Access to this work was provided by the University of Maryland, Baltimore County (UMBC) ScholarWorks@UMBC digital repository on the Maryland Shared Open Access (MD-SOAR) platform.

Please provide feedback

Please support the ScholarWorks@UMBC repository by emailing scholarworks-group@umbc.edu and telling us what having access to this work means to you and why it's important to you. Thank you.

Reassessing the Contributions of African American Inventors to the Golden Age of Innovation

Michael J. Andrews¹ and Jonathan T. Rothwell²

October 15, 2020

Abstract

During the Industrial Revolution and subsequently, it is widely believed that African Americans contributed disproportionately little to the economic development of the United States, especially in comparison to European Americans and immigrants from Europe. Yet, African Americans lived in entirely different institutional environments than other Americans, particularly in the South under Jim Crow laws. Using a new database that matches inventors to census records, we find that the share of patents invented by Black Americans living in the North matched their share of the U.S. population from 1870 to 1940 and exceeded it in some decades and in some Northern states throughout the period. We find that Black Americans from all regions were responsible for more patents than immigrants from all but two countries (Germany and England). Northern Black Americans patented at rates that exceeded Southern White Americans and were comparable to the highest patenting groups. In total, we estimate that African Americans were the identified inventors of 50,000 patents over the period. Thus, when freed of extreme political oppression, African American demonstrated level of inventiveness that matched the most inventive groups in U.S. history.

¹ Affiliation: National Bureau of Economic Research

² Corresponding author's contact information: Jonathan_Rothwell@gallup.com; Affiliations: Principal Economist at Gallup; Nonresident Senior Fellow at the Brookings Institution

I. Introduction

In leading theories of economic growth, technology and innovation are the driving forces of long-term gains in living standards (Jones 2016). Ideas, developed and commercialized, are key to innovation, and the economics literature has long recognized that patents offer a valuable measure of invention. Patents were particularly important during the so-called Golden Age of Invention (1870 to 1940), or the second-phase of the Industrial Revolution, which is characterized by an unprecedented flowering of sustained economic growth and advances in living standards (Deaton (2014); Gordon (2016)). As historians have documented, people living in the United States contributed disproportionately to this rise.

A notable fact of this period is that it started following the Civil War, which liberated millions of African Americans from slavery. As discussed in the historical literature (DuBois 2014, liberation from slavery was far from the only significant benefit for African Americans during this period. During the Reconstruction period in the South and for a longer period in the North, former slaves and their children were given access to education and occupational opportunities long-denied to them, particularly if they lived in the North. This is clear in the historical evidence from rapidly rising literacy rates across regions and high test scores and social status of Northern Black people compared to many European immigrant communities (Rothwell 2019). The relative prosperity of Northern Black people is also captured in many examples of Black invention and entrepreneurship, summarized in Rothwell (2019), Cook (2011, 2014), and Cook and Kongcharoen (2010).

Perhaps the earliest and most ambitious attempt to measure the contribution of Black people to U.S. invention was made by Henry Baker (1913), who worked at the U.S. Patent Office. In the early 20th Century, he surveyed approximately 8,000 registered patent attorneys, found 1,200 inventions attributed to people of African American ancestry and was able to confirm 800 of them. He emphasizes that this was a large undercount, and attorneys reported failing to recall the names or inventions of some of their Black clients. More recently, librarian Margaret Collins (2008) has created a digital database of Black inventors. During the Golden Age (1870-1940), her database shows that only 26% of 985 identified Black inventors lived in the South, whereas Census data show that the South accounted for 86% of the Black population (Ruggles et al 2020).

The sharp differences in economic and social outcomes between African Americans living in the North and the South has been explained by the very different institutional environments. After the end of Reconstruction in 1877 and the withdrawal of the Federal military, White-supremacy terrorist groups, such as the Klu-Klux-Klan regained power and influence (Foner 1988). The educational efforts made by freed Blacks and Northern White allies were undermined by the defunding of public education for Black children, restrictions on occupations, lending, and residence. In addition to these policies, Black people in the South lived under a reign of intimidation and oppression (Wilkerson 2010). Toward the end of the Great Migration and during a time of widely accepted White-Supremacy, the North would eventually adopt many of these practices under a system described as Jim Crow system, named after a popular vaudeville act that drew upon Black stereotypes.

The main contribution of this paper is to investigate and quantify the contributions of Black inventors, after taking into account the vast differences in the institutional environment. Perhaps because of the difficulty of identifying the race of inventors, there have been relatively few studies on the race or ethnic background of inventors (Iancu and Peter 2019). Two recently published studies noted Black patenting rates, and concluded Black people were heavily under-represented. From 1880 to 1940, Akcigit, Grigsby, and Nicholas (2017) find that Black people comprised 1.8% of U.S. inventors versus 9.1% of the total U.S. population. Sarada, Andrews, and Ziebarth (2019) uncover a slightly higher rate (2.7%), but still well below population shares. Neither paper formally considers the differential effect of Jim Crow institutional environments.

Our work is closely related to that of Cook (2011) and Cook (2014), who finds that segregation laws and violence against Black people explain some of the variation in African American patenting over time and across states. We extend her analysis by directly matching census data to patenting records, providing broader coverage and allowing us to estimate population level characteristics, since whether or not an inventor in the patenting records matches to the Census appears to be largely random.

This paper also contributes to the literature on the political economy of inequality and economic growth (Ogilvie 2019; Acemoglu, Johnson, and Robinson 2001; Acemoglu and Robinson 2012; Rothwell, 2019). Inequality and economic growth can have a shared underlying cause when a society systematically prevents a group of people from reaching their optimal level of skill or if they prevent people in that group from applying those skills in the optimal occupations. A version of this model is formally laid out in Hsieh et al (2019) and sketched in Rothwell (2019). As applied to the Jim Crow era, this work builds on Logan and Parman (2017), and Cook, Logan, and Parman (2018), who find that residential segregation was much higher in the U.S. South in 1880 and 1940 and that segregation was correlated with worse health outcomes for Black Americans and the probability of being lynched.

Following this introduction, we describe the database and analytic methods. Then, we show results of inventions per capita by state and region of residence. In the next section, we compare these baseline results to those by birthplace. Here, we include a discussion of inventors born abroad and compare aggregate and per capita rates to African Americans. In the final section, we attempt to estimate the total number of patents by African Americans living in the North and South. In the implications section, we argue that this evidence should prompt a re-thinking of the role of Black people to American history and provide further evidence that institutional features of political economy play important roles in shaping social outcomes.

II. Data and methods

It is typically difficult to ascertain an inventor's race. A patent contains an inventor's name and location of residence, but not information about race, ethnicity, or other demographic characteristics. To overcome this challenge, we use data from Sarada, Andrews, and Ziebarth (2019) who match the names and locations of inventors to the same information in U.S. population census records. U.S. census records are kept confidential for 72 years, so Sarada, Andrews, and Ziebarth examine patentees in seven census years from 1870 through 1940 (the 1890 census records were destroyed in a fire, so it is not possible to match patentees to the census for that year). These decades constitute some of the most important in the history of U.S. invention.

The patent data is collected from Annual Reports of the Commissioner of Patents and Annual Indices of Patents, which list each patent granted by the US Patent & Trademark Office (USPTO) in each year. Sarada, Andrews, and Ziebarth use “fuzzy matching” techniques to link the names and locations of patentees to individuals in the census. A given patentee record may plausibly link to several different records in the census, and these records may contain different demographic information, making it difficult to determine the patentee's race. Sarada, Andrews, and Ziebarth therefore report several different statistics related to patentee demographics to capture this degree of uncertainty, including upper and lower bounds on the number of patents from inventors of different races.

In this paper, we present results in which the race of each patentee is calculated as a weighted average of the races of individuals in the census to whom that patentee plausibly matches. For instance, if a patentee links to three individuals in the census and two of those individuals are Black and one is white, this 2/3 of the patent is attributed to a Black inventor and 1/3 is attributed to a white inventor.³ In practice, the vast majority of

³ Over time, the census used numerous different names for individuals of African or Caribbean descent, individuals of multiple races, and individuals whose race could not be determined. We follow Sarada, Andrews, and Ziebarth (2019)

inventions in our database (96%) are matched to exactly one person. This is true for Black and non-Black inventors. Roughly 3.6% have two potential inventors and 0.4% have three.

We present statistics for the Black and White inventors separately in Table 1. Black inventors from this period are slightly younger than White inventors and more likely to be native-born and female. The mean age for Black inventors is 37.3 versus 41.7 for White inventors. 18% of Black inventors are women compared to only 4% of White inventors. Black and White inventors are similar in their propensity to migrate across state lines (roughly 60% of both), but Black inventors are much less likely to be born outside the United States (15% vs 26%).

[Table 1]

To calculate per capita patenting rates over time, we need data on total population, which we obtain by state and census year from IPUMS USA (Ruggles et al 2020). Since the patents were matched to Census data, it is straightforward to match state population levels of each year of database, which encompasses the seven decennial years with available data (data from the 1890 Census was destroyed in a fire). We aggregate population totals by state and year by state of residence by race and by place of birth by race. Birthplace data in the Census report the state of birth for those born in the United States and the country of birth for immigrants. This allows us to calculate the how Black patenting differs between state of residence and state of birth and compare patent

III. Rates of invention by decade and region of residence or birth

Broad regional patterns

We start by showing the broad pattern in patenting by race during the period. White Americans were 4.6 times more likely to patent than Black Americans during the period (Figure 1). That rate fluctuated somewhat but remained fairly constant. A superficial interpretation of this result is that Black Americans faced enduring obstacles throughout the country that resulted in consistently low rates of patenting. Yet, underlying this pattern is the fact that Black Americans were born and raised mostly in the U.S. South, where the institutional environment was radically different for most of this period with respect to both race and invention (Figure 2). The share of African Americans living in the South went from 90% in 1870 to 77% in 1940. Meanwhile, only one-quarter (26%) of White Americans lived in the South throughout the period. Despite the lopsided share of African Americans living in the South, the majority of patents were filed by northern African Americans (58% is the average for the entire period), with the northern patenting share reaching 71% by 1940. Most patents filed by White Americans also came from Northern residents (90%), reflecting regional differences in education and industrial concentrations.

These regional patterns raise a simple question: At what rate did northern African Americans patent, and how does that compare to White Americans. The question is more profound when re-stated to reflect the differing institutional environments: How did varying social and economic restrictions affect invention?

The data suggest quite a dramatic difference, as shown in Figure 3. Across the period, Black people living in Northern U.S. states were 9 times more likely to patent than Black people living in Southern states. The regional gap for White inventors is also large in that northern White people were 3 times more likely to patent than their Southern counterparts, but that is only one-third as strong as the effect on Black invention. A simple interpretation of these facts is that poor social and economic resources (eg lack of education, research and development, and industry) limited invention in the South by a factor of three, whereas systemic racism

and, rather than decide which of these groups should count as Black, we classify all non-white patentees as Black. Individual from other ethnic groups, such as those of Asian or Latin American descent, accounted for a tiny share of patents prior to the second half of the twentieth century.

had an even larger effect—albeit only on the Black population. Black people in the North were almost as likely to file a patent as Northern White people and far more likely to patent than Southern White people.

To put in perspective the extraordinary patenting of Northern Black people in the decades after the end of slavery, consider that patenting in Northern Black communities was equal to White Americans nationally (Figure 4). The United States during this era was arguably the most inventive place on earth, and this was arguably the most inventive era in world history. This puts northern Black people in the global vanguard of invention in the late 19th and early 20th Century.

We also consider what these patenting rates look like by region of birth. The latter distinction is important in analyzing the causes of different patenting rates by region. A state could be better at providing Black people learning opportunities, practice opportunities, or both. A state that provides only practice opportunities may provide no advantages to people born there but may be a welcoming destination to highly-skilled migrants raised elsewhere.

The patenting rates by region of birth are largely consistent with patenting by region of residence. For both races, patenting rates are slightly higher by region of residence, consistent there being both learning and practice opportunity effects from northern states (Figure 5). Whether using state of birth or residence, the broad regional distinctions are still evident, and the data are clear that northern Black patenting rates were high by either definition.

Patenting rates by state of residence and birth

We now turn to state-specific estimates of patenting rates by state for Black and White people and consider patents by residence and state of birth. On average, black patenting rates are lower than white patenting rates in the same state, but there are several notable exceptions (Table 2). In Washington, Maine, Colorado, Pennsylvania, and Indiana both patenting by residents and patenting by those born in the state are higher for Black people. In Wisconsin, black patenting rates are roughly the same as white patenting for residents, but black patenting is much higher by birth, suggesting Wisconsin provided especially advantageous learning opportunities. In New York, Michigan, and Ohio patenting rates were essentially the same between Black and White people, whether by residence or birth

In Southern states, patenting is almost uniformly lower for White and Black people, but some of the within race comparisons are instructive. In states with heavy slave populations historically, such as Alabama, South Carolina, Georgia, Mississippi, Texas, and Florida, patenting was much higher for Black people who were born there than patenting by residence, suggesting these states were especially bad at providing practice opportunities, but many Black people born in these states achieved inventive success elsewhere after migrating.

IV. Comparison between Black inventors and foreign-born White inventors

Historic and contemporary data both suggest that inventors tend to be far more literate, numerate, and well-educated than their peers (Sarada et al 2019, Bell et al 2019). In this way, the prevalence of inventors across demographic groups provides information about relative social status, including opportunities for learning and practicing specialized skills.

Contemporary literature on innovation and patenting has emphasized the distinct contributions of foreign-born migrants (Peri 2016). Yet, comparisons between foreign-born migrants and African Americans, as to their propensity to invent, are biased by the different institutional arrangements facing those groups. This is especially apparent during the time period being considered here. Foreign-born migrants faced discrimination, in various ways, but nothing like the systemic stifling of educational, social, and professional opportunities that hindered Black Americans from pursuing their optimal line of research or work (Massey and Denton

1993). These anti-Black restrictions were much more severe in the American South, at least in the beginning of the 20th Century. As mid-Century approached, local governments in North began adopting more aggressive policies designed to segregate races and classes, as discussed in Rothwell (2019). To partly account for these institutional differences, we compare northern Black patenting rates to those achieved by various groups of immigrants over the period in questions (1870-1940).

Our first finding confirms that patenting rates were relatively high for European immigrants, especially those from England, Scotland, Sweden, Germany. Patenting rates were also high among Canadians. People from these places exhibited measured patenting rates that exceeded 100 per million, compared to 55 among northern Black residents and 74 among northern White residents. In interpreting these differences, one should consider that the denominator is restricted to international migrants, a small subset of people actually living in the countries listed and a group much more likely to contribute to invention than those who do not migrate.

When compared to other large European sources of migration, patenting by northern White and Black Americans is at roughly the same level. These include mostly Jewish migrants from Russia and Poland, as well as mostly Catholic migrants from Ireland and Italy. Total inventions by Black Americans exceeded the totals produced by each of these groups and the rate of patenting per capita was similar. Indeed, the scale of Black patenting can be put in better context when assessing these other groups. There were more patents from Black Americans than there were from migrants from any specific country, with the exception of England and Germany.

Thus, while our results are consistent with the theory that international migrants innovate at relative high rates, we show that the gap is not so large compared to Northern Black and White Americans, and the dominate source of inventions were done by people born in the United States.

V. Adjusting for the partiality of Census Records

The strength of our database is that it directly matches patent holders to Census records. Limitations include that not everyone who patents is captured, and our data is limited to inventors whose patent was approved during a decennial year.

To get a more complete picture of African American patenting, we therefore need to adjust the data to account for missing records. We do this by multiplying the total number of domestic utility patents granted in a given year by the percentage of patents attributed to Black people in the same year, using our database.

The assumption here is that whether a patent is linked to the Census database is random with respect to whether the inventor is Black or not. In other words, matching an inventor's name to Census records is neither more nor less likely if the inventor is Black.

Overall, our database accounts for 19% of patents (34,410) issued during the seven years: 1870, 1880, 1900, 1910, 1920, 1930, and 1940. Of those 957 went to African Americans. After adjusting for patents missing from our database, we estimate 5058 patents were issued to African American inventors during this seven-year period, of which 3096 went to Northern Black residents. If we impute the nearest-year share of patents going to Black inventors to the actual number of U.S. domestic patents, we account for a total of 49,821 patents issued to Black inventors from 1870 to 1940.

We also put the northern Black patenting rate in perspective by comparing it to the U.S. average for the entire history of the USPTO (Figure 6). Throughout the period, Northern Black patenting was near the most innovative rates achieved nationally. The level of invention of Northern Black residents was extremely high relative to U.S. history and world history.

VI. Discussion

For over a century, the contributions of African Americans to science and invention were assumed to be picayune. A common theme in the social science literature and its popular interpretations is that the end of slavery marked the beginning of Jim Crow, and racism was a steady and powerful force holding down the social status of Black people from the 1860s until the present. That perspective ignores the important advantages in educational opportunities and labor markets that the North afforded Black people relative to the South, before the worst of Jim Crow was implemented outside the South.

As argued in Rothwell (2019) a cultural shift occurred among many Northern White people just before and after the Civil War that rejected the racist ideology that Black people were naturally incapable of great achievements and unworthy of educational investments and highly-skilled vocations. This is not to deny that racial discrimination was a problem for Black people in the North during this period, but it was not strong enough to prevent thousands of Black inventors from obtaining intellectual property protection for ideas deemed novel and significant enough to warrant approval from the U.S. Patent Office. Other evidence on home ownership, literacy, and cognitive testing conducted during the 1920s finds that northern Black people performed relatively well compared to many European immigrants, consistent with the patenting data (Rothwell 2019).

If we are right that these findings uncover a hidden and underappreciated period of opportunity, albeit imperfectly available, these findings also highlight the tragedy of what occurred next. As Jim Crow laws set in the North, housing segregation, civil violence directed against Black people, and other manifestations of oppression became more frequent. As argued in Cook (2014), these institutional changes seemed to have stymied much of the educational opportunities as well as creative outlets for entrepreneurship and invention that had previously been available for Northern Black people and gradually eroded their social standing.

We hope future research will do more to uncover the extent to which the North provided special learning opportunities as compared to opportunities to work. Furthermore, we believe more systemic documentation of institutional laws and practices by state and how they evolved over this time-period would strengthen our historic understanding of what went wrong and why—and more precisely identify the policies and practices most harmful to Black people.

For now, we end by quoting Baker (1913), who shared our research goal over 100 years ago. He eloquently summarized the importance of this line of inquiry and forecasted the degree of equity and social status that Black people were on pace to achieve by Mid-Century, if not for the rapid erosion of civil liberties for Black people that occurred in the decades that followed his publication.

“The foregoing facts are here presented as a part only of the record made by the race in the field of invention for the first half century of our national life. We can never know the whole story. But we know enough to feel sure that if others knew the story even as we ourselves know it, it would present us in a somewhat different light to the judgment of our fellow men, and, perhaps, make for us a position of new importance in the industrial activities of our country. This great consummation, devoutly to be wished, may form the story of the next fifty years of our progress along these specific lines, so that someone in the distant future, looking down the rugged pathway of the years, may see this race of ours coming up, step by step, into the fullest possession of our industrial, economic and intellectual emancipation.”

References

- Abramitzky, Ran, Leah Platt Boustan, and Katherine Eriksson. "Have the poor always been less likely to migrate? Evidence from inheritance practices during the age of mass migration." *Journal of Development Economics* 102 (2013): 2-14.
- Acemoglu, Daron, Simon Johnson, and James A. Robinson. "The colonial origins of comparative development: An empirical investigation." *American economic review* 91, no. 5 (2001): 1369-1401.
- Acemoglu, Daron, and James A. Robinson. 2012. *Why nations fail: The origins of power, prosperity, and poverty*. Currency.
- Akcigit, Ufuk, John Grigsby, Tom Nicholas. 2017. "The Rise of American Ingenuity: Innovation and Inventors of the Golden Age" NBER Working Paper No. 23047
- Baker, Henry 1913, "The colored inventor: A Record of Fifty Years" (Project Gutenberg, <https://www.gutenberg.org/files/21281/21281-h/21281-h.htm>)
- Bell, Alex, Raj Chetty, Xavier Jaravel, Neviana Petkova, and John Van Reenen. 2019 "Who becomes an inventor in America? The importance of exposure to innovation." *The Quarterly Journal of Economics* 134, no. 2: 647-713.
- Borjas, George J. "Self-selection and the earnings of immigrants." *American Economic Review* 77, no. 4 (1987): 531-553.
- Chetty, Raj. and Hendren, Nathaniel. 2018. The impacts of neighborhoods on intergenerational mobility I: Childhood exposure effects. *The Quarterly Journal of Economics*, 133(3), pp.1107-1162.
- Collins, William J. and Marianne H. Wanamaker. "Selection and economic gains in the Great Migration of African Americans: New evidence from linked census data." *American Economic Journal: Applied Economics* 6, no. 1: 220-252.
- Collins, Margaret J. 2008. "Index of Black Inventors by State or Country of Residence 1834-2008," Patent and Trademark Depository Library, Illinois State Library
- Cook, Lisa D. 2014. "Violence and economic activity: evidence from African American patents, 1870–1940." *Journal of Economic Growth* 19 (2): 221-257.
- Cook, Lisa D., 2011. Inventing social capital: Evidence from African American inventors, 1843–1930. *Explorations in Economic History*, 48(4), pp.507-518.
- Cook, Lisa D. and Chaleampong Kongcharoen. "The idea gap in pink and black." NBER Working Paper 16331 (2010).
- Cook, Lisa D., Trevon D. Logan, and John M. Parman. "Racial Segregation and Southern Lynching." *Social Science History* 42, no. 4 (2018): 635–75. doi:10.1017/ssh.2018.21.
- Deaton, Angus. 2014. *The Great Escape: Health, Wealth, and the Origins of Inequality* (Princeton University Press).
- Du Bois, W.E.B., 2014. *Black Reconstruction in America (The Oxford WEB Du Bois): An Essay Toward a History of the Part Which Black Folk Played in the Attempt to Reconstruct Democracy in America, 1860-1880*. Oxford University Press.
- Foner, Eric. 1988. *Reconstruction: America's Unfinished Revolution, 1863-1877* (Harper Collins)
- Gordon, Robert J. 2016. *The Rise and Fall of American Growth: The U.S. Standard of Living since the Civil War* (Princeton University Press).

Hsieh, Chang-Tai, Erik Hurst, Charles I. Jones, and Peter J. Klenow. 2019. "The allocation of talent and us economic growth." *Econometrica* 87, no. 5: 1439-1474.

Iancu, Andrew and Laura A. Peter. "Study of underrepresented classes chasing engineering and science success: SUCCESS Act of 2018." Report to Congress, October 2019.

Jones, Charles I. "The facts of economic growth." In *Handbook of macroeconomics*, vol. 2, pp. 3-69. Elsevier, 2016.

Logan, Trevon D., and John M. Parman. "The national rise in residential segregation." *The Journal of Economic History* 77, no. 1 (2017): 127-170.

Massey, Douglas, and Nancy A. Denton. *American apartheid: Segregation and the making of the underclass*. Harvard university press, 1993.

Ogilvie, Sheilagh. 2019. *The European guilds: An economic analysis*. (Princeton University Press).

Peri, Giovanni. "Immigrants, productivity, and labor markets." *Journal of economic perspectives* 30, no. 4 (2016): 3-30.

Rothwell, Jonathan. 2019. *A Republic of Equals: A Manifesto for a Just Society* (Princeton University Press).

Steven Ruggles, Sarah Flood, Ronald Goeken, Josiah Grover, Erin Meyer, Jose Pacas and Matthew Sobek. IPUMS USA: Version 10.0 1880 to 1930 Linked Samples. Minneapolis, MN: IPUMS, 2020.
<https://doi.org/10.18128/D010.V10.0>

Sarada, Michael J. Andrews, Nicolas L. Ziebart. 2019. "Changes in the demographics of American inventors, 1870–1940" *Explorations in Economic History* 74: 101275

Wilkerson, Isabel. 2010 "The Warmth of Other Suns: The Epic Story of America's Great Migration." (Random House, New York).

Figure 1. Patents per thousand residents by race and decennial year, 1870-1940

Figure 2. Northern share of population and patents by race by year, 1870-1940

Figure 3. Patents per capita by region by race, 1870-1940

Figure 4. Patents per capita for Black people living in North and White people from all regions, 1870-1940

Figure 5. Patents per capita by region of birth by race, 1870-1940

Figure 6. Black Patenting during the Golden Age in Historical Perspective

Note: Rates are 1000s of patents per capita.

Source data: Ziebarth, Nicolas, X, Sarada, and Andrews, Michael. American Inventors, 1870-1940. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2019-06-03. <https://doi.org/10.3886/E109970V2>
USPTO and MeasuringWorth.Com

Table 1. Summary demographic information of inventors matched in census, 1870-1940

	Not-Black	Black
Age	41.7	37.3
Female	5%	18%
Inter-state migrant	60%	62%
Born outside United States	25%	14%

Data are restricted to cases in which record match race exactly.

Table 2. Patents per million population by race and state of residence and birth, 1870-1940
(cumulative)

	Black people		White people	
	State of residence	State of birth	State of residence	State of birth
District of Columbia	201.5	140.7	491.6	300.4
Massachusetts	188.3	120.4	222.9	179.9
Washington	151.6	117.9	87.0	33.5
Maine	111.0	413.3	65.0	137.7
New York	100.9	96.7	98.0	97.1
Connecticut	100.6	96.7	293.7	223.9
Colorado	79.7	70.1	71.4	51.1
Delaware	74.7	63.0	174.5	114.3
Pennsylvania	59.1	67.9	49.3	52.5
California	58.7	25.6	84.9	53.7
New Jersey	57.9	57.0	219.3	121.6
Illinois	57.2	39.0	53.4	44.2
Maryland	50.9	51.7	133.0	115.7
Michigan	41.1	40.7	48.0	45.5
Ohio	36.4	46.4	45.5	50.9
Wisconsin	34.8	77.4	38.6	39.9
Indiana	30.4	45.7	26.8	36.3
Kansas	19.6	19.6	12.9	35.6
Utah	14.8	513.1	84.9	58.2
Minnesota	14.7	10.1	28.9	31.9
Missouri	13.2	13.5	24.5	29.2
Iowa	9.5	102.9	16.2	28.5
Oregon	7.5	16.1	81.3	49.0
Tennessee	6.5	11.8	11.8	14.2
Florida	6.3	8.3	29.5	23.3
Louisiana	6.1	5.8	25.9	23.7
Oklahoma	5.8	9.7	17.1	11.6
Kentucky	4.5	9.2	10.4	19.0
Alabama	2.8	5.3	10.3	13.2
Texas	1.9	2.4	7.6	9.4
South Carolina	1.6	6.1	15.4	21.0
Mississippi	1.4	4.8	8.9	11.4
Georgia	1.0	4.7	7.6	13.9
Arkansas	1.0	2.4	6.1	7.8
North Carolina	0.4	5.2	7.0	12.9
New Hampshire	0.0	501.4	78.4	184.9
Vermont	0.0	158.2	88.5	147.4
Nebraska	0.0	25.9	12.2	26.4
Idaho	0.0	0.0	42.1	19.9
North Dakota	0.0	0.0	19.0	20.0
Arizona	0.0	0.0	34.0	44.7
South Dakota	0.0	0.0	15.3	23.8
Wyoming	0.0	22.9	43.8	47.1

New Mexico	0.0	0.0	19.6	14.2
Nevada	0.0	0.0	73.5	79.6
West Virginia	0.0	7.8	1.1	13.1
Hawaii	0.0	0.0	18.3	23.8
Montana	0.0	0.0	0.0	36.7
Rhode Island	0.0	40.7	0.0	65.1
Virginia	0.0	20.9	0.0	31.5
Alaska	0.0	0.0	0.0	1097.7

Table 3. Summary data from 1870 to 1940 period of patenting by Black Americans compared to European Immigrants and White Americans

	Share of U.S. Patents/Share of U.S. Population	Share of patents matched to census	Share of population	U.S. Patents per million cumulative population	Total patents (directly observed)
Northern Black Americans, by birth	0.95	0.8%	0.8%	52.6	267
Southern Black Americans, by birth	0.17	1.7%	9.6%	9.6	572
Northern Black Americans by residence	0.99	1.6%	1.6%	55.0	556
Southern Black Americans by residence	0.12	1.1%	9.0%	6.7	371
All Black Americans	0.25	2.7%	10.6%	14.2	927
<i>Select immigrant groups by country of birth</i>					
Germany	2.40	5.2%	2.2%	133.0	1,781
England	3.71	3.2%	0.9%	205.0	1,083
Canada	2.10	2.5%	1.2%	115.9	863
Russia and Poland	1.53	2.4%	1.6%	84.8	822
Ireland	1.42	2.2%	1.5%	78.4	741
Sweden	2.36	1.2%	0.5%	130.3	425
Scotland	3.44	1.0%	0.3%	190.4	332
Italy	0.79	0.9%	1.1%	43.9	305
West Indies	1.68	0.1%	0.0%	93.1	25
<i>White Americans</i>					
All White Americans	1.10	97.3%	88.8%	61.1	33,843
Southern White American by state of residence	0.43	9.7%	22.6%	23.9	3,329
Northern White American by state of residence	1.32	87.6%	66.2%	73.8	30,154
Southern White American by state of birth	0.42	9.4%	22.3%	23.6	3,247
Northern White American by state of birth	1.20	64.4%	53.6%	67.0	22,143