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Racial Diversity in Aviation

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Abstract

Commercial aviation has grown rapidly since the 1950s yet racial diversity in the aviation workforce has showed little progress. To explore this issue, this archival study was conducted to examine the representation of Black individuals in aviation occupations and other specialized professions from 2009 to 2018. Data were obtained from the American Community Survey using Public Use Microdata Sample from the United States Census Bureau. The frequency count and percent were calculated each year for each occupation by race (White or Black). Five aviation occupations were selected for comparison: aircraft pilot and flight engineer; air traffic controller and airfield operations specialist; aerospace engineer; avionics technician; and aircraft mechanic and service technician. Four specialized training professions were compared to pilots: actuary; mechanical engineer; lawyer, judge, and magistrate; and physician. This study also quantified the percent change of Black pilots, compared to White pilots, across the 10-year time frame. Results highlighted a consistent lack of racial diversity across the aviation occupations and specialized training professions examined in this study. Percent change across the years was shown to be markedly erratic for Black pilots, while percent change for White pilots was relatively stable. Further research is warranted to investigate the underlying causes for this erratic trend. Findings from this archival study highlight a potential untapped resource for solving the labor shortage facing the entire aviation industry.

Keywords: aviation, diversity, race, labor shortage

Introduction

Commercial aviation has grown rapidly since the 1950s yet racial diversity in the aviation workforce has showed little progress. Walk through any airport and many pilots in uniform are white male. Race has been and continues to be an issue in the aviation community and, often, a disqualifying characteristic for employment opportunities in aviation. To illustrate, Michael Zirulnik wrote in a blog post (2014, para 1), “The chief pilot asked me to hire a black female pilot so we could check off a diversity box on a reporting form so we could keep our government contract.” Once the one was hired, the chief pilot returned and stated, “never hire another one again. Things are gonna stay the way they’ve always been around here”. Yet, this perspective can be costly for the aviation industry. As an example, in 2016, Republic Airways filed for Chapter 11 bankruptcy protection partly because of the airline was grounding aircraft due to insufficient pilot resources (Ostrower, 2017, para 6).

Black pilots comprise a small percentage of the pilot workforce and are an untapped resource for aviation companies facing pilot shortages. To further examine this issue, this archival study investigated the following three research questions (RQs):

- RQ1 How does the number of White and Black pilots in the aviation industry compare to the number of White and Black individuals in other aviation occupations in the United States from 2009 to 2018?
- RQ2 How does the number of White and Black pilots in the aviation industry compare to the number of White and Black individuals in other specialized training professions in the United States from 2009 to 2018?
- RQ3 What is the percent change over time in the number of White and Black pilots in the aviation industry in the United States from 2009 to 2018?

Background

To ensure a strong workforce in the future, the aviation industry needs to promote racial diversity, opening its occupations to all members of society (Hansen & Oster, 1997). Black individuals are a vast resource overlooked for far too long. To optimize their success, aviation companies could target this untapped resource to help fill the gap the traditional white male pilots will be leaving when they retire. However, as will be discussed next, two factors (legality and perceptions) have had a significant negative influence on racial diversity in aviation.

Legality

Limited attention has been paid to the Black workforce in the current pilot industry. As Darity and Mason (1998) point out, the lack of Black individuals within the airline industry has rarely been addressed unless, or until, a complaint or lawsuit has been filed, such as, for example, *Colorado v. Continental Airlines*, 1963. The creation of Affirmative Action laws in 1960 were intended to aid access to education to Black individuals, yet these laws have had little impact in the field of aviation. In 1986 and 1987, the Government Activities and Transportation Subcommittee of the House Committee on Government Operations held hearings on Black representation within the airline industry. Key findings cited in the Committee's report (U.S. Congress, 1988, pp. 23-24) include:

- Black pilots receive multiple rejections for employment from most large commercial airlines.
- Black airline employees are predominantly in low-wage and unskilled positions.
- Black airline employees are disillusioned and frustrated by their companies' treatment of Blacks.

Over thirty years after these hearings were completed, only a limited number of studies have been performed on the number of Black pilots in the cockpit and the number of programs aiding them in the aviation community. Another noted legal battle came to an end in 1995 involving United Airlines. United Airlines was sued by the Equal Employment Opportunity Commission charging United and its unions with “a pattern and practice of discrimination in hiring, termination, and other job related practices, based upon race, national origin and sex in violation of Title VII of the Civil Rights Act of 1964” (from the government’s April 14, 1973, complaint as reported in U.S. District Court, 1995, p. 2). One specific allegation stated the airline entered “collective bargaining agreements that contained discriminatory provisions on promotion, demotion, transfer, and layoffs based on seniority” (Hansen & Oster, 1997, p. 117). Further, the Equal Employment Opportunity Commission opened several cases against the airline unions for unfair practices stemming from seniority and low wages for Black individuals.

Perceptions

Since its origins, the field of aviation has never been ethnically diverse nor does it reflect the diversity of the overall workforce or the community it serves (Foster, 2003). The perceptions of pilots have always been white males and individuals from underrepresented groups may be unaware this career field is open to them due to a lack of role models. In addition, these individuals may choose not to explore career opportunities in aviation due to perceptions about the challenges and barriers they will have to overcome (Evans, 2013). To illustrate, Harl and Roberts (2011) performed a case study on the Black experience in business aviation examining the perceptions of Black pilots in the workplace. Notable conclusions from their study were:

- The perceptions of White aviators toward Black aviators often reflect fear, ignorance, indifference, or a lack of knowledge of Black aviation history.

- The business aviation community and Black aviation professionals have not addressed racism collectively. No one wants to recognize the existence of racism in aviation and many are uncomfortable discussing it. As a result, the ‘good ole boy system’ is changing very slowly.
- Most participants in their study have been the first or only Black individual in their flight department. They sense the sheer magnitude of what they have accomplished may be greater in that White professionals may have grown up with a sense of entitlement that the aviation industry would automatically accept them. Yet, this creates a feeling of pressure to represent the entire Black race to White aviators.
- All participants in their study stressed that skin color cannot be an issue when safety is the first mission of the team yet minorities often have to accommodate whites who are uncomfortable with a minority on their team (Harl & Roberts, 2011, p. 16).

Harl and Roberts’ discoveries illustrate several accommodations Black pilots made for their White counterparts in order to fly with them. Though racism may not be the exact descriptive used in the situation, having to accommodate another pilot’s personal feeling toward oneself creates a stressful workplace environment. Hochschild (as cited in Evans, 2013) describes this issue in terms of ‘emotional labor’ labor, or “the labor required to reduce or suppress feeling in order to sustain the outward countenance that produces the proper state of mind in others” (p. 2).

Call for Continued Attention

The National Academy of Sciences 1996 Committee on Education and Training for Civilian Aviation Careers (Hansen & Oster, 1997, p. 8) concluded that increasing participation from underrepresented groups in aviation must be accomplished along three dimensions: (1) develop these individuals’ interest in aviation careers, (2) provide opportunities to develop basic

academic competencies, and (3) address any remaining barriers impeding access, either formally or informally, by these groups to pursue aviation careers. The Federal Aviation Administration “recommends that all organizations seeking to encourage interest in knowledge of aviation focus special attention on the continuing need to reach and involve individuals from groups who have been and are still underrepresented in the industry” (Hansen & Oster, 1997, p. 121).

Method

Data for this archival study were collected from the American Community Survey (ACS) using Public Use Microdata Sample (PUMS) from the United States Census Bureau (<https://www.census.gov/programs-surveys/acs/data/pums.html>). PUMS data are drawn from a survey conducted all year, every year where randomly selected addresses in every state, the District of Columbia, and Puerto Rico are selected to complete the survey (United State Census Bureau, 2020). Anyone with an address can take the survey and respond. A limitation of the archival research is the use of PUMS data; this database uses a smaller sample size because it is microdata and is edited using top coding to protect privacy. An assumption for the archival research is the data were collected and recorded accurately.

Two keywords, RACIP (detailed race code) and OCCP (Occupation), were searched and analyzed from 2009 to 2018. This 10-year time frame was selected because the data are readily available from the United States Census Bureau and are relatively current. The frequency count and percent was calculated each year for each occupation by race (White or Black). Five aviation occupations were selected for comparison: (1) aircraft pilot and flight engineer, (2) air traffic controller and airfield operations specialist, (3) aerospace engineer, (4) avionics technician, and (5) aircraft mechanic and service technician. Four specialized training professions were compared to pilots: (1) actuary, (2) mechanical engineer, (3) lawyer, judge, and magistrate, and

(4) physician. Pilots and these specialized training professions all require specialized exams to participate in their field. Pilots require check rides and certifications. Actuaries require several exams including probability exam, financial mathematics exam, and models for financial economics exam. Mechanical engineers require the Fundamentals of Engineering exam. Lawyers, judges, and magistrates must pass the bar exam. Physicians require medical boards.

Ethical Considerations

This archival study did not present any ethical issues as the data are published by the U.S. Census Bureau in the public domain and available for public use. The data are gathered by mail from participating individuals in questionnaires administered and returned and de-identified.

Results

Results for each research question will be presented separately. Due to the large disparity in number between the two race categories (White and Black) in each occupation, no inferential statistical analyses were conducted on the data. Instead, frequency counts and percentages for each year will be reported.

Diversity in Aviation Occupations (RQ1)

Tables 1 and 2 show the frequency counts and percentages by race for the five aviation occupations. During the 10-year time frame, the predominant race across all five aviation occupations was White, ranging from 72.2% to 95.3%. In contrast, representation of Black individuals was low across all five aviation occupations, ranging from 1.6% to 13.1%. The occupation *Aircraft Pilot and Flight Engineer* consistently reported the smallest percentages of Black individuals, ranging from 1.6% to 3.4%. The occupation *Air Traffic Controller and Airfield Operations Specialist* consistently reported the largest percentages of Black individuals, ranging from 6.5% to 13.1% of the workforce. The occupation *Aviation Mechanic and Service*

Technician consistently reported the largest numbers of Black individuals across the years, ranging from 14,395 to 22,050, with percentages ranging from 7.3% to 10.6%.

Table 1

Comparison of Aviation Occupations by Race from 2009 to 2013

Year OC/RC	2009		2010		2011		2012		2013	
	White	Black	White	Black	White	Black	White	Black	White	Black
PFE	165,424	4,574	158,860	4,303	154,157	2,858	155,879	5,394	153,791	2,663
%	93.1%	2.6%	93.7%	2.5%	95.3%	1.8%	93.2%	3.2%	94.1%	1.6%
ATC	42,336	5,184	38,168	4,859	43,933	5,297	42,378	4,292	36,085	6,058
%	81.8%	10.0%	84.3%	10.7%	82.3%	9.9%	82.6%	8.4%	77.0%	12.9%
AE	121,754	6,410	120,317	6,518	123,859	6,209	121,600	6,066	114,920	6,452
%	78.3%	4.1%	79.1%	4.3%	82.8%	4.1%	79.6%	4.0%	78.5%	4.4%
AVT	23,975	2,426	21,616	1,902	20,756	2,456	21,211	3,461	24,198	3,201
%	85.6%	8.7%	83.3%	7.3%	79.6%	9.4%	74.1%	12.1%	77.8%	10.3%
AMT	169,721	18,637	162,735	14,395	163,042	18,750	185,449	21,298	164,645	18,970
%	80.7	8.9%	83.0%	7.3%	80.5%	9.3%	81.0%	9.3%	79.5%	9.2%

Note: OC: occupation; RC: race; PFE: aircraft pilot and flight engineer; ATC: air traffic controller and airfield operations specialist; AE: aerospace engineer; AVT: avionics technician, and AMT: aircraft mechanic and service technician.

Table 2

Comparison of Aviation Occupations by Race from 2014 to 2018

Year OC/RC	2014		2015		2016		2017		2018	
	White	Black	White	Black	White	Black	White	Black	White	Black
PFE	149,972	3,872	154,703	3,602	183,378	3,270	172,092	6,343	192,165	5,074
%	93.8%	2.4%	92.9%	2.2%	92.8%	1.7%	92.5%	3.4%	91.4%	2.4%
ATC	40,064	6,264	39,786	6,059	37,806	5,327	34,054	2,637	36,967	6,120
%	80.1%	12.5%	77.7%	11.8%	81.1%	11.4%	83.8%	6.5%	78.9%	13.1%
AE	106,745	3,610	109,773	4,440	118,700	5,768	126,204	5,991	118,396	6,116
%	79.6%	2.7%	81.1%	3.3%	81.2%	3.9%	79.8%	3.8%	76.0%	3.9%
AVT	20,252	2,068	23,420	2,668	19,638	2,723	19,560	2,248	16,620	2,867
%	78.7%	8.0%	77.9%	8.9%	73.5%	10.2%	79.3%	9.1%	72.2%	12.5%
AMT	154,581	15,962	173,898	21,028	168,477	20,588	173,043	20,199	161,885	22,050
%	80.2%	8.3%	78.4%	9.5%	80.5%	9.8%	77.9%	9.1%	77.5%	10.6%

Note: OC: occupation; RC: race; PFE: aircraft pilot and flight engineer; ATC: air traffic controller and airfield operations specialist; AE: aerospace engineer; AVT: avionics technician, and AMT: aircraft mechanic and service technician.

Diversity in Specialized Training Professions (RQ2)

Tables 3 and 4 show the frequency counts and percentages by race for the five specialized training professions. During the 10-year time frame, the predominant race across all five specialized training professions was White, ranging from 69.7% to 95.3%. In contrast, representation of Black individuals was low across all five specialized training professions, ranging from 0.6% to 5.7%. The professions *Actuary* and *Aircraft Pilot and Flight Engineer* consistently reported the smallest percentages of Black individuals, ranging from 0.6% to 3.5% and 1.6% to 3.4%, respectively. The professions *Lawyer, Judge, and Magistrate* and *Physician* consistently reported the largest percentages of Black individuals, ranging from 4.6% to 5.7% and 4.5% and 5.5%, respectively. The profession *Lawyer, Judge, and Magistrate* also consistently reported the largest numbers of Black individuals across the years, ranging from 52,980 to 73,098.

Table 3

Comparison of Specialized Training Professions by Race from 2009 to 2013

Year Race OCC	2009		2010		2011		2012		2013	
	White	Black	White	Black	White	Black	White	Black	White	Black
PFE	165,424	4,574	158,860	4,303	154,157	2,858	155,879	5,394	153,791	2,663
%	93.1%	2.6%	93.7	2.5%	95.3%	1.8%	93.2%	3.2%	94.1%	1.6%
ACT	23,275	385	24,491	172	20,702	750	19,467	297	24,678	306
%	85.7%	1.4%	86.0%	0.6%	80.0%	2.9%	81.4%	1.2%	82.3%	1.0%
ME	205,386	10,244	202,802	8,902	188,381	10,166	203,368	9,379	215,004	8,313
%	82.5%	4.1%	82.8%	3.6%	83.3%	4.5%	83.2%	3.8%	82.9%	3.2%
LAW	1043,475	56,878	1007,018	52,980	1020,070	56,827	1041,373	56,855	1049,390	54,776
%	88.9%	4.8%	88.8%	4.7%	88.5%	4.9%	88.2%	4.8%	88.3%	4.6%
PHY	667,746	43,431	665,185	44,827	684,872	49,289	692,901	47,878	692,997	52,080
%	74.9%	4.9%	73.0%	4.9%	72.6%	5.2%	73.3%	5.1%	71.4%	5.4%

Note: OCC: occupation; PFE: aircraft pilot and flight engineer; ACT: actuary; ME: mechanical engineer; LAW: lawyer, judge, and magistrate; and PHY: physician.

Table 4

Comparison of Specialized Training Professions by Race from 2014 to 2018

Year Race OCC	2014		2015		2016		2017		2018	
	White	Black	White	Black	White	Black	White	Black	White	Black
PFE	149,972	3,872	154,703	3,602	183,378	3,270	172,092	6,343	192,165	5,074
%	93.8%	2.4%	92.9%	2.2%	92.8%	1.7%	92.5%	3.4%	91.4%	2.4%
ACT	26,560	361	23,225	264	24,831	1,059	26,469	586	30,177	836
%	79.4%	1.1%	76.4%	0.9%	81.7%	3.5%	76.9%	1.7%	79.0%	2.2%
ME	215,610	10,144	228,823	8,246	243,241	12,825	234,495	10,147	258,820	14,058
%	80.7%	3.8%	83.0%	3.0%	79.8%	4.2%	81.1%	3.5%	80.3%	4.4%
LAW	1059,381	62,892	1087,799	60,720	1085,988	59,092	1084,382	64,159	1109,107	73,098
%	87.7%	5.2%	87.6%	4.9%	87.7%	4.8%	87.2%	5.2%	86.6%	5.7%
PHY	671,105	41,501	714,845	44,389	697,210	53,513	725,512	56,816	687,281	53,798
%	72.4%	4.5%	72.6%	4.5%	69.8%	5.4%	70.4%	5.5%	69.7%	5.5%

Note: OCC: occupation; PFE: aircraft pilot and flight engineer; ACT: actuary; ME: mechanical engineer; LAW: lawyer, judge, and magistrate; and PHY: physician.

Diversity in Pilot Workforce Across Time (RQ3)

The percent change by race for Aircraft Pilots and Flight Engineers is shown in Table 5 and graphically illustrated in Figure 1. Frequency counts for White pilots remained relatively stable across the 10-year time frame examined in this study, ranging from -3.97% to 0.19%. For Black pilots, the frequency counts were erratic. Frequency counts for Black pilots increased between 2011 and 2012 (88.73%) and between 2013 and 2014 (45.40%), with the largest increase (93.98%) between 2016 and 2017. However, the data showed a notable decrease in the number of Black pilots between 2010 and 2011 (-33.58%), between 2012 and 2013 (-50.63%), and between 2017 and 2018 (-20.01%).

Table 5

Frequency Count and Percent Change for Aircraft Pilots and Flight Engineers by Race from 2009 to 2018

Year	White		Black	
	Count	% Change	Count	% Change
2009	165,424	***	4,574	***
2010	158,860	-3.97	4,303	-5.92
2011	154,157	-0.03	2,858	-33.58
2012	155,879	0.01	5,394	88.73
2013	153,791	-0.01	2,663	-50.63
2014	149,972	-0.02	3,872	45.40
2015	154,703	0.03	3,602	-6.97
2016	183,378	0.19	3,270	-9.22
2017	172,092	-0.06	6,343	93.98
2018	192,165	0.12	5,074	-20.01

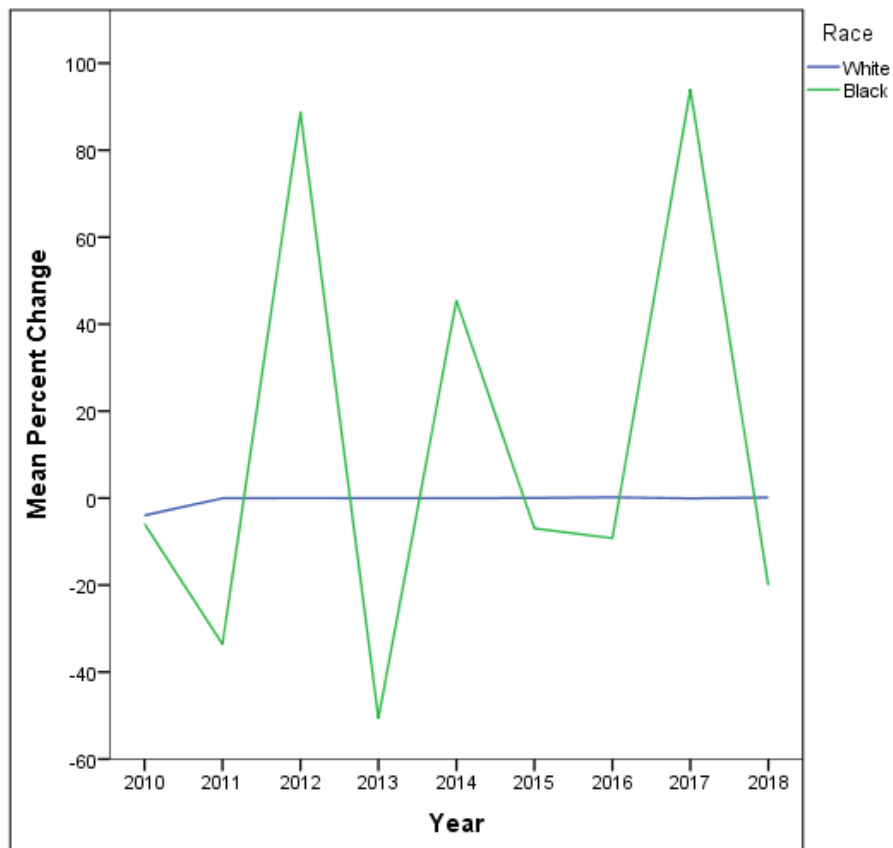


Figure 1. Percent change of Aircraft Pilots and Flight Engineers by race from 2010 to 2018.

Discussion

The objective of this archival study was to examine the representation of Black individuals in aviation occupations and other specialized professions. Results highlighted a consistent lack of racial diversity. The aviation occupation with the highest number of Black individuals in 2018 was *Aviation Mechanic and Service Technician* at 22,050 (compared to White individuals at 161,885). The aviation occupation with the lowest number of Black individuals in 2018 was *Aircraft Pilot and Flight Engineer* at 5,074 (compared to White individuals at 192,165). When compared to other specialized training professions, *Aircraft Pilot and Flight Engineer* had the second lowest number of Black individuals in 2018. Only the profession *Actuary* had a lower number of Black individuals in 2018, with 836 (compared to White individuals at 30,177).

This study also quantified the percent change of Black pilots, compared to White pilots, across a 10-year time frame. Percent change across the years was shown to be markedly erratic for Black pilots, while percent change for White pilots was relatively stable. Further research is warranted to investigate the underlying causes for this erratic trend. As a starting point, qualitative research studies, involving focus groups and in-depth interviews, can be conducted to identify potential organizational factors contributing to this erratic trend, such as hiring practices or negative influences in the workplace environment (e.g., racial discrimination).

In summary, findings from this archival study highlight a potential untapped resource for solving the labor shortage facing the entire aviation industry. Although the challenge of diversifying the aviation workforce is complex, organizational stakeholders, both in the private and public sector, must work together to identify effective recruitment and retention strategies and policies to promote greater racial diversity in the aviation domain.

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