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**Women 50+ in the NYC Workforce:
Tackling Economic Vulnerability**

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Executive Summary

By 2030, it is expected that one in every five US residents will be of retirement age. Yet there have been few reports on older adults' participation in the workforce and their financial standing.

It has been well established that women over 50, a growing subset of the population, experience financial vulnerability at higher rates than other demographics. They face a unique set of challenges that range from carrying a greater burden of family responsibilities—including childcare—to earning lower incomes and experiencing a higher unemployment rate.

They are also more vulnerable to financial insecurity and when employed, are more likely to have part-time jobs with fewer benefits. Moreover, as a result of widowhood, women over 50 are less likely to be married and, therefore, less likely to benefit from being part of a dual-income household. It's important to note that even though women earn less than men, they have a higher life expectancy, which means they need to be particularly attuned to saving for retirement.

While a number of studies have explored gender disparities across all age groups, fewer resources have been devoted specifically to studying how older women are impacted by structural inequality. As baby boomers and Generation X age, exploring this disparity has become increasingly important.

Using the latest data from the American Community Survey, we find that:

- More than a third of women over 50 in New York City work in either the medical (25 percent) or education (13 percent) industries.
- Women over 50 entrepreneurs made up 42 percent of female entrepreneurs in the New York City workforce in 2017, representing an increase of about 4 percentage points from 2008.
- While women's wages as a fraction of men's wages in New York City for ages 25 through 49 is 84 cents to a dollar, the ratio for women over 50 is 77 cents. This is 7 cents less for older women. While this may not seem like a dramatic difference, these 7 cents compound quickly and amount to thousands of dollars lost every year.
- The gender wage gap has widened over the past decade, increasing about 5 percent for women over 50.
- After age 55, the number of women participating in the workforce relative to their male counterparts decreases with age.
- For women over 50, having a bachelor's degree or higher reduces exposure to economic vulnerability. However, only 41 percent of women over 50 in the city have a bachelor's degree or higher.
- Some industries are more secure for women over 50 than others. Compared to finance and real estate, being employed in either social care (e.g., vocational rehabilitation services, individual and family services) or other services (e.g., restaurant and food services) increases the odds of economic vulnerability by 19 percentage points or more.

The findings of this study provide strong evidence that age discrimination, compounded by other biases, plays a critical role in contributing to the gender wage gap for women over 50 and making this demographic, on the whole, exposed to financial and economic disadvantages.

To combat this, the following policy recommendations have been made:

- Developing tailored workforce development programs for women over 50. This could include accelerated learning programs, entrepreneurship incubators, and skills bootcamps.
- Creating even more supportive workplace policies that enable women to work flexible schedules—empowering them to take more full-time, high-quality jobs while balancing dependent care.
- Incentivizing and rewarding employers that encourage savings and wealth accumulation for women. This would include incentive policies like offering tax breaks to those employers that offer better retirement savings options, e.g., matching, auto-enrollment, auto-escalation, etc.

1. Introduction

Maximizing female workforce participation is good for economic and social well-being. While educational and labor market opportunities for US women improved significantly in the second half of the 20th century, the trend has stagnated and reversed since 2000, with women's labor force participation falling from 60.7 percent in 2000 to 57.2 percent in 2016 (Schanzenbach and Nunn, 2017). Had women's labor force participation remained at its 1970 levels, the US economy would have been \$2 trillion (13.5 percent) smaller (Council of Economic Advisers, 2015).

On average, women still earn less than men in nearly all occupations, and the wage gap is notably wider and more profound for older female workers. Much of the gender wage gap can be explained by occupational segregation, differences in academic specialization, the challenge of balancing work and household responsibilities, and wage discrimination (Burke, 2017).

Compared to a similar age cohort of men, W50+ still bear a greater burden of childcare and other family responsibilities; earn lower incomes and are less likely to have jobs; are more vulnerable to financial insecurity and when employed, are more likely to have part-time jobs with fewer benefits.

While a number of seminal studies have looked at gender discrimination among all age groups, not many have focused on women 50 years and older (W50+) specifically. Given that W50+ as a demographic will continue to grow as the US population becomes older (US Census Bureau, 2018), it is important to take a closer look at the unique hardships this particular cohort faces, especially here in New York City (NYC). This is the focus of this paper.

W50+ face a unique set of challenges. Compared to a similar age cohort of men, W50+ still bear a greater burden of childcare and other family responsibilities; earn lower incomes and are less likely to have jobs; are more vulnerable to financial insecurity; and when employed, are more likely to have part-time jobs with fewer benefits. In the US and NYC, women have a higher life expectancy than men.

According to the US Department of the Treasury (2017), compared with older men and younger women, older women are much less likely to be married due to widowhood; are much less likely to live with someone with whom they can share economic risks; and are more disproportionately impacted by disability resulting in considerable uninsured health expenses. This trend holds true for W50+ and other cohorts of older women.

This paper contributes to the existing literature by exploring city-level socioeconomic characteristics of economic vulnerability. Existing feminist research on discrimination and vulnerability focuses primarily on national-level trends and case studies. By examining the workforce in NYC, and the W50+ demographic in particular, we provide nuanced insights into many important city-level trends, some of which vary sharply from what is observed in the

US as a whole. NYC is ahead of other large cities in closing the gender wage gap,¹ but much work remains to be done, especially for women of color, who experience a much wider pay gap.

In the next section, we review the existing literature. This is followed in Section 3 by a descriptive analysis of the major pillars of economic vulnerability faced by W50+ in the NYC workforce. Section 4 discusses the data, methods and results, while Section 5 provides concluding comments and policy recommendations.

¹ Based on median earnings data from the US Census Bureau, in NYC, women earn 87 cents for every dollar a man makes, compared to Los Angeles (86 cents), San Francisco (81 cents), Chicago (84 cents), Boston (81 cents), and Seattle (74 cents).

2. Literature Review

W50+ face the twin challenges of age and gender-related discrimination. Although W50+ are a growing subset of the population,² research on gender discrimination is generally focused on all age groups. Despite women achieving some gains in recent years, discrimination persists. For workers in 2018, the average woman had to continue working until April 2, 2019 to earn what the average man earned in 2018 alone (Equal Pay Today, 2019).

There has been much discussion over explaining the gender wage gap and the lack of equal career opportunities for women in the workplace. Globally, while progress has been made toward closing the gender gaps in educational attainment and health and survival, far more work remains to be done in closing the gaps in political empowerment and economic participation and opportunity (World Economic Forum, 2019).

The economic imperative for increased female participation in the economy is clear; addressing the issue of gender disparities in the labor force could open up currently untapped economic opportunities.

Existing research points to evidence of sex discrimination in explaining pay disparities and hiring (Hersch, 2006; Goldin and Rouse, 2000). In what she termed the “quiet revolution,” Goldin (2014) explains that women’s participation has increased significantly in occupations that were once heavily male-dominated. Using data from the beginning of the 20th century until recently, Goldin explains the pollution theory of discrimination and shows that occupations that tended to be restrictive were those that paid above the female median wage, while those that paid below the female median wage were less restrictive and more inclusive of women. In the modern context, progress has been made to break down barriers at the top of the income and educational attainment distributions (e.g., lawyers and physicians), but “frog ponds”—i.e., workplaces with particular characteristics and skills (e.g., firehouses, police departments, and trading floors in the financial sector)—still remain.

Other research notes that women undertake a disproportionately higher burden of household responsibilities and work fewer hours compared to men. Working college-educated women spend about one to two hours more each day on household responsibilities; this affects their ability to accommodate increasing workplace demands (Cortés and Pan, 2016). Generally, more men than women working full-time penalizes wages earned and opportunities over women’s careers (Goldin, 2015). As Goldin notes, women are more likely to work fewer than 40 hours per week. Despite being paid less, women’s earnings are key to the economic stability of families (Milli, Huang, Hartmann, and Hayes, 2017). The economic imperative for increased female participation in the economy is clear; addressing the issue of gender disparities in the labor force could open up currently untapped economic growth opportunities.

² By 2030, all baby boomers will be older than 65, meaning that one in every five US residents will be of retirement age (US Census Bureau, 2018).

Concurrently, research notes that older populations encounter more obstacles in pursuing employment. A recent correspondence study created over 40,000 fake job applications and measured the callback rates to infer discrimination. They found that callback rates decreased significantly as age increased in almost all occupations (Neumark, Burn, and Button, 2019). In addition, studies show a stark contrast between women and men in accumulating wealth and assets, leading to worse economic outcomes in later life. Using data from the Panel Study of Income Dynamics, Schmidt, and Sevak (2006) find that while households headed by a single female and single male show no significant wealth gaps, a comparison of their older counterparts reveals wide wealth gaps favoring men over women.

Research that looks at the economic well-being of older women also points to disparities. Globally, the labor force participation rate among women over 65 is half that of men, and this population disproportionately experiences income insecurity (United Nations, 2017). An analysis of gender disparities in older populations' financial insecurity reveals that women are disproportionately more likely than men to face a poverty risk in the 27 European Union countries considered (Vlachantoni, 2012). This research outlines how the design of pension systems disadvantages women with atypical employment patterns by emphasizing uninterrupted periods of full-time employment, whereas other studies note that women in Europe are more likely to work part-time (Blau and Kahn, 2013; Ilinca, Rodrigues, Schmidt, and Zolyomi, 2016). This finding is also relevant to the US; a congressional report concludes that the median income for women ages 65 or older is 44 percent less than that of men, while women ages 75 and older are twice as likely to live in poverty (US Congress, 2016).

The concept of economic vulnerability is complex and multifaceted; definitions and modeling approaches are evolving. One popular attempt at defining vulnerability is to look at the probability of falling below the poverty line in any of three consecutive time periods in the future (Pritchett, Suryahadi, and Sumarto (2000); Christiaensen and Boisvert (2000); and Chaudhuri (2003)). In a micro-theoretic sense, the line between poverty and economic vulnerability is blurry; there is no consensus in the economic development literature on the ideal measure of vulnerability.

Sen (1976) concludes that the aggregate sum of individual poverty levels is, by implication, society's poverty. Ersado (2008) finds that the determinants of poverty and vulnerability are similar; Chaudhuri, Jalan, and Suryahadi (2002) show that the poor are also a subset within the broader set of the vulnerable; and Morduch (1994) and Dercon and Krishnan (2000) propose consumption and income smoothing as a risk sharing and vulnerability reduction strategy. While traditional poverty measures define a certain level of well-being below which the population of interest is targeted, more recent literature has begun to focus on the risks associated with falling below that poverty threshold due to fluctuations in well-being (Gallardo, 2017).

In the following section, we analyze descriptive statistics for the W50+ cohort in the NYC workforce and explore their pillars of economic vulnerability.

3. Descriptive Analytics and Pillars of Vulnerability

What does the population of W50+ in the NYC workforce look like? Figure 1 shows the distribution of this cohort across the five boroughs, with a majority living in Brooklyn (30 percent). The distributions of W50+ by race and highest level of educational attainment are detailed in Table 1: the majority of W50+ in NYC are White (39 percent), followed by Black (25 percent); and the majority's highest level of educational attainment is a high school degree (24 percent). 41 percent of W50+ have a bachelor's degree or higher.

Unless otherwise specified, the data used in this analysis come from the American Community Survey (2013–2017 5-year estimates).

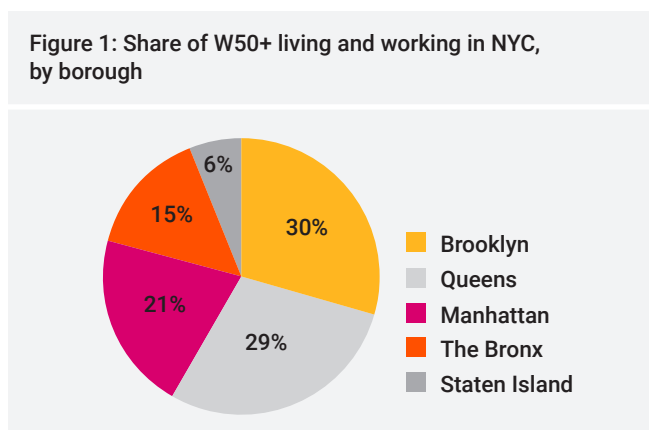


Table 1: Distribution of W50+ by race and highest level of educational attainment

Race	Share (% of total cohort)	Educational Attainment	Share (% of total cohort)
White	39%	Less than High School	12%
Black	25%	High School	24%
Hispanic	20%	Some College	23%
Asian	13%	Bachelor's	21%
Other	2%	Master's and/or Above	20%

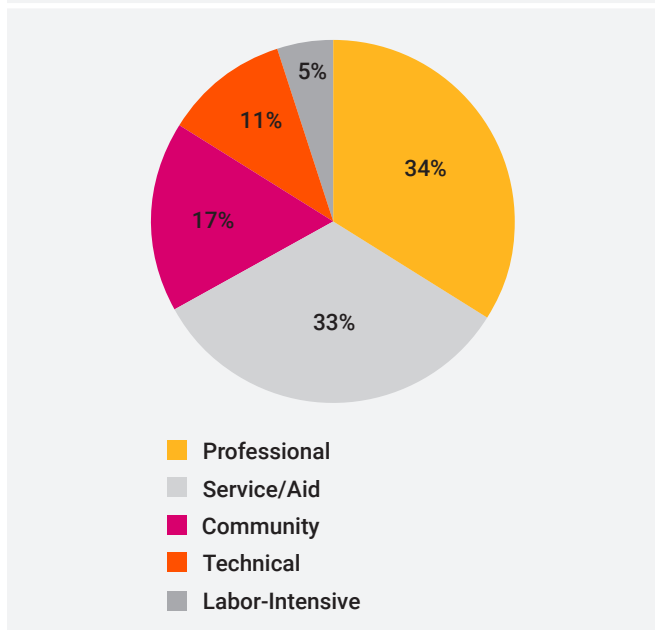
Source: Author calculations using American Community Survey 2013–2017 5-year estimates

The top three industry sectors employing W50+ are medical (25 percent), education (13 percent), and professional (11 percent) industry sectors (Table 2). We classify occupations into five categories: Professional (e.g., financial managers, construction managers), Technical (e.g., information security analysts, civil engineers), Community (e.g., social workers, firefighters), Service/Aid (e.g., pharmacy aides, food servers) and Labor-Intensive workers (e.g., electricians, laundry and dry-cleaning workers). By occupational classification, the greatest share of W50+ work as either Professionals (34 percent) or Service/Aid workers (33 percent) (Figure 2). Within the NYC workforce, W50+ have a higher median income (\$38,700), compared to women overall (\$36,300).

Table 2: Share of W50+ by industry*

Industry	Share (% of total cohort)
Medical Services	25%
Educational Services	13%
Professional, Scientific and Technical Services	11%
Finance, Insurance and Real Estate	8%
Social Care	8%
Services	7%
Retail Trade	6%
Entertainment	5%
Administrative Services	5%
Labor-Intensive (Agriculture, Extraction, Utilities, Construction and Transportation)	4%
Manufacturing	4%
Information	3%
Wholesale Trade	2%

Figure 2: Share of W50+ workers, by occupational status**



* The Military sector is excluded because of insufficient observations.

** Labor-Intensive industry differs from Labor-Intensive occupational category. While the former includes industrial sectors of: Agriculture, Extraction, Utilities, Construction and Transportation that employ people under all five occupational categories, the latter consists of occupations that rely on physical labor (e.g., repairers, assemblers, crane operator) and can be employed under any industrial classification.

Source: Author calculations using American Community Survey 2013–2017 5-year estimates

Box 1: Facts about W50+ entrepreneurs

1. W50+ entrepreneurs make up **42 percent of the total population of women entrepreneurs** in the NYC workforce in 2017, representing an increase of about 4 percentage points from 2008
2. W50+ who have their own incorporated business **have a median income of \$47,300** compared to \$38,700 for W50+ overall
3. **More than a quarter** of NYC entrepreneurs 50 and older are women (27.1 percent), compared to about a third of NYC entrepreneurs overall (29.5 percent)
4. Compared to the overall W50+ who live in NYC, W50+ entrepreneurs are **more likely to live in Manhattan** (41.2 percent vs. 20.5 percent), and are **less likely to be a person of color** (39.1 percent vs. 60.6 percent)
5. W50+ entrepreneurs are **more likely to live in an owner-occupied housing unit** (65.4 percent vs. 54.2 percent)
6. Compared to W50+ in the workforce overall, W50+ entrepreneurs are **more likely to have a spouse who works full-time** (34.2 percent vs. 24.9 percent), and are **less likely to have no spouse present** (18.5 percent vs. 33.9 percent)

Within the broader research area of women in the workforce, public discourse has increasingly focused on the challenges faced by women of childbearing age and older women. Evidence abounds that any policy targeted at subsidizing childcare for low-income families often generates high economic payoff. Similarly, older women are more susceptible to economic insecurity due to the underlying vulnerabilities discussed in more detail below. We delve into the pillars of economic vulnerability for the W50+ demographic below.

3.1 Gender wage gap

Based on US Census Bureau data analyzed by the American Association of University Women (2019), women of all races and ethnicities who work full-time, year-round in the US earn 80 cents for every dollar a man is paid. In NYC and New York State, the most commonly cited statistic shows that women earn the equivalent of 89 cents for every dollar a man makes (New York State Department of Labor, 2018). Currently, there is no consensus on the preferred method for measuring the gender wage gap; estimates often depend on data sources and assumptions underlying which workers are included in the sample (i.e., age and hours/weeks worked), earnings type, and typical earnings (i.e., average or median).

Our analysis shows that an employed woman over 25 in NYC earns 81 cents for every dollar a man makes.³ Put another way, the median wage gap for an employed woman over 25 working and/or living in NYC is \$9,650 per year. Over a hypothetical 40-year career from age 25 to 65, a woman earning the median wage at each age would earn \$409,000 less than her male counterpart.

Segregating the microdata by age bracket, we see the wage gap is wider for W50+ compared to women 25–49. Women aged 25 to 49 earn 84 cents for every dollar a man makes, while W50+ make 77 cents (Figure 3). Furthermore, the wage gap widened over the 2007–2017 period, increasing 10 percent for women 25–49, and 4.5 percent for W50+.⁴ One explanation for this is hours worked. The share of W50+ working full-time has fallen in the past decade (79.6 percent in 2007 vs. 77.3 percent in 2017). The fall in W50+ full-time workers is more pronounced, compared to men (2.89 percent for W50+ vs. 1.35 percent for men over 50) (Table 3). When employed, W50+ are more likely than men 50 and older to work part-time, and consequently, less likely to receive benefits.

Figure 3: Women’s wages as a fraction of men’s wages by age bracket in NYC, cents per dollar

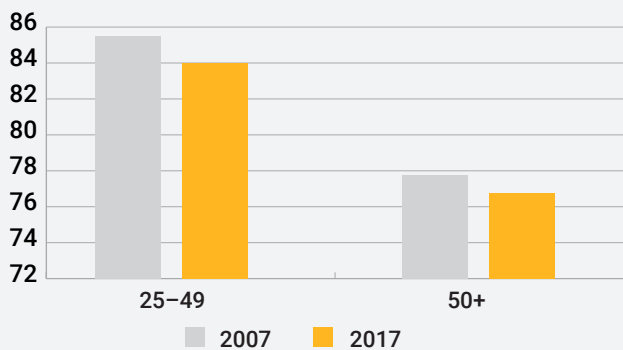


Table 3: Share of workers 50+ by gender working full-time in NYC

	2007	2017
Male	88.7%	87.5%
Female	79.6%	77.3%

Source: Author calculations using American Community Survey 2005–2007 3-year estimates and 2013–2017 5-year estimates

³ Data retrieved from US Census Bureau (American Factfinder) find the gender wage gap for NYC at \$8,900 per year (i.e., a woman earns 74 cents for every dollar a man makes). Our methodology is based on the wage gap for employed women over 25.

⁴ Comparison based on American Community Survey 2005–2007 3-year estimates and 2013–2017 5-year estimates.

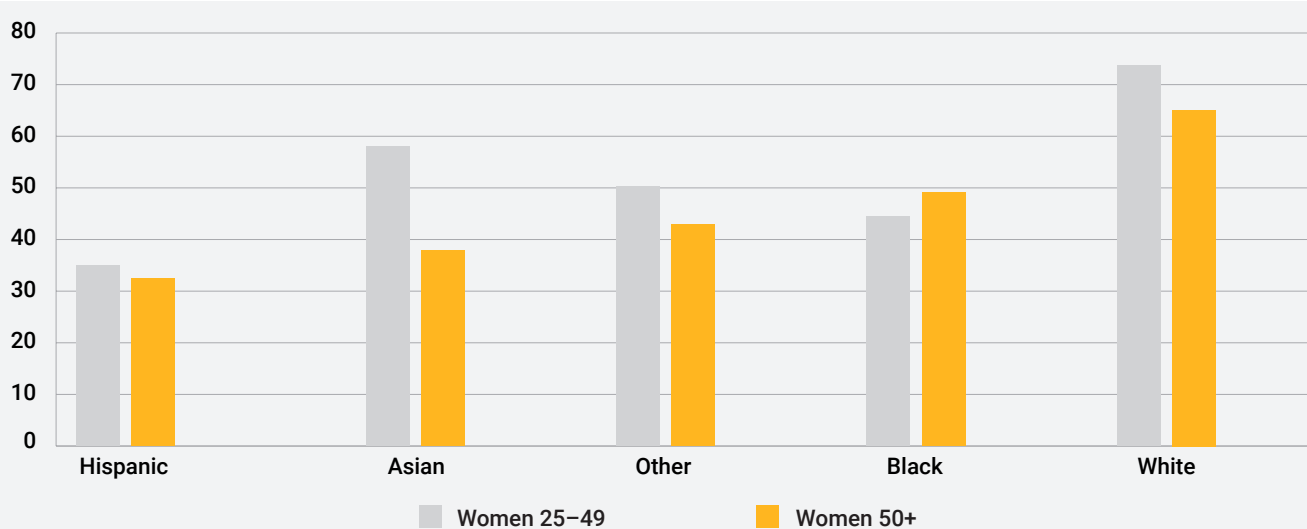
The American Association for University Women notes that after controlling for educational attainment between men and women, the gender wage gap widens at the highest levels of education. This raises an important question: are the best-educated women experiencing discrimination? Again, Goldin attributes this to the fact that even better-educated women are more likely to choose occupations that enable them to strike a balance between work and family life.

The gap in hours worked is a critical piece of the gender wage gap. In a bid to generate more insight, we look at the gender wage gap by race/ethnicity, borough and industry/occupation.

3.1.1 Gender wage gap by race/ethnicity

Looking at the gender wage gap by race/ethnicity shows that women of color feel income disparities most acutely. For every dollar a White male over 25 in NYC makes, a Hispanic woman over 25 earns 34 cents; and a Black woman over 25 earns 46 cents. The gaps widen more acutely for W50+ of color. For every race/ethnicity, except Black, W50+ face a wider wage gap when compared to White men in their respective reference cohort (Figure 4).⁵

Figure 4: Women’s wages as a fraction of men’s wages by age bracket and race/ethnicity in NYC, cents per dollar

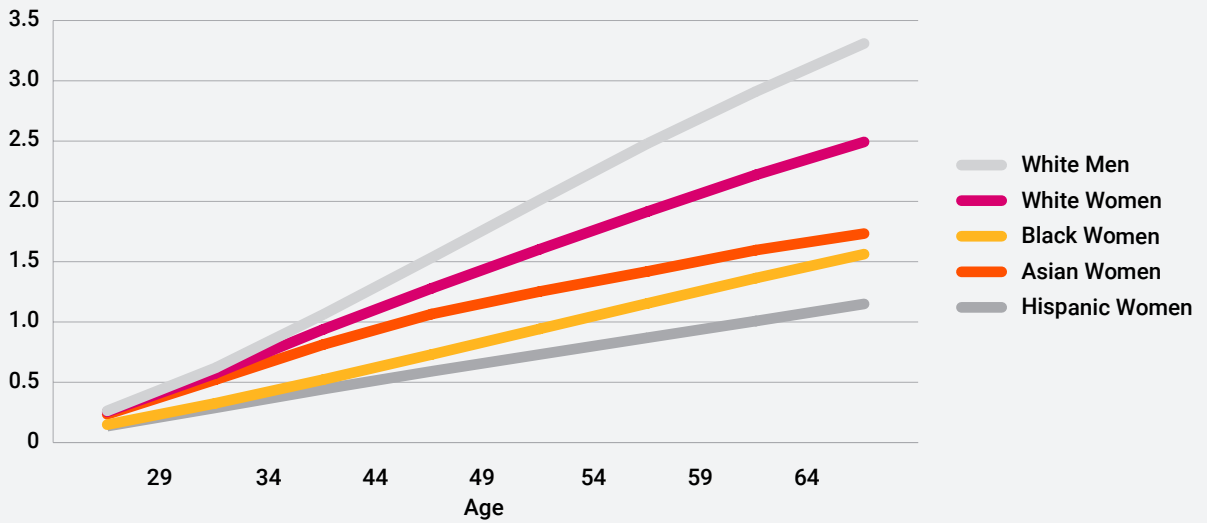


Source: Author calculations using American Community Survey 2013–2017 5-year estimates

The cumulative median income for a White man working full-time, year-round, from age 25 to 64 is \$3.3 million; a White woman under the same scenario earns \$2.4 million. In comparison, Asian (\$1.8 million), Black (\$1.5 million) and Hispanic (\$1.2 million) women working under the same scenario earn much less (Figure 5).

⁵ Women 25–49 of color are compared to White men 25–49. Similarly, W50+ of color are compared to White men over 50.

Figure 5: Cumulative median lifetime income by gender and race, USD million

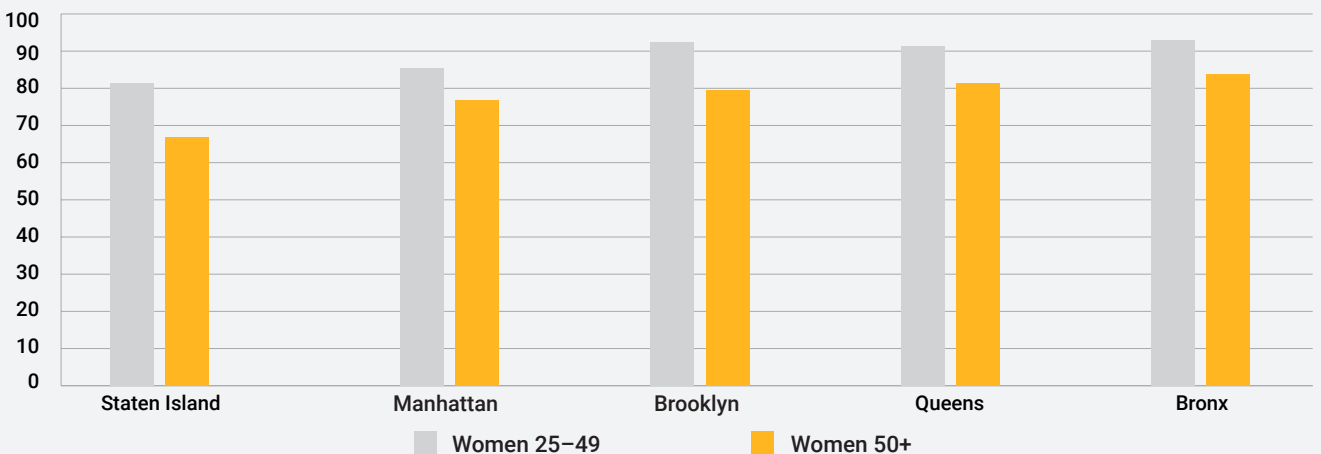


Source: Author calculations using American Community Survey 2013–2017 5-year estimates

3.1.2 Gender wage gap by borough

Next, we analyze the wage gap for employed women working and/or living in the five boroughs. Women over 25 in Staten Island and Manhattan face the widest wage gaps among the five boroughs, with women earning 75 cents and 83 cents to a dollar, respectively. Further disaggregation into age groups 25–49 and 50+ shows an overall trend of wider wage gaps for W50+ in all five boroughs (Figure 6). For W50+, Staten Island and Manhattan also have the widest wage gaps, with wages at 67 cents and 77 cents to a dollar, respectively. Brooklyn, Queens, and the Bronx have smaller wage gaps compared to Manhattan.⁶

Figure 6: Women’s wages as a fraction of men’s wages by age bracket and borough, cents per dollar



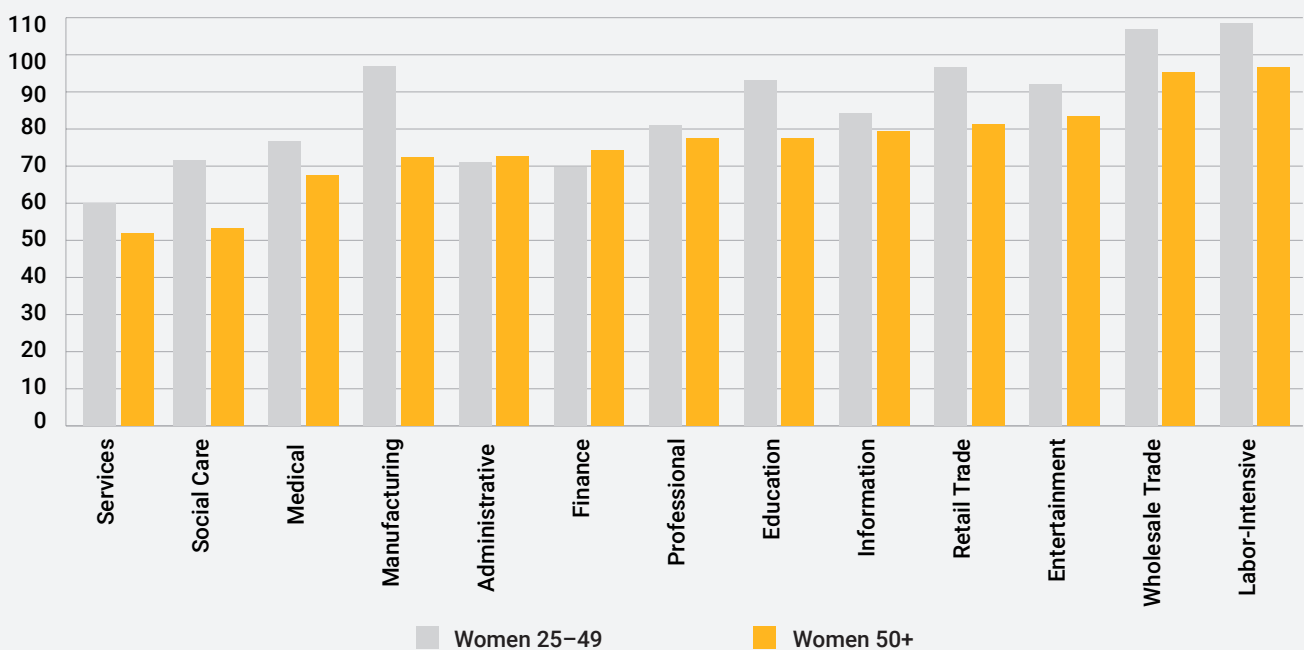
Source: Author calculations using American Community Survey 2013–2017 5-year estimates

⁶ The median wage for women by borough is compared to men living and/or working in the same borough.

3.1.3 Gender wage gap by industry

Overall, women over 25 in NYC experience the widest wage gap in the services sector (e.g., restaurant and food services, equipment repair and maintenance), where women earn 58 cents for every dollar a man earns, followed by the social care sector (e.g., vocational rehabilitation services, individual and family services) at 64 cents to a dollar. Disaggregating by age bracket, we see that W50+ have wider wage gaps compared to younger women in every industry sector, except administrative services and finance. For W50+, the industries with the widest pay gaps are services, social care, medical, and manufacturing; wages are 52 cents, 53 cents, 68 cents, and 72 cents to a dollar earned by a man, respectively. The industries that have narrower wage gaps are those that have historically lower median wages (e.g., retail trade, entertainment, wholesale trade, and labor-intensive sectors such as extraction and construction) (Figure 7).

Figure 7: Women's wages as a fraction of men's wages by age bracket and industry, cents per dollar



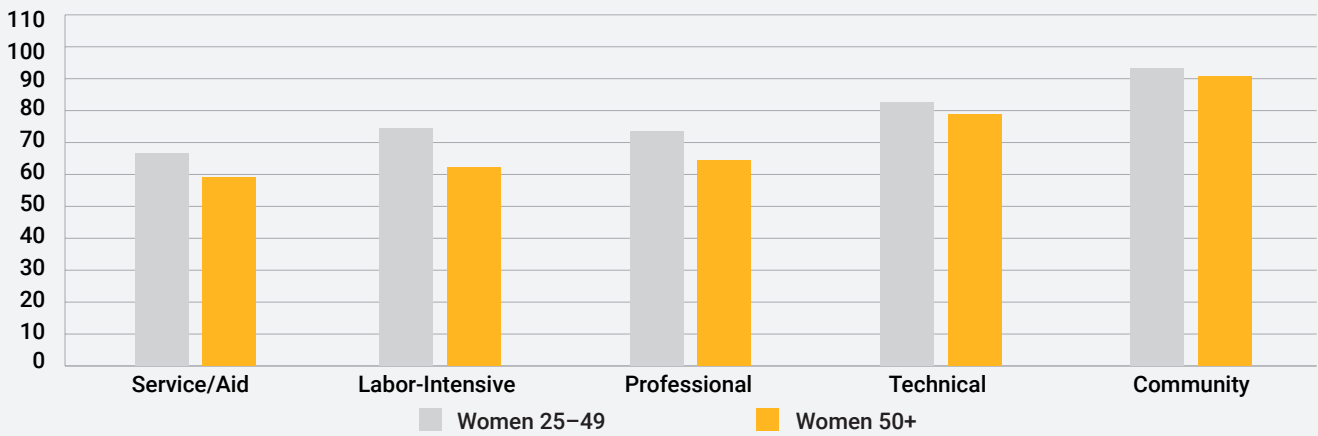
Note: 'Finance' implies Finance, Insurance and Real Estate. The Labor-Intensive industries (Agriculture, Extraction, Utilities, Construction, and Transportation) are grouped together. The Military sector is excluded because of insufficient observations.

Source: Author calculations using American Community Survey 2013–2017 5-Year Estimates

3.1.4 Gender wage gap by occupation

Women over 25 in NYC employed in the Service/Aid occupational category face the widest pay gaps (wages are 65 cents to a dollar earned by a man), followed by those employed in Labor-Intensive occupations (69 cents to a dollar). W50+ face wider gaps compared to the younger cohort for every occupational category (Figure 8). For instance, while a woman in the 25–49 age range makes 73 cents for every dollar earned by a man in the Professional occupational category, a woman in the W50+ cohort is paid 64 cents for every dollar a man earns.

Figure 8: Women's wages as a fraction of men's wages by age bracket and occupational category, cents per dollar



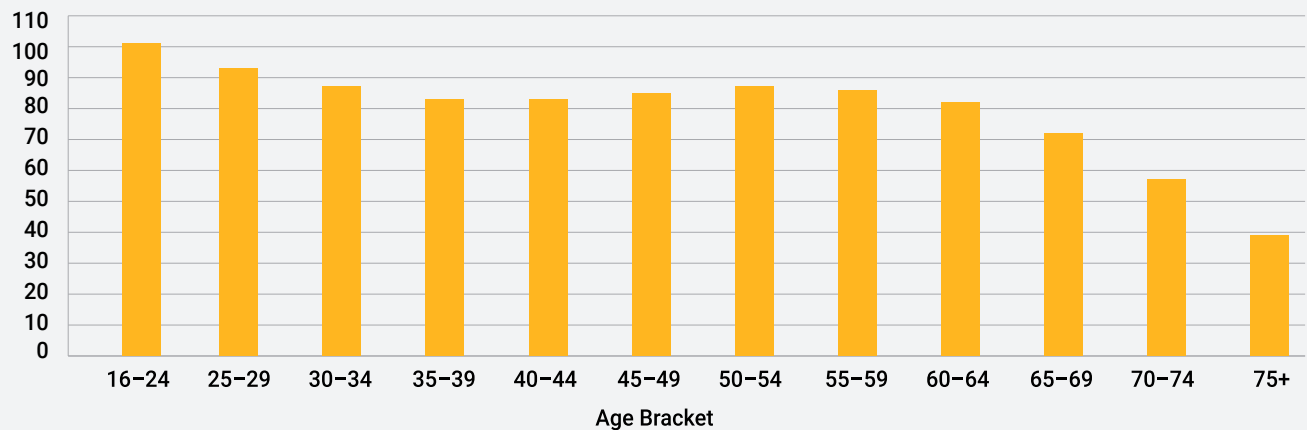
Source: Author calculations using American Community Survey 2013–2017 5-year estimates

3.2 Gender savings gap

The median household retirement savings for women is \$23,000, compared with \$76,000 for men (Transamerica Center for Retirement Studies, 2019). According to Transamerica, “31 percent of women are or have been caregivers, and nearly all of them made some work-related adjustments as a result of caregiving, such as using vacation or sick days (38 percent) or missing work (36 percent).”

As a result of raising children and caring for relatives, women often switch jobs and transition in and out of work more frequently throughout their careers, compared to men. When analyzed by age, women in NYC participate in the labor force at lower rates than men, for every age cohort after 25. Labor force participation for women relative to men increases after 50, compared to 45–49; after age 55, this relative gap widens with age (Figure 9).

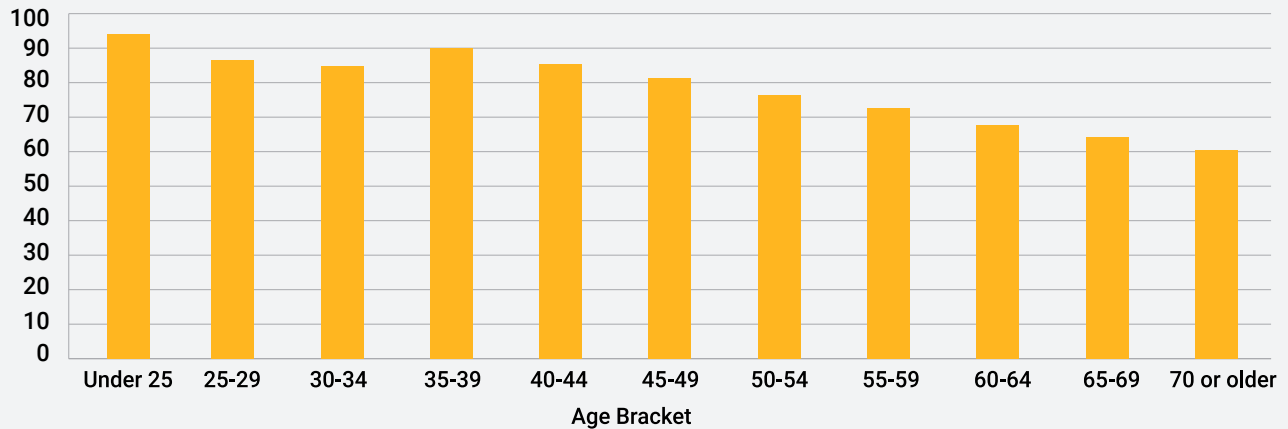
Figure 9: Ratio of female to male participation rates by age bracket, percent



Source: Author calculations using data from American Community Survey 2013–2017 5-year estimates

The gender wage gap and the gender participation gap both contribute to a gender wealth gap. In the US, women have lower Individual Retirement Account (IRA) balances than men at every age; 46 percent of women are not confident in their ability to retire comfortably, compared to 31 percent of men (Transamerica, 2019). After age 39, this gap widens with age. Women tend to reach peak earnings at age 44, while men reach peak earnings at 55 (Payscale, 2019). This means it is often harder for women to “catch up” on retirement saving toward the end of their careers (Figure 10).

Figure 10: Ratio of median female IRA balance to median male IRA balance by age bracket, percent



Source: Author calculations using data from Employee Benefit Research Institute IRA Database, 2018

3.3 The burden of caregiving

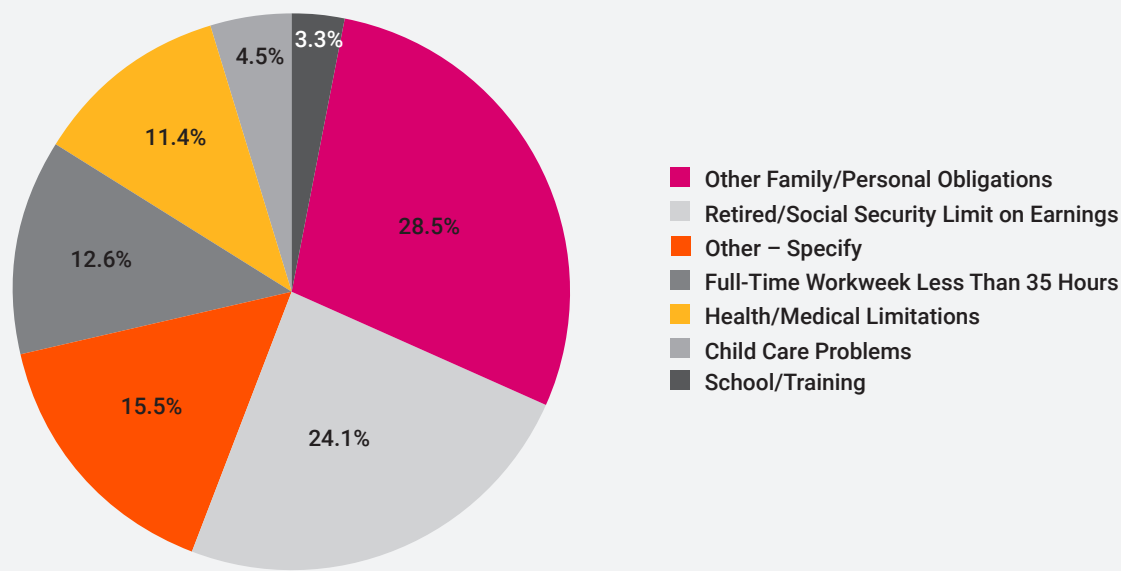
Caregiving is a key career constraint that disproportionately affects women. Nationwide, women make up about 60 percent of family caregivers. While caregiving burdens fall with age, family obligations are a key reason why W50+ in NYC work part-time or drop out of the labor force entirely (Figure 11).⁷ For NYC, the share of W50+ prevented from working full-time is almost three times the share of men over 50.⁸ Women with high school education are more likely than women with higher educational attainment to be working part-time and prevented from working full-time due to family obligations.⁹ In NYC, approximately 40,000 women are primary caretakers of grandchildren, more than double the number of men with this responsibility (US Bureau of Labor Statistics, 2019).

⁷ Caregiving accounts for 33 percent of the cases of working part-time, not full-time among W50+ (4.5 percent childcare problems, 28.5 percent other family/personal obligations).

⁸ 1.3 percent of W50+ in the NYC labor force work part-time, not full-time for family reasons, compared to 0.4 percent of men 50 and above.

⁹ 1.5 percent of W50+ in the NYC labor force that are high school graduates work part-time, not full-time for family reasons, compared to 1.2 percent of those that have bachelor's degrees or higher.

Figure 11: Reason for working part-time for W50+



Source: Author calculations using Current Population Survey, 36-month average September 2016–August 2019.

3.4 Bias and Discrimination

A potential career constraint faced by W50+ is bias and discrimination. Anecdotes and academic research suggest ageism exists in hiring practices; this is perceived to be particularly acute towards women. Data from the US Equal Employment Opportunity Commission show that more than 20 percent of its discrimination cases are focused on age discrimination. Between 1990 and 2017, the number of Age Discrimination in Employment Act charges by women over 40 increased by 15 percent (the number of charges by men over 40 decreased by 18 percent over the same period) (US Equal Employment Opportunity Commission, 2019).

Older individuals face difficulties in getting callbacks from job applications, compared to younger applicants. Neumark, Burn, and Button (2015) measure bias and discrimination in hiring decisions by creating 40,000 fake job applications and analyzing callback rates. The analysis focuses on three age groups: 29–31, 49–51, and 64–66. The authors find stronger evidence of age discrimination against older women than against older men; this is notably stronger for ages 64–66, compared to 49–51.

In economic downturns, older women's employment is also less resilient compared to their male counterparts. Analysis by the Federal Reserve Bank of St. Louis in 2015 found that long-term unemployment affected older women more, compared to older men, following the Great Recession of 2008. In the period before the recession (2006–07), the long-term unemployment to unemployment ratio was 14 percent for women 65 and older; this climbed to 50 percent in the period after the recession (2012–13), an increase of 36 percentage points. For men 65 and older, the pre-recession ratio was 23 percent, compared to 48 percent, post-recession (an increase of 25 percentage points).

The descriptive analytics in this section support the view that W50+ face a unique set of challenges. W50+ are financially vulnerable: they earn lower incomes and are less likely to have jobs than men 50 and older. When employed, W50+ are more likely to have part-time jobs and receive fewer benefits. As a result, they tend to lag men in retirement savings and wealth accumulation. Research supports the view that in addition to all the factors discussed so far in this paper, other characteristics that are difficult to measure—the so-called “unobservables”—may account for a reasonable portion of the remaining gender wage gap.

In the next section, we develop an analytical framework based on a probit model to predict the likelihood of economic vulnerability for the W50+ cohort, across the various socioeconomic characteristics.

4. A Probit Model of Economic Vulnerability

A major contribution of this paper is to employ a probit model to predict the likelihood of vulnerability, with the various socioeconomic characteristics as predictors. In the process, we narrow the subset of the cohort that should be targeted for policy and/or programmatic interventions. To achieve this objective, we take a closer look at the cohort of economically vulnerable W50+ in the NYC workforce.

We use data from the American Community Survey (5-year estimates from 2013 to 2017) for the analysis.

4.1 Economic vulnerability defined

As discussed under the literature review section, defining economic vulnerability is not a simple task. For our purposes, we define economic vulnerability as having main, real income less than the 40th percentile of the NYC real income distribution.¹⁰ We do not use poverty line as a measure of economic vulnerability; doing so limits the possibility of focusing on the group that is currently poor.

We model income vulnerability by recognizing that there are downside risks a person faces in relation to how much above or below the poverty threshold they are in. Focusing on the bottom two quintiles captures the actual case of being below the poverty line, as well as chances of being below or near poverty.¹¹

In our categorization of the economically vulnerable cohort, we also include women who may have income greater than the 40th percentile threshold, but who are on any form of public assistance, since such welfare dependency directly signals economic vulnerability. Our definition is not directly linked to the probability of falling into poverty—every individual below the 40th percentile threshold is potentially vulnerable. In short, vulnerable W50+ in the NYC workforce are defined as those whose main income is less than the 40th percentile income (i.e., \$48,394), or those on any form of public assistance. By this definition, 56.5 percent of the cohort can be categorized as economically vulnerable.¹²

4.2 Socioeconomic characteristics associated with vulnerability

The socioeconomic characteristics we consider fall into one of four categories: educational attainment, labor market participation, individual demographics, and household characteristics.

¹⁰ For 2017, the NYC government real income at the 40th percentile is \$48,394 (NYC Mayor's Office for Economic Opportunity, 2019).

¹¹ A similar approach is adopted by Evans and Palacios (2015) and World Bank' Global Database of Shared Prosperity.

¹² Our definition is neither a defining attribute nor an exclusive characteristic of the economically vulnerable. Our definition is focused on one-dimensional economic vulnerability, and the concept of multidimensional vulnerability is not addressed here. Furthermore, the analysis focuses on individuals vulnerable to one-period poverty. This conceptual framework does not address the concept of multi-period, or persistent poverty. Questions of long-term social mobility of individuals can be better answered with analysis of multi-period economic well-being indicators.

Educational attainment

- About 52.7 percent of the population that is categorized as economically vulnerable has a high school degree or less. This is compared to 9.1 percent of the same population with a master's degree or more.

Labor market participation

- We analyze employment status, work status (full-time or part-time), industry of work and occupational grouping. About 95 percent of the cohort is employed, and about 75 percent of the employed population works full-time. Of the cohort that is unemployed, 92.6 percent is categorized as vulnerable; of those working full-time, 46.5 percent are also vulnerable.¹³ About 79 percent of workers in social care, 78 percent in services, and 70 percent in retail trade are economically vulnerable. About 50 percent of those categorized as vulnerable are in Service/Aid occupations.

Individual demographics

- About 70.7 percent of the vulnerable cohort is non-white: 27.3 percent is Black, 14.3 percent is Asian, 26.4 percent is Hispanic, and 2.7 percent is of other races. 42 percent of White women in this cohort are categorized as vulnerable; 8.2 percent of this cohort has some form of disability, and 70.3 percent of those with disabilities are categorized as vulnerable.

Household characteristics

- For household characteristics, we identify the presence of dependents, whether the household has a single female head and household income. 33.5 percent of this cohort has dependents, whether related children or grandchildren living in the same household or elderly relatives. 60 percent of those with any dependents are categorized as vulnerable. 22.7 percent of individuals in this cohort are single female head of households and 64 percent of this categorization is found to be vulnerable.
- Excluding the individual's main income, 20.4 percent of individuals belong to a household that has real income more than \$100,000; 16.2 percent of those categorized as vulnerable belong to this type of household. If we analyze the same for \$150,000, 11 percent are in this household category, and 7.7 percent are classified as vulnerable.

In the following sub-section, we analyze the main characteristics that define the economically vulnerable W50+ in the workforce in NYC by means of a probit model. Once we identify the characteristics that increase the likelihood of vulnerability, we narrow the focus to the vulnerable subset.

¹³ Reference period for work experience data: the past 12 months for data from the American Community Survey. Full-time, year-round workers in (reference period): all people 16 years old and over who usually worked 35 hours or more per week for 50 to 52 weeks in the (reference period). Part-time, year-round workers in (reference period): all people 16 years old and over who usually worked 1 to 34 hours per week for 50 to 52 weeks in the (reference period). Part-time or part-year workers in (reference period): all people 16 years old and over who usually worked 1 to 34 hours per week or less than 50 weeks in the (reference period).

4.3 Probit model

The probit model is a probability function in which the dependent variable can take only two values (0/1). Our probit analysis is based on the standard normal probability distribution; we draw inferences based on statistically significant socioeconomic characteristics associated with vulnerability. The probit model interprets the relationship between a specific variable and the outcome of the probability by means of the marginal effect, which provides the partial change in the probability. Marginal effects shed light on how the explanatory variable shifts the outcome probability.

We employ a simple probit model for W50+ in the NYC workforce. The dependent variable is a dummy for economic vulnerability, which indicates whether an individual falls in this category, per our definition in Section 4.1. The independent variables include the socioeconomic characteristics described in Section 4.2, i.e., educational attainment, characteristics of labor market participation, individual demographics, and household characteristics. We discuss the key predictions around being economically vulnerable in the following section.

4.4 Estimation results

In this section, we present the probit model estimation results. Results for all four socioeconomic characteristics are considered, along with the appropriate tests to check the robustness of our findings to alternative specifications. Only coefficients that are significant at the 95 percent level of confidence are discussed. Only sub-categories that have the largest effects within industry and occupational groupings are discussed.

Educational attainment

- Compared to the group whose highest level of education is “Less than High School,” each higher level of education reduces the chances of vulnerability. Having a bachelor’s or master’s degree or more reduces the odds by 27 and 38.6 percentage points, respectively.

Labor market participation

- *Unemployed vs. employed:* Changing employment status from unemployed to employed reduces the chances of vulnerability by 25 percentage points.
- *Part-time vs. full-time employment:* Part-time work does not play as important a role in reducing vulnerability as does full-time work. Full-time employment has the maximum effect of reducing the odds of vulnerability, by 38.4 percentage points.
- *Industry and occupational dynamics:* Being employed in certain industries also increases the chances of economic vulnerability. When compared to FIRE (finance, insurance, and real estate), being employed in social care increases the likelihood by 24.5 percentage points; employment in the services industry increases the odds by 19.3 percentage points. The type of occupation in an industry matters too. Compared to those whose current occupation is Professional, being a Service/Aid worker increases the likelihood by 18.3 percentage points. Working in a labor-intensive occupation also increases the odds by 13.5 percentage points.

Individual demographics

- Age, disability, race and education are statistically significant, implying that the likelihood of vulnerability is impacted by changes in these socioeconomic characteristics.
 - *Disability*: The presence of a disability increases the odds by 4 percentage points.
 - *Race*: Being Asian or Hispanic increases the odds by about 10 percentage points; and being Black and Other Races by about 8 percentage points each.
 - *Race and education*: The interaction between college and race is also significant; when a female person of color achieves a bachelor's degree or more, there is a further 3.5-percentage-point reduction of their probability of vulnerability compared to a White female with a bachelor's degree or more.

Household characteristics

- The presence of any dependents also increases the chances of vulnerability by about 1 percentage point.

To summarize, individuals who have low levels of education, are unemployed or work in social care or services, or who are employed as Service/Aid workers are much more likely to be economically vulnerable than their counterparts. Furthermore, being disabled or having any dependents also increases the odds of vulnerability.

Box 2: Select W50+ profiles and associated probabilities of vulnerability

1. **64-year-old unmarried Hispanic woman** with an associate's degree works 40 hours a week as a dental assistant. Her 82-year-old mother lives with her: **81.8 percent probability**
2. **53-year-old Asian executive director** working in investment banking. She lives with her husband and has two kids; both are seniors in college: **8.1 percent probability**
3. **71-year-old White woman** who lives with her husband. He works as a doctor earning \$150k+. She has a bachelor's degree and works part-time as a middle school teacher and has partial hearing loss. She has a son who lives and works in Los Angeles: **73.6 percent probability**
4. **55-year-old divorced White woman** who is a former editor of a prominent magazine, currently unemployed, and looking to launch an app that connects sellers and buyers of clothes made from recycled materials: **90.8 percent probability**
5. **57-year-old Black woman** working as a Partner in a law firm. Her husband passed away a couple of years ago. She has one 17-year-old daughter in high school: **13.4 percent probability**
6. **66-year-old Black woman** working as a janitor employed by a Manhattan cleaning company. She dropped out of high school, works 30 hours a week, and takes care of a 78-year-old husband: **98.7 percent probability**
7. **61-year-old Asian woman** freelancing as an advertising designer and works part-time from home. She has a bachelor's degree in computer programming. She is looking for funding to create a software program for businesses to use big data: **36.2 percent probability**

5. Conclusions and Recommendations

While significant progress has been made toward greater gender equality, women in the US and NYC still face a substantial gender pay gap across the spectrum. This analysis provides robust evidence that age, disability, race, educational attainment, employment status, child/dependent care, industry and occupational dynamics, and bias and discrimination all play a critical role in the gender gap discourse.

The findings validate previous research on closing the gender gap through labor force participation and economic vulnerability assessments: **more education, full-time employment, and working in technical occupations tend to insulate an individual from financial vulnerability.** These results also hold true for the W50+ age cohort; we provide new insight into the major sources of economic insecurity, after controlling for the relevant factors.

Leveraging the predictive power of the specified probit model, the estimated parameters lend support to a wide range of initiatives targeted at increasing economic security for the W50+ population in NYC—from upskilling, to cohort-specific friendly workplace policies, to providing more savings opportunities targeted at financially vulnerable women or women in the peak earnings phase of their careers.

Recommendations on policy responses and programmatic intervention options to help mitigate some of the effects of these realities, across the spectrum, are provided below:

Identifying opportunity occupations for W50+: Our analysis shows that working in social care or services sectors increases women’s financial vulnerability. In addition, there is both anecdotal and empirical evidence that women face more intense ageism compared with men of the same age. For women later in their careers looking to make a change, there is no single career path solution. Therefore, we support a multi-pronged approach of identifying various “opportunity occupations” for W50+ and supporting appropriate interventions by industry to encourage W50+ towards these fields. In general, such occupations support jobs that pay a living wage, are unlikely to be automated, and/or are relatively accessible via retraining or upskilling initiatives. Accelerated learning programs or entrepreneurship incubators would also offer opportunities for women to learn new skills and apply existing skills in a new way.

Address the gender wealth gap via retirement policy changes: Women participate in the workforce at lower rates than men, are paid less on average than men, and reach peak earnings earlier in their careers. Women disproportionately miss out on opportunities to contribute to savings products like 401(k)s and IRAs. As a result, the gender wage gap may contribute to the gender wealth gap (see Figure 10). For 2020, the contribution limits for 401(k) plans are \$19,500 for workers under age 50, and \$26,000 for those 50 and over. Similarly, the annual contribution limit for IRAs is \$6,000 for people under age 50, and \$7,000 for people 50 and over. Federal policy could be amended to allow women to contribute more to these vehicles during their high wage-earning years (which tend to be before age 50), such as doubling the IRA allowable contribution per year or backfilling prior years of savings.

Dependent support: W50+ may not have the same burden of childcare as younger women; however, they may be responsible for caring for siblings, parents, or grandchildren. In NYC, the average family pays about \$1,300 per month for childcare for pre-K-age children (Economic Policy Institute, 2019), while the median cost for adult day care services and home health aides are approximately \$1,800 and \$4,700, respectively, per month (Genworth, 2019). At the same time, it is difficult to financially plan for older family members' caretaking because of the uncertainty around duration and intensity of care (e.g., home health aides, assisted living, etc.) required. Pre-tax accounts for childcare could be made available for other types of dependents, enabling women to better plan financially for these caretaking burdens and freeing up time for them to participate in the workforce. Other options could be adopted to reflect the reality of dependent care such as expanding Earned Income Tax Credit eligibility to a wider population and other types of dependents like parents and siblings.

Education financing: Higher levels of education continue to be predictors of economic security—especially for racial minorities. Affirmative action policies increasing access to, and providing financial support for, tertiary education remain helpful interventions to support women. Traditional scholarships for students emerging from secondary education, as well as opportunities for continuing education, can help protect women from vulnerability. In addition, innovative cost-sharing agreements between upskilling facilities and students can reduce the up-front costs and/or long-term debt associated with retraining, thereby reducing barriers for more financially vulnerable populations to access these programs.

Supporting entrepreneurship through tools like targeted financing: Female business owners are less likely than men to seek business financing, and they are more likely to fund businesses via personal financing. When women receive business loans, the loans are, on average, smaller than those received by their male counterparts (Biz2Credit, 2019). Small business loans aimed at W50+ could allow them to explore entrepreneurship opportunities that may not have been easily available through existing means.

Targeted savings interventions: Female service/aid workers are found to have greater vulnerability than women in professional or technical roles. Similarly, women employed in industries of social care or services experience greater vulnerability than women working in finance and real estate. Institutions could create savings interventions for specific industry and occupation classes that would position women to withstand economic shocks and build wealth for the future. Another possible intervention is incentivizing and rewarding employers that encourage savings and wealth accumulation for women. This could include offering tax breaks to those employers that offer better retirement savings options, e.g., matching, auto-enrollment, auto-escalation, etc.

Supportive workplace policies: Women bearing childcare and dependent care responsibilities may accept part-time work, work close to home at a lower-paying job, or forego work altogether. If provided opportunities to work flexible hours or split shifts, women would be incentivized to take more full-time, high-quality jobs while balancing dependent care.

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