kendrick (1961, 338-40). These estimates are for the "Private Domestic Nonfarm" Sector. Column C, Bartelsman and Beaulieu (2007, 468). These estimates are for the "Nonfarm business" sector.

Table 2. Distribution of Taxable Wealth of Male Household Heads in Massachusetts, 1820-1910

Year	Share of taxable wealth held by		
	Top 20 percent	Top 5 percent	Top 1 percent
1820	72.0	40.5	20.3
1830	77.6	49.2	28.9
1840	78.3	45.0	20.0
1850	85.8	55.7	33.4
1860	88.1	55.7	27.0
1870	90.1	56.7	27.2
1880	93.7	60.3	29.1
1900	97.3	70.5	37.2
1910	98.3	68.7	35.0

Table 3. Distribution of Millionaires in 1892 by Primary Source of Wealth									
	Total	Percent	Region 0	Region 1	Region 2	Region 3	Region 4	Region 5	Region 6
Manufacturing	996	24.6%	142	164	324	38	302	4	22
Inheritance	807	19.9	402	80	220	18	68	0	19
Wholesale trade	474	11.7	148	46	105	40	111	3	21
Finance and Insurance	356	8.8	112	23	82	28	72	16	23
Real Estate, Rental, and Leasing	355	8.8	50	41	51	28	120	18	47
Retail trade	353	8.7	103	51	54	19	83	10	33
Transportation and Warehousing	208	5.1	53	23	53	7	50	5	17
Mining	147	3.6	11	3	42	5	26	15	45
Construction	80	2.0	18	3	24	2	27	4	2
Agriculture	69	1.7	9	5	1	18	14	7	15
Professional, Scientific, and Technical Services	66	1.6	18	6	13	4	18	2	5
Information	53	1.3	17	5	14	1	15	0	1
Utilities	27	0.7	5	2	11	0	7	0	2
Not Available	22	0.5	6	4	8	1	1	2	0
Accommodation and Food Services	20	0.5	5	3	4	2	3	0	3
Arts, Entertainment, and Recreation	7	0.2	1	3	1	2	0	0	0
Health Care and Social Assistance	5	0.1	1	0	2	0	2	0	0
Other Services	2	0.0	0	0	0	0	2	0	0
Public Administration	2	0.0	1	0	1	0	0	0	0
Management of Companies and Enterprises	1	0.0	0	0	1	0	0	0	0
Total	**4,050**	**100**	**1,102**	**462**	**1,011**	**213**	**921**	**86**	**255**

Source and notes. Ratner (1953, 5-85). The regions are as follows. Region 0: New York City. Region 1: Maine, Vermont, New Hampshire, Massachusetts, Connecticut, and Rhode Island. Region 2: New York, New Jersey, Pennsylvania, Delaware, Maryland, and the District of Columbia, Except New York City. Region 3: Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, Arkansas, Kentucky, and Tennessee. Region 4: Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, and Missouri. Region 5: North Dakota, South Dakota, Nebraska, Kansas, Montana, Wyoming, Colorado, New Mexico, and Oklahoma. Region 6: Washington, Oregon, California, Idaho, Utah, Nevada, and Arizona.

Table 4. Distribution of American Millionaires in 1892 by Supplementary Sources of Wealth

Industry	2	3	4	5	6
Finance and Insurance	727	410	144	31	14
Real Estate, Rental and Leasing	644	291	72	23	4
Manufacturing	348	108	34	11	2
Transportation and Warehousing	277	158	58	20	6
Retail trade	179	31	4	3	0
Wholesale trade	168	32	5	0	0
Mining	70	28	10	2	3
Construction	47	15	12	1	0
Agriculture	46	17	11	1	0
Inheritance	29	20	8	0	0
Professional, Scientific, and Technical Services	28	10	5	0	0
Utilities	24	19	13	9	0
Information	16	8	1	1	0
Accommodation and Food Services	12	5	5	2	0
Arts, Entertainment, and Recreation	2	3	0	0	0
Management of Companies and Enterprises	2	0	0	0	0
Other Services	2	0	0	0	0
Public Administration	1	0	0	0	0
Health Care and Social Assistance	1	0	0	0	0
Not Applicable or Not Available	1,427	2,895	3,668	3,946	4,021
Total	**4,050**	**4,050**	**4,050**	**4,050**	**4,050**

Source and notes. Ratner (1953, 5-85). See text for a discussion of the meaning of the supplementary sources of wealth.

Table 5. Distribution of American Millionaires in 1902 by Primary Source of Wealth

Classification	Total	Region 0	Region 1	Region 2	Region 3	Region 4	Region 5	Region 6
Capitalist	840	116	186	216	42	199	36	45
Manufacturing	730	67	137	199	46	261	8	12
Real Estate	679	106	115	202	27	190	10	29
Finance and Insurance	353	114	34	58	19	78	26	24
Retail trade	184	64	25	34	5	38	8	10
N/A	142	15	40	49	1	30	1	6
Management of Companies and Enterprises	139	60	14	34	3	21	2	5
Inheritance	98	34	15	39	2	5	0	3
Mining	85	4	2	34	2	13	10	20
Transportation and Warehousing	69	7	8	18	5	24	0	7
Wholesale trade	73	21	3	15	7	25	0	2
Professional, Scientific, and Technical Services	44	23	6	7	1	5	2	0
Agriculture	39	0	1	3	5	15	10	5
Information	30	4	5	11	2	7	0	1
Public Administration	27	2	7	4	2	6	2	4
Construction	8	1	0	4	1	2	0	0
Accommodation and Food Services	10	3	2	3	0	2	0	0
Utilities	8	0	2	4	0	2	0	0
Health Care and Social Assistance	3	0	3	0	0	0	0	0
Arts, Entertainment, and Recreation	3	0	1	0	0	1	0	1
Total	**3,564**	**641**	**606**	**934**	**170**	**924**	**115**	**174**

Source and Notes. Ratner (1953, 95-106). The regions are defined in Table 3.

Table 6. The Change in the Number of Millionaires Between 1892 and 1902

Classification	1892	Dropouts	Additions	1902	Matched
Manufacturing	959	-531	400	828	428
Real Estate and Rental and Leasing	473	-18	254	709	455
Capitalist	0	0	503	503	0
Finance and Insurance	347	-131	170	386	216
Inheritance	775	-582	23	216	193
Retail trade	340	-219	89	210	121
N/A	22	-9	130	143	13
Wholesale trade	464	-387	28	105	77
Transportation and Warehousing	207	-140	36	103	67
Mining	139	-91	49	97	48
Professional, Scientific, and Technical Services	64	-32	25	57	32
Management of Companies and Enterprises	1	0	54	55	1
Agriculture	69	-45	23	47	24
Information	52	-36	15	31	16
Public Administration	20	-9	16	27	11
Construction	78	-66	4	16	12
Utilities	26	-19	6	13	7
Accommodation and Food Services	18	-7	0	11	11
Health Care and Social Assistance	5	-4	3	4	1
Arts, Entertainment, and Recreation	7	-6	2	3	1
Administrative and Support and Waste Management and Remediation Services	0	0	0	0	0
Education Services	0	0	0	0	0
Other Services	2	-2	0	0	0
Total	**4,050**	**-2,316**	**1,830**	**3,564**	**1,734**

Source and Notes. Ratner (1953; 5-85, 95-106). The categories are ranked according to their importance in 1902. In each category, the 1902 number is the 1892 number less dropouts plus additions. The number of additions plus the number of matches (the number who appear on both lists) equals the number in 1902.

Table 7. Boston Millionaires in 1892 and 1902

Classification	1892	Dropouts	Additions	1902
Real Estate and Rental and Leasing	42	-17	37	62
Inheritance	38	-20	5	23
Manufacturing	37	-18	34	53
Retail trade	35	-18	8	25
Wholesale trade	22	-17	1	6
Finance and Insurance	13	-4	13	22
Transportation and Warehousing	10	-6	3	7
N/A	4	-2	21	23
Professional, Scientific, and Technical Services	4	-1	1	4
Information	3	-2	2	3
Accommodation and Food Services	3	-1	0	2
Arts, Entertainment, and Recreation	2	-1	0	1
Public Administration	1	0	1	2
Utilities	1	-1	2	2
Construction	1	-1	0	0
Capitalist	0	0	75	75
Management of Companies and Enterprises	0	0	2	2
Mining	0	0	1	1
Health Care and Social Assistance	0	0	1	1
Total	216	-109	207	314
Source. Ratner (1953, 18-22, 137-38).				

Table 8. Sources of Wealth, Chicago Millionaires, 1892

	Primary Source of Fortunes		Secondary Source of Fortunes	
	Number of Millionaires	Percentage	Number of Millionaires	Percentage
Wholesale Trade	41	14.64	2	2.67
Real Estate	34	12.14	18	24
Manufacturing	33	11.79	2	2.67
Merchandising	29	10.36	5	6.67
Packing	19	6.79	0	0
Banking	16	5.71	17	22.67
Railroads	16	5.71	6	8
Lumber	15	5.36	4	5.33
Grain	15	5.36	0	0
Brewing, Distilling, etc.	13	4.64	0	0
Publishing	9	3.21	0	0
Raw Materials	8	2.86	2	2.67
Law	8	2.86	0	0
Construction	6	2.14	1	1.33
Speculation	5	1.79	16	21.33
Manufacturing (Farm Machinery)	5	1.79	0	0
Miscellaneous	5	1.79	0	0
Hotels	2	0.71	2	2.67
Medicine	1	0.36	0	0
Total	**280**	**100.00**	**75**	**100.00**

Source. Ratner (1953, 19-22).

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