



Inventing social capital: Evidence from African American inventors, 1843–1930[☆]

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ABSTRACT

Much recent work has focused on the influence of social capital on innovative outcomes. Little research has been done on disadvantaged groups who were often restricted from participation in social networks that provide information necessary for invention and innovation. Unique new data on African American inventors and patentees between 1843 and 1930 permit an empirical investigation of the relation between social capital and economic outcomes. I find that African Americans used both traditional, i.e., occupation-based, and nontraditional, i.e., civic, networks to maximize inventive output and that laws constraining social-capital formation are most negatively correlated with economically important inventive activity.

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Recent research using historical and contemporary data have begun to explore the social aspects of innovation. Thomson (2004, 2009) finds that innovation during the antebellum period hinged critically on knowledge that was socially organized, i.e., that was shared through social networks within and across industries, as well as through civil organizations engaged in pure and applied science. Khan and Sokoloff (2004) cite the importance of the social institution of apprenticeships as a critical mechanism for transmitting and accumulating knowledge that accelerated the pace of inventive and innovative activity during the Second Industrial Revolution. In reference to the Second Industrial Revolution, Neal and Davis (2007) suggest that “to realize the commercial prospects of electricity, telephony, ... a firm needs complementary inputs from a social infrastructure.”¹ Lamoreaux et al. (2007) show that “hub” enterprises, such as the Brush Electric Company in Cleveland, were important loci of inventor networks, including as disseminators of technical knowledge, attractors of inventive talent, business incubators, and screeners of opportunities for venture capital investment. The relation between ethnic groups and innovative activity has been a particular interest among those using data from the late 20th and early 21st centuries. Recently, much scholarship has focused on social networks derived from ethnicity and national origin, including patenting and international knowledge flows, e.g., Trajtenberg (2001), Agarwal et al. (2007), and Kerr (2008), and entrepreneurial activities associated with innovation, e.g., Castillo et al. (2000) and Saxenian (2000). While social capital has been studied among disadvantaged groups, e.g., Munshi (2003) and O’Regan (1993), it has largely related to contemporary labor-market outcomes. The contribution of this paper is to fill two important holes in the literature. African American inventors and patentees have not been studied as a group systematically. A new data set I have constructed allows this for the first time. Further, since African Americans were often restricted from participation in many social networks that provided information necessary for innovation, e.g., apprenticeships and venture-capital networks, the data allow us to examine social capital among these inventors. Did African

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¹ Neal and Davis cited in Lamoreaux and Sokoloff (2007), p. 132.

American inventors possess traditional social capital relevant for inventive activity historically? If so, what kind and how was it used? If not, were there other forms of social capital that were relevant for invention and innovation?

I find that even the most prolific African American inventors possessed relatively little traditional social capital in the late 19th and early 20th centuries and used broader social networks to access the information needed for invention and innovation. Further, I find that proliferation of segregation laws, which would disrupt information flows, depressed patent outcomes, particularly among those of economic importance.

1. Data on African American innovation and social capital: collection and summary statistics

I have collected unique new data on African American inventors between 1843 and 1930 to test the hypothesized relation between social capital and inventive, or economic, activity.

1.1. Historical identification of African American inventors and patentees

Data on patents are extracted first from survey data compiled by Henry Baker, a Second Assistant Patent Examiner, who was African American.² Baker conducted surveys of 9000 patent agents and attorneys for the Patent Office in 1900 and in 1913. Questions focused on information about clients who were African American. His findings were published in a pamphlet, in the *Journal of Negro History*, and as a two-volume catalog of patents.³ The pamphlet and article provide biographical information on a small set of inventors whose patents appear in the catalog. The Baker volumes include images of patent records, which include first and last name of the inventor, city of patent application, patent number, dates of application and issue, title and description of patent, and drawings. For the period under review, the Baker data were incomplete and needed to be extended to include patent histories of inventors in his data set that extended beyond 1917, missing patents, and patents obtained by other inventors after 1917.⁴

With the names of the inventors identified by Baker, executing the first task was straightforward using online patent-search tools, including that of the [European Patent Office \(2007\)](#). Just slightly more than half of the inventors in the current data set were originally cited in a Baker publication.

In contrast, identifying missing and additional African American patentees was considerably more difficult, since race is missing in patent data.⁵ The strategy executed was to identify African Americans among the population of inventors and likely inventors from other sources and to match them to patent records. In addition to collecting data from the aforementioned works, this was accomplished by collecting names from modern and historical directories of African American scientists, engineers, and medical doctors, e.g., [Drew \(1950\)](#), the State Library of New York, and [Sammons \(1990\)](#); published biographies and collections of biographies, e.g., [Aptheker \(1951\)](#), [Haber \(1970\)](#), [Polski \(1967\)](#), and [Work \(1921\)](#); programs from or scholarship on the “Negro Building” or “Negro Day” at fairs and exhibitions related to science and invention, e.g., from the [Garrett Morgan Papers Collection and Foner \(1978\)](#); Census data; and online searches of newspapers, company archives, and patent databases, e.g., [newspaperarchive.com](#), [Western Electric](#) and the [Great Lakes Patent and Trademark Center of the Detroit Public Library](#). While better-known inventors may appear in directories and biographies, newspaper and obituary searches and programs from fairs and exhibitions capture lesser-known inventors. For the sake of comparison to existing historical data sets, inventors were selected according to the following criteria: identified by Henry Baker (1917), the aforementioned patent examiner, as a significant inventor; identified in published scholarly literature as an important inventor; or obtained four or more patents.⁶ The last criterion is consistent with a method of defining “prolific” in [Ciarlante \(1978\)](#). In the resulting data set, patents are restricted to those obtained by an inventor with at least one utility patent by 1930. Assigned patents are total or share of utility patents which are assigned to a person or to a firm at issue.⁷ Since citation data, which are used by the literature as a quality measure, are not publicly available until 1975, patent assignment will be the best information available on a patent’s commercial viability.⁸

This data set will have several limitations. First, Baker observes that there was likely under-reporting by patent attorneys and agents who feared revelation of their clients’ racial identity and possible negative consequences that may have resulted.⁹ Second, the method employed to find other patentees is relatively conservative. Although a broad range of sources was used, African American inventors who are not identified as such will not be matched to patents. It is a general problem in the literature that less

² Throughout the paper the terms “patent” and “utility patent” will be used interchangeably. A utility patent is issued for any new and useful process, machine, manufacture, composition of matter, or any new and useful improvement thereof. From 1995, utility patents are effective for 20 years from the date of application. Utility patents constitute over 95 percent of all patents granted African Americans. While it is standard to use patents as a proxy for innovation and inventive activity, it should be recognized that this measure has limitations as, for instance, not all inventions are patentable or patented.

³ See Baker (1913, 1917, 1921).

⁴ Missed the first known U.S. patent to an African American inventor in 1821, which suggested that others might be missing.

⁵ Census-based approaches, including those exploiting the recent literature related to “black names”, were attempted but were unsuccessful. These are described in the Appendix.

⁶ Another reason to select an alternative population from which one might obtain a sample of African American inventors is because it has been argued in the literature that African Americans are generally underrepresented in the *DAB*. [Bandolph \(1955\)](#) offers adjustments to the *DAB* and to *Who’s Who in America* for the period 1770 to 1936. This work resulted in the addition of one inventor, James Forten, to the data set.

⁷ Excluded are patents assigned to inventors in the data set but on which they are not designated as inventors, e.g., as assignees.

⁸ This will still be a crude measure of commercializability, because assignment at issue does not account for the secondary market in patents.

⁹ For example, in the *Garrett Morgan Papers* it is noted that orders for Garrett Morgan’s gas masks were canceled when southern fire chiefs saw a photo of him identifying him as the inventor of the modern gas mask.

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