Are American Women more deprived than Men?

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Abstract

American men experience higher premature death than women, while women are more likely to experience poverty throughout their lifetimes. These gender inequalities are substantially different across racial groups. Based on these facts, I explore in this paper two complementary questions. First, what is the most disadvantaged gender group when combining poverty and mortality data? Second, are there racial disparities in the pattern of gender inequalities in total deprivation? This study uses the generated deprivation index, a novel indicator that aggregates poverty and mortality as components of total deprivation, to answer those questions. Two main conclusions emerge. First, since the 1990s, men and women have been experiencing very similar total deprivation rates, whereas, before then, men were more deprived than women. The reduction of the gender gap in mortality combined with the lack of significant progress in gender inequality in income poverty resulted in a steeper decline in total deprivation among men. Second, this near gender equality in total deprivation hides sizable disparities across races. The gender gap against women is higher for Hispanics and Blacks compared to Whites Non-Hispanics. This finding suggests that women in Minorities face more severe racial penalties than men.

JEL Classification: *I32, J16, O51*
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1 Introduction

In several countries across the World, poverty and mortality rates are different across genders. In the United States for example, recent statistics indicate that women, at all ages above 18, are more likely to experience income poverty compared to men (US Census Bureau, 2019). However, they consistently hold an advantage in terms of life expectancy (at birth), with women reaching an average of 81 years compared to 76 years for men in 2016 for instance (Arias & Xu, 2020). This general picture in the US hides important racial disparities in terms of the size of gender differences. For instance, the income poverty gender gap is the highest among Whites Non-Hispanics[1], while the largest gender difference in mortality is in observed among Blacks.[2] Taken together, the mortality and poverty data in the US lead to unclear conclusions about the most disadvantaged gender group, on the one hand and the most (gender) unequal racial group on the other hand.

Existing research typically examines economic poverty and mortality as distinct phenomena. Yet, it is recognized that comparing deprivation between groups with a distinct focus on mortality or poverty raises the possibility of a "mortality paradox", which occurs when higher mortality rates in a population artificially result in a decrease in poverty rates among the living population, as poor are more likely to die (Lefebvre et al., 2013). Moving on to comparisons between groups, the effect of poverty masking premature mortality becomes more concerning when one group is better off in one dimension and worse off in another. This is especially the case of gender differences as shown earlier. The relatively low poverty rate among men may be a result of their higher mortality rate. In the United States, for instance, poor men are more prone to premature death than their women counterparts (Chetty et al., 2016). Furthermore, the extent of bias resulting from the mortality paradox may vary across racial groups due to differences in the magnitude of gender gaps in mortality and poverty, as presented earlier. Considering these established facts in the US, gender differences in deprivation based solely on the poverty status of the living population may be misleading, with biases potentially being race-specific. A possible solution lies in aggregating mortality and poverty into a single indicator to facilitate accurate comparisons between groups and over time.

Empirical studies that combine mortality and income poverty are scarce in the United States. The existing research close to this subject has focused on geographical disparities, concluding that mortality rates are highest in areas with high levels of poverty and inequality. (Chetty et al., 2016; Currie & Schwandt, 2016, Geronimus et al., 2011; McDonough et al.,

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[1]In 2016, Non-Hispanic White females were 20% more likely to experience poverty than their male counterparts, while Black women were 12% more likely to face poverty compared to Black men (Ruggles et al., 2021)

[2]The gender disparity in mortality rates stands at 0.38 percentage points for Blacks (1.08% for men and 0.7% for women), whereas for Non-Hispanic Whites, the gap is 0.24 percentage points (0.88% for men and 0.64% for women) (S. L. Murphy et al., 2021)

1997; Ross et al., 2000). The main objective of this paper is to provide an overview of gender differences in total deprivation in the US. The persistence of large gender disparities in poverty and mortality makes the US a compelling case study (see Iceland, 2013 for poverty and Case & Deaton, 2017 for mortality). Additionally, I investigate racial differences in the deprivation gender gap, considering the pronounced racial disparities in the magnitude of gender gaps in poverty and mortality. It is crucial to emphasize that this paper explores gender differences in outcomes and does not focus on disparities in opportunities.

Several measures that aggregate poverty and mortality have been proposed in the economic literature. The first and most common is the Human Development Index, a composite index that aggregates alive and lifespan deprivations using arbitrary weights. As discussed in Baland et al. (2021), this index does not hold a constant trade-off between poverty and premature mortality leading to inconsistent comparisons across groups and over time. The second family of measures assumes an inter-temporal utility function to aggregate quantity and quality of life. The main challenge of this approach is the definition of the inter-temporal utility function since it needs to be unique across time and space (Grimm & Harttgen, 2008).[3] The third approach takes into account the mortality paradox by attributing fictitious incomes to prematurely dead individuals to compute an adjusted poverty rate (Lefebvre et al., 2013 and Lefebvre et al., 2019). The underlying assumption in the determination of these fictitious incomes is crucial for the validity of the measures. In this study, I use the Generated Deprivation Index (GDI), recently developed by Baland et al. (2021). The choice of GDI is dictated by its theoretical and practical advantages over other indices. The intuition behind the GDI is to avoid the mortality paradox by considering premature death as deprivation in itself.[4] The GDI respects the separability property[5], and it aggregates poverty and mortality without relying on a particular representation of the preferences. The GDI is also easy to interpret and requires less data, which makes it more practical (Baland et al., 2021).

The Generated Deprivation Index (GDI), also referred to in this paper as the total deprivation, aggregates the number of poor and the number of person-years prematurely lost, both measured in time units. A dead person is considered as lifespan deprived if he dies before a certain age threshold assumed to be the minimal lifespan in a given society. At each age, the number of person-years lost is computed by the difference between the age line and the age at death. The total number of person-years lost in the society is the sum of person-years lost at each age. With information on premature death and the number of poor (alive deprivation), the GDI is calculated by summing the prevalence of these two components in the same reference population using a weight that expresses the relative importance of premature death versus Alive Deprivation. The reference population is the sum of the poor, the non-poor, and the total number of person-years lost prematurely in the society in

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[3]This particularity limits the consensual implementation of these indices from a practical point of view.

[4]It does not require the allocation of hypothetical fictitious income as in Lefebvre et al. (2019)

[5]The GDI provides a constant trade-off between premature mortality and poverty

a given year.

The estimations in this study are based on the restrictive assumption that being alive deprived is as bad as being prematurely dead (weight=1), and the minimum lifespan is 75 years.[6] I use poverty data from the US Census Bureau, the official institution for poverty statistics. The measure considers that, within each family, all members are classified as poor if the pooled family income falls below the designated income threshold (Ruggles et al., 2021).[7] This definition has two implications for poverty estimation. First, any gender gap in poverty arises mainly from single-head families, as husband-wife families exhibit no gender disparity in poverty rates.[8] Second, as highlighted by Ponthieux & Meurs (2015), this methodology introduces a bias in individual poverty estimation, resulting in an under-estimation of (married) women's poverty due to their lower income levels compared to men. Yet, I conducted sensitivity analyses to attempt to address these limitations.

Overall, the results indicate that the total deprivation (GDI) of both men and women decreased over the last 50 years. Before 1990, men were more deprived than women, but the higher rate of decline among men afterward led to the gender-balanced deprivation rates since the 1990s. The breakdown of the GDI highlights two main periods regarding the role of lifespan and alive deprivation components. Between 1970 and 1990, the progress made in mortality reduction over-compensated the increase in poverty, and, as a result, the GDI decreased. After 1990, the mortality rates were relatively constant while poverty continued to fluctuate such that the variations of the GDI were mainly driven by income poverty. Since 1990, the relative advantage of women over men in the premature mortality has been largely absorbed by their disadvantage in income poverty so that the gender gap in GDI has been negligible. Recognizing the limitations of poverty measures as mentioned earlier, I conducted sensitivity analysis, considering an extreme scenario where only personal income matters for individual poverty status. In this scenario, the gender gap in total deprivation favors men in all years, albeit smaller compared to when income poverty alone is considered. Thereby, it can be concluded that *even when premature death is added to poverty, American women remain more deprived than men but, the gender gap is much lower than that reported with income poverty.*[9]

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[6]These parameters are required for computing the deprivation rates. The chosen age line is close to the average life expectancy in the US from 1970 to 2016. Similar to Baland et al. (2021), I opt for a conservative value of the weight (1). I conduct sensitivity analysis by varying these parameters, and the main conclusions of the paper remain consistent.

[7]The income thresholds vary based on family size and age composition. They are adjusted annually to the consumer price index at the national level.

[8]On average, the gender distribution within husband-wife families in the US is balanced

[9]The extreme scenario implicitly assumes no sharing within households and no economies of scale. As women typically benefit more from sharing within households (due to their lower incomes compared to men) (Cherchye et al., 2012), this scenario sets an upper bound for the gender gap in poverty, whereas the standard approach provides a lower bound (the real gender gap being between the two bounds).

This overall trend hides important disparities across racial groups. While the income poverty suggests that the highest gender inequality against women is observed in the group of Whites Non-Hispanic, the picture is reversed when the lifespan component is taken into account: The relative position of women in the Majority group is more favorable, while serious gender inequalities against women are observed in Minorities[10] (and particularly high in the Hispanic group). In fact, White Non-Hispanic women are very often less deprived than men while the contrary characterizes Hispanics and Blacks. Furthermore, the results suggest that women in Minorities bear higher race penalties compared to men and that they accumulate race and gender disadvantages in a non-additive fashion. Note that within gender racial gaps (in favor of Whites Non-Hispanic) are much more alarming than within race gender inequalities.

The lack of progress in reducing income poverty, particularly among women in Minorities, can be considered as a consequence of the increased prevalence of singlehood. This trend weakens the potential impact of enhanced female participation in the labor market on poverty (Snipp & Cheung, 2016). Conversely, the progress observed in the life expectancy of men in Minorities can be attributed to advancements in medicine and the implementation of health programs targeting vulnerable groups (K. M. Murphy & Topel, 2006).)

This paper contributes to the existing literature on gendered poverty (Lichtenwalter, 2005; Iceland, 2013; Provencher & Carlton, 2018) and mortality (Case & Deaton, 2017; Case & Deaton, 2015 and Ezzati et al., 2008) in the United States. These two strands of the literature have evolved independently, without much reflection on the fact that premature death is a more extreme form of deprivation. This paper enriches this literature in two ways. First, it uses a novel index called the "Generated Deprivation Index" to combine lifespan and alive deprivations in a simple and meaningful manner. Remember that this index satisfies desirable properties unmet by commonly used indices such as the Human Development Index (see discussion above). Second, this study is among the first to have explored how the compensation in poverty and mortality has been made since 1970 as these dimensions of deprivation yield conflicting results regarding the direction of the gender gap in the US. The findings provide some nuance to the existing literature by showing that the gender difference in total deprivation is less pronounced if mortality and poverty are studied together than when they were taken separately. In addition, the existing literature has shown that the relative women's disadvantage in income and poverty was greater in the Majority group than in Minorities (Snipp & Cheung, 2016). The results of this study take an opposite direction: women in Minorities experience more gender disadvantage in total deprivation.

The remainder of this paper is organized as follows. Section 2 delves into insights from existing literature on poverty and mortality in the US. In Section 3, the Generated Deprivation Index and the data used in this study are introduced. Section 4 presents the disparities

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[10]In the USA, racial and ethnic groups other than Whites non-Hispanics (Hispanics, Blacks, Asians, Indians, and Native Hawaiians) are classified as minorities (US Census Bureau, 2019)

in total deprivation across genders in each racial group. To take into account measurement concerns, I perform some sensitivity analysis in Section 5. Section 6 presents the conclusion.

2 Poverty and mortality in the United States

2.1 Gendered Poverty

Despite important economic performance observed over time, the United States continues to face the challenge of persistent poverty. For instance, between 1970 and 2015, the annual increase in real GDP averaged 2.8%, yet the poverty rate remained relatively stable, around 12.5% (12.6% in 1970 and 12.7% in 2016) (US Census Bureau, 2019). In this section, I present insights from the literature on poverty in the US, supplemented by statistics computed using data collected through the Current Population Surveys (CPS). These surveys are conducted annually by the US Census Bureau and provide a nationally representative picture of household socio-economic conditions.

The literature has identified socio-demographic factors such as family structure, education, and nativity as significant contributors to poverty persistence in the US (Iceland, 2019; Hoynes et al., 2006). These factors disproportionately impact women and men across different racial groups, leading to persistent inequality along gender and ethnicity lines.

Education is a crucial indicator of human capital and has played a significant role in poverty dynamics since the post-Fordism era. This period marked a restructuring of the American economy, characterized by a widening wage gap between human capital-intensive occupations and low-skilled jobs (Florida & Mellander, 2016; Gartman, 1998). Education levels vary significantly by race in the US, contributing to racial disparities in poverty rates. For instance, the lower levels and quality of education among Black Americans, exacerbated by racial residential segregation, is widely cited as a key factor driving the poverty gap between Black (21.1% in 2015) and White (10.5% in 2015) populations (Iceland, 2019; Massey & Denton, 1993).

The country of origin also impacts poverty rates, with immigrants being more susceptible to poverty even within racial groups (Proctor et al., 2016). This vulnerability stems from limited labor market networks combined with language barriers. Additionally, immigrants often have lower quality of education compared to natives, which hinders their ability to translate academic credentials into good jobs (Iceland, 2013). For instance, the substantial poverty gap between Hispanics (19.6% in 2015) and Whites (10.5% in 2015) can be attributed in part to an important share of Hispanics being immigrants in the US (Iceland, 2019).

Family structure plays a crucial role in shaping the gendered pattern of poverty within each racial group in the United States. In 2015, the poverty rate among husband-wife families stood at 5%, contrasting starkly with the 28% poverty rate among female-headed families (Proctor et al., 2016). Women are more likely to be in single-headed households

due to factors such as unmarried childbirth and retaining custody after marital breakdowns (Sharma, 2023) making them disproportionately affected by poverty driven by the family structure. The share of single-head families increased from 22% in 1976 to 37% in 2016, with an average of 35% of women living in single-head families compared to 28% for men (Table 1). Consequently, the potential gains in poverty alleviation that could emerge with the rise of women's participation in the labor market, increasing from 57% in 1970 to 76% in 2000, have been largely offset by the increase in the number of female-headed families (Hoynes et al., 2006). It is important to highlight the disparity in poverty likelihood with respect to the gender of the single parent: in 2015, while 26% of individuals in single-male families were living in poverty, this proportion reaches 46.5% for single-female families (Proctor et al., 2016).

Table 1: Poverty and Singlehood rate

| | Poverty rates | | | | | Singlehood rates | | | | |
| | 1976 | 1990 | 2016 | *Pairwise t-test* | | 1976 | 1990 | 2016 | *Pairwise t-test* | |
	(1)	(2)	(3)	(2)-(1)	(3)-(1)	(4)	(5)	(6)	(5)-(4)	(6)-(4)
ALL										
All	0.13	0.13	0.14	0.00***	0.01***	0.22	0.30	0.37	0.08***	0.15***
Men	0.11	0.11	0.12	0.00	0.01***	0.18	0.27	0.34	0.09***	0.16***
Women	0.14	0.15	0.15	0.00***	0.01***	0.26	0.34	0.40	0.08***	0.14***
Non-Hispanic Whites										
All	0.08	0.08	0.09	-0.00	0.01***	0.19	0.27	0.31	0.07***	0.12***
Men	0.07	0.07	0.08	-0.00	0.01***	0.15	0.23	0.29	0.08***	0.14***
Women	0.10	0.10	0.10	0.00	0.01***	0.23	0.30	0.34	0.07***	0.11***
Hispanics										
All	0.26	0.26	0.21	0.00	-0.05***	0.24	0.33	0.39	0.09***	0.16***
Men	0.24	0.24	0.19	0.00	-0.05***	0.21	0.31	0.37	0.10***	0.17***
Women	0.27	0.28	0.23	0.00	-0.04***	0.27	0.35	0.42	0.08***	0.15***
Blacks										
All	0.32	0.30	0.24	-0.01**	-0.08***	0.44	0.56	0.62	0.12***	0.18***
Men	0.29	0.27	0.22	-0.02**	-0.06***	0.38	0.50	0.57	0.12***	0.19***
Women	0.34	0.33	0.25	-0.01	-0.09***	0.50	0.62	0.67	0.12***	0.17***

Note: This table presents poverty and singlehood rates by race and gender for the years 1976, 1990, and 2016, using data from the American Current Population Surveys (CPS). Poverty=1 if the individual lives in family with total income below the official poverty line, considering the family size and age composition. Singlehood=1 if the individual lives in a family with only one head (either a man or a woman, with or without children), while 0 indicates living in a family consisting of a husband and wife. Note */**/*** pairwise mean difference significant at 10%/5%/1%.

National averages hide important racial disparities in terms of the prevalence of singlehood. In 2016, singlehood averaged 62% among Blacks, compared to 31% among non-Hispanic Whites (Column 6 of Table 1). Sociologists attribute this phenomenon to a cultural argument, suggesting that Blacks are more accepting of singlehood than Whites (Goldschei-der & Kaufman, 2006) resulting in lower marriage rates (Raley et al., 2015). These disparities in family structure correlate strongly with large differences in poverty rates across

racial groups and variations in gender inequality within races. To delve deeper, Figure 12 in the appendix illustrates poverty rates by family structure while controlling for education, nativity, citizenship, age, number of children, State, and year Fixed Effect. Two main results emerge from the figure. First, within each type of family, Blacks consistently exhibit higher poverty rates, while non-Hispanic Whites are less likely to experience poverty. In single-male families, Hispanics and Whites reach similar levels of poverty rates. Second, the data reveal that individuals in female-headed households are more prone to poverty across all racial groups, with particularly high proportions among minorities, reaching around 50%. As illustrated in Table 1 (Column 6), across all racial groups, women are more likely to live in female-headed families, with the largest proportions observed among minorities (e.g., 67% for women vs 57% for men in the group of Black in 2016).

Family structure and measure of poverty

The statistics on poverty provided by the US Census Bureau through the Current Population Surveys rely on total family income. Specifically, all family members are considered poor if the household's pooled income falls below the official national threshold. This approach does not account for intra-household inequality, implicitly assuming that resources are equally distributed within each household. In this regard, in husband-wife families where, on average, the composition of men and women is equal, there is no noticeable gender differential in poverty rates, as suggested by Figure 13 in the appendix. With this official approach of measuring poverty, any gender differences in poverty rates stem from singlehood.

Numerous studies have shown that this assumption does not hold in the majority of cases, leading to potential misreporting of poverty (Cherchye et al., 2012; Ponthieux & Meurs, 2015). In other words, by not accounting for intra-household income inequality, we may misclassify individuals as poor in non-poor families and vice versa. In the US, it is well established that women earn less than men in the labor market, and these gender differences persist over time (Snipp & Cheung, 2016). Given this reality, women's poverty rates in husband-wife families are more likely to be underestimated, while those of men will tend to be overestimated when intra-household inequality is not taken into account. Yet, I attempt to address this bias by computing an individualized poverty rate (see details Subsection 5.4)

In summary, the facts highlighted in this subsection shed some light on American women's disadvantage in income poverty. Another important dimension of deprivation in the US is mortality.

2.2 Gendered mortality in the United States

Several empirical studies conducted in the US have shed some light on the high gender and racial disparities in life expectancy at birth, with women holding a permanent advantage.

This pattern persists across all racial groups, with women typically living 5 to 6 years longer than men on average. Furthermore, the disparities between the most advantaged and disadvantaged groups in terms of life expectancy are striking. Murray et al. (2006) found that in 2001, the life expectancy gap between 3.4 million high-risk urban black men and 5.6 million Asian women was nearly 21 years. Within each gender, the life expectancy gap between the most advantaged and the least advantaged groups was 15.4 years for men (Asians versus high-risk urban blacks) and 12.8 years for women (Asians versus low-income rural blacks in the South).

In terms of trends, as shown in Figure 1 between 1980 and 2015, men gained six years (from 70 to 76.3), while women gained four years, reducing the gender gap by two years. Black males, initially the most disadvantaged group, saw their life expectancy increase from 64 years in 1980 to 76 years in 2016, while that of Black females rose from 72.5 to 78.5, reducing the gender gap by six years. Gains in the life expectancy among Whites were more modest (six years for men versus three years for women), thereby reducing the Blacks-whites racial gap. Despite this overall decrease in mortality, Case & Deaton (2017) found that Non-Hispanic Whites without a college degree have been experiencing a reduction in life expectancy since 1990.

In the literature, it is well documented that improved nutrition, public health policies, and development in mainstream medicine led to substantial increases in life expectancy (Cutler et al., 2006). In the United States, education is often identified as a crucial factor in reducing mortality rates (Montez et al., 2011; Case & Deaton, 2017). Higher levels of education provide individuals with better incomes, enabling them to afford superior healthcare services, which are expensive in the US. Additionally, higher education is associated with a decreased likelihood of engaging in risky health behaviors such as smoking. The Black population in the US faces disadvantages in education, leading to higher mortality rates compared to other racial groups.[11] Regarding gender inequality in mortality, Schünemann et al. (2017) highlighted that the mortality gap can be attributed not only to biological factors but also to gender-specific preferences and health behaviors.[12] Their findings suggest that between 86% and 89% of the gender gap in mortality in the US can be explained by gender-specific preferences and behaviors.

In summary, the literature suggests that in the United States, women in each racial group are more likely to experience poverty, while also exhibiting lower mortality rates than men. Studies on poverty and mortality have largely evolved independently, without much

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[11]It is worth noting the existence of the Hispanic mortality paradox, which suggests that despite lower socioeconomic conditions among Hispanics, they exhibit, on average, a 17.5% lower risk of mortality compared to comparable individuals in other racial groups (for a comprehensive review, refer to Ruiz et al., 2013).

[12]From a biological perspective, women have a better immune system than men. From the behavioral side, on average women are less likely to take health risky behaviors such as smoking, drinking, drug use, hazardous driving, and more likely to have healthy nutrition and to use health care services (Schünemann et al., 2017).

Figure 1: Life expectancy in the US
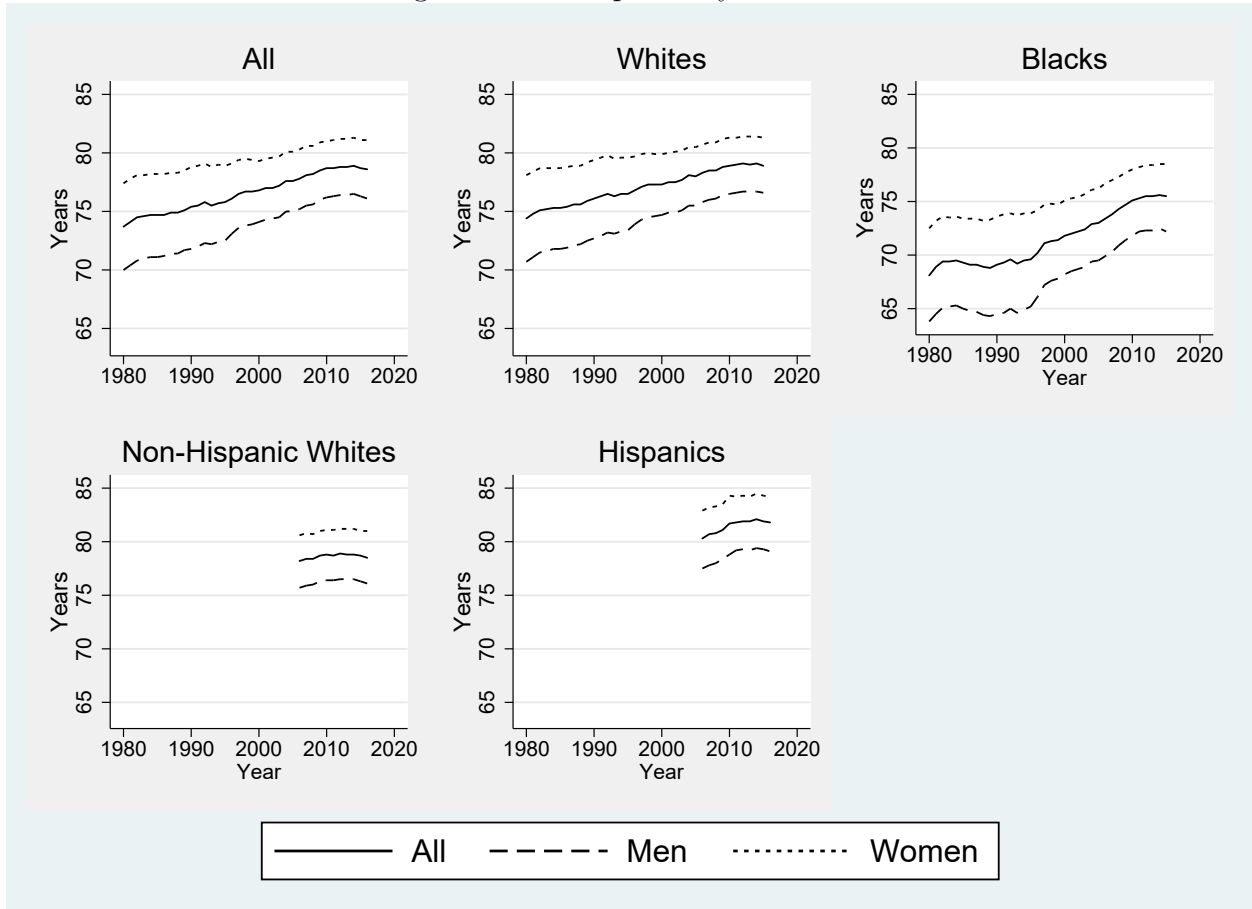
reflection on the idea that early mortality can be considered an extreme form of deprivation. In the next sections, I aim to discuss this issue by combining poverty and mortality data to investigate the gendered pattern of total deprivation.

3 Methodology

In this section, I first present data that were used and then explain the computation of the Generated Deprivation Index.

3.1 Data

Since 1964, the US Census Bureau conducts annually the so-called "Current Population Survey (CPS)" that collects detailed information on individual poverty status and income

level in the United States. The CPS data were downloaded from Integrated Public Use Microdata Series (IPUMS CPS) website (Ruggles et al., 2021). I also exploited data from The Survey of Epidemiology and End Results (SEER) that contains information on the US population from 1969 to 2016. From these two sources, I constructed a long time series of the number of poor by gender and race in the US from 1969 to 2016. It is important to note that while these poverty data were used in this study, I acknowledge the limitations of the methodology used by the Census Bureau. As discussed in Section 2 the Bureau's definition of poverty relies on the assumption of intrahousehold equality in resources allocation, which can result in misreported individual poverty rates, especially in underestimating poverty among women. Later in the paper (Section 5.4), I discuss this concern in more details.

Furthermore, age-specific mortality data for all deaths occurring in the US were downloaded from the website of the National Bureau of Economic Research (NBER). These data collected by National Center for Health Statistics are publicly available with individual characteristics at the national since 1959. For sensitivity analysis, I exploit additional data from The Bureau of Justice Statistics.

3.2   Computation of the Generated Deprivation Index

Following Baland et al. (2021), I proceeded as follows to compute the annual Generated Deprivation Index for each gender, and racial group. First, from mortality data, for each year, gender and racial group, I computed the number of individuals dead at each age by summing up individual records. Having information on age-specific mortality, the second step was the choice of an age line that should be seen as the normal age to die with in the US. I considered in the next steps an age line of 75 years that is close to the average life expectancy at birth in the US between 1980 and 2016 (76.5 years).[13] After, I computed for each age a, the number of person-years prematurely lost ($PY(a)$) using the following formula:

$$PY(a) = d(a) * (\hat{a} - (a+1)) \tag{1}$$

Where $\hat{a}$ is the age line, a the age at death, and $d(a)$ the number of individuals dead at age a. I computed $PY(a)$ for all death that occurred at an age lower than the threshold. For all other deaths above, the value of $PY(a)$ is equal to zero. For each year, gender and racial group, I calculated the total number of person-years lost ($d^{GD}(x)$), measured in time units in group x, by aggregating the age-specific $PY(a)$.

$$d^{GD}(x) = \sum_{a=0}^{\hat{a}-1} PY(a) \tag{2}$$

The annual number of poor for each racial and gender group (x) was estimated from the Current Population Survey (CPS, 1969-2016) and the Survey of Epidemiology and End

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[13]Men's average is 73 while for women it reaches 79.4 (National Center for Health Statistics, 2021)

Results (SEER) population data.[14] Having information on poor (p), non-poor individuals (f), and the number of person-years lost in the group (d^{GD}) in the group x, I was able to determine the annual Generated Deprivation Index (GDI) at the national level using the following formula:

$$GDI_\gamma(x) = \underbrace{\frac{p(x)}{f(x) + p(x) + d^{GD}(x)}}_{alive\ deprivation} + \gamma \underbrace{\frac{d^{GD}(x)}{f(x) + p(x) + d^{GD}(x)}}_{lifespan\ deprivation} \qquad (3)$$

Where γ is the relative weight of lifespan over alive deprivation. Being more conservative, I considered a lower bound of γ of 1 (as in Baland et al., 2021) meaning that being alive deprived is as bad as being lifespan deprived. The traditional Head Count Ratio (HCR) is calculated based on the living population $(f(x)+p(x))$. Conversely, the reference population for the GDI (and its components) adds the number of prematurely dead individuals $(f(x)+p(x)+d^{GD}(x))$ to compute the total deprivation. Figure 2 shows the differences in these two reference populations for both men and women. As expected, the distance between the two populations is higher for men than for women given that the firsts are more likely to die prematurely. This implies that, once we account for lifespan deprivation, we will be less pessimistic regarding the relative position of women than the literature focusing on HCR only.

As mentioned, we need information on poverty and mortality to compute the GDI. Therefore, I calculated the GDI at the national level from 1969 to 2016. In addition, for all the periods, we computed the indicators for Whites and Blacks. Detailed information on other races was available only from 1990 onward, the year from which I computed the indices for Whites non-Hispanics (Whites NH), Hispanics, and Blacks.

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[14]Specifically, individual poverty status information is available in the CPS. Hence, I calculated the poverty rate for each gender and racial group (denoted as x), and subsequently multiplied it by the population (from SEER) to estimate the number of poor and non poor in each group x.

Figure 2: Alive population and reference population for the total deprivation
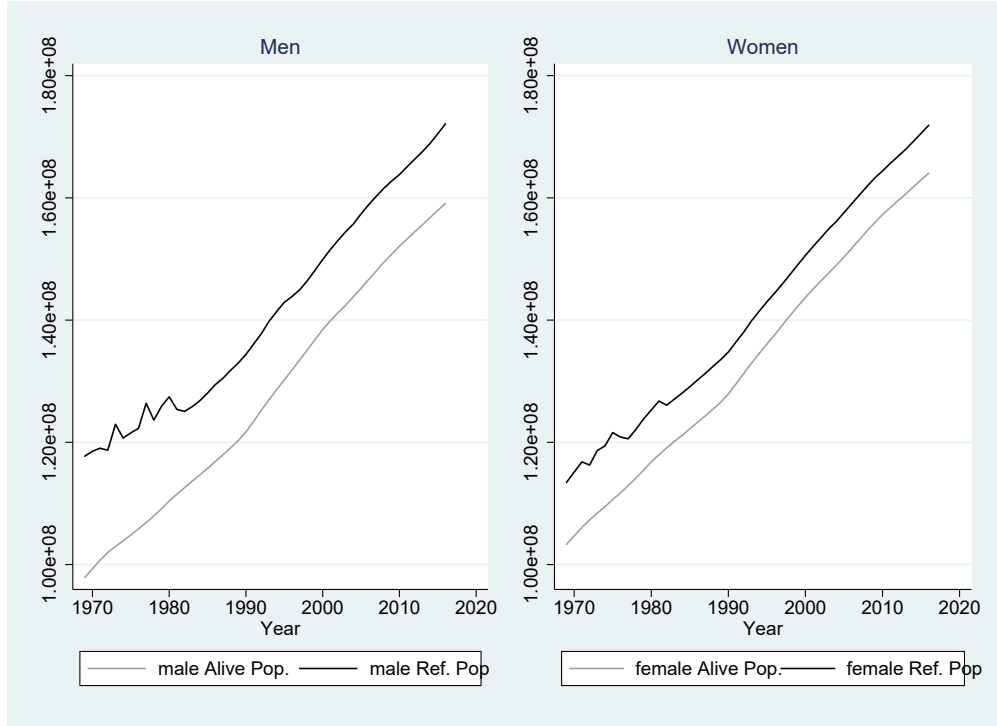
Note: These figures present the difference between the Alive Population and the reference population (both measured in time units) used in the Generated Deprivation Index (GDI) calculations for both men and women. The reference population includes, the living population (poor and non-poor) and the number of person-years prematurely lost in a society for a given year

4 Pattern of total deprivation in the United States

In this section, I first present gender differences in total deprivation, and second, I explore racial differences.

4.1 Evolution of the generated deprivation index (GDI) by gender

Let us start by commenting on the overall evolution, and then we turn to gender comparisons. Figure 3 presents the evolution of the total deprivation (GDI) and the Head Count Ratio (HCR) by gender in the US. We observe from the left panel of Figure 3 that, in general, there has been no clear trend of income poverty (HCR) since 1969. The pattern is very different when premature mortality and poverty are combined: there seems to be a decreasing trend in the Generated Deprivation Index (GDI) with some fluctuations. To accurately interpret this trend, I decompose the GDI into its Lifespan Deprivation (LD)[15] and Alive Deprivation (AD)[16] components.

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[15]Proportion of Person-years prematurely dead in the reference population

[16]Proportion of poor in the reference Population

Figure 4 shows that there has been a decreasing trend in the Lifespan Deprivation (LD) component while the Alive deprivation (AD) slightly increased by 0.01 percentages points (pp) on average each year (note that figures on average annual change are reported in Table 2). The combination of information from Figure 3 and 4 allows to distinguish two periods regarding the contribution of these two components on the GDI's behavior : Before 1990, there is a negative trend in GDI driven by a strong decrease in LD whereas, after 1990, we observe a small additional decrease in LD and large fluctuation in GDI dictated by the trend in AD. More precisely, the total deprivation rate (GDI) went from 24% in 1969 to 19% in 1990 (annual average decrease of 0.15pp) despite a slight increase of the AD from 11 to 12% (annual increase of 0.16pp). In this period, the downward trend is driven by the decrease of LD from 13 to 7% (annual decline of 0.31pp). The second period which spans from 1990 to 2016 is characterized by a slowing down of the declining rate of LD (-0.05 pp per year) and higher variability of poverty which entirely dictates the trend of the GDI.[17]

It is important to note the choice of the year 1990 as the cutoff for data analysis is based on both statistical and contextual considerations. As shown in Table 2, the average annual variation in total deprivation (GDI) before 1990 (-0.15pp per year) differs significantly from that observed after 1990 (-0.05). Furthermore, as discussed in Snipp & Cheung, 2016, government programs aimed at increasing opportunities for women and minorities were implemented in the US prior to this period. In the period post-1990, there was a notable relaxation of these initiatives, leaving disadvantaged groups in precarious positions. While the impact of these programs on poverty remained limited, possibly due to an increase in singlehood (+ 8 percentage points, Table 1), they had an important effect on mortality rates, particularly evident in the substantial reduction in mortality due to heart disease and strokes. This decline in mortality can also be attributed to significant advancements in medical technology (K. M. Murphy & Topel, 2006). It is worth noting that additional gains in mortality rates post-1990 were marginal, as the major causes of mortality had already been addressed or mitigated to some extent before this period. Consequently, achieving further reductions in mortality rates beyond 1990 became increasingly challenging.

Turning to gender differences, the total deprivation (GDI) provides a very different picture from the income poverty (HCR). Figure 3 shows that women are poorer than men and the gender gap is almost stable over the entire period (Min 2.4pp, Max of 3.6pp, st dev 0.36pp). In contrast, the GDI curve suggests that the total deprivation was higher for men until 1990 and extremely similar afterward. More precisely, over the whole period, the poverty rate of women is around 3pp higher than that of men. Regarding the total deprivation, in 1969, men's rate is 5 pp higher than women's, and since the 1990s, the gender gap has been narrowed considerably.

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[17]For example, in this segment, the minimum levels of the GDI (16.7%) and AD (10.5%) are both observed in 2001, while the maximums are in 1994 (21% and 14% for GDI and AD deprivation). Regarding the LD, it has been below 7% since 1991 and its variability is low (minimum of 5.7% and a maximum of 7.1 %).

Figure 3: Evolution of the Generated Deprivation Index (GDI) and the Head Count Ratio (HCR) by gender
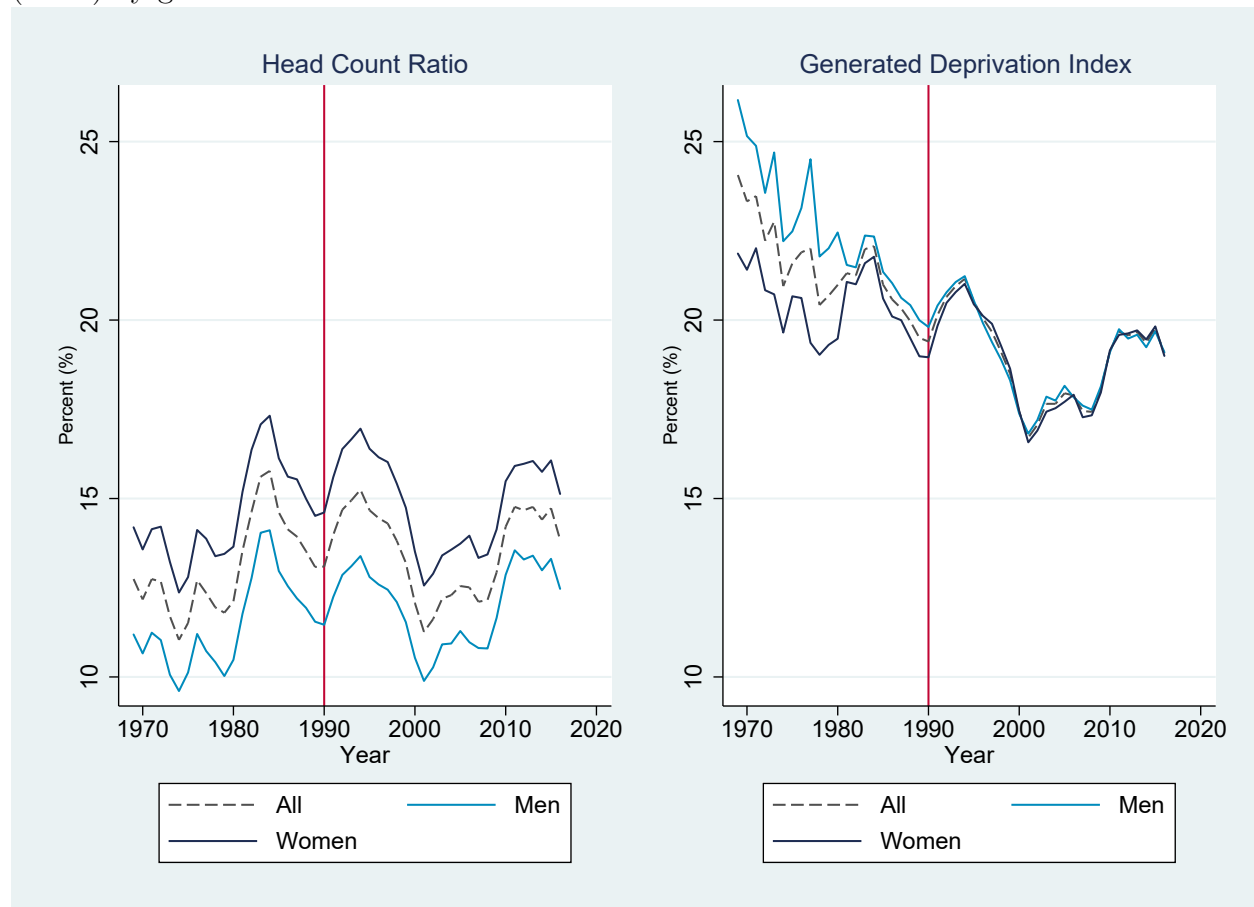

Note: These figures present, by gender, the evolution of the total deprivation (GDI) and the income poverty (HCR) in the United States from 1969 to 2017

The similarity in men's and women's total deprivation hides important gender differences in the individual components (Figure 4). Men's advantage in Alive Deprivation (AD) remains stable at about 3 pp (as in HCR) over the period, while women's advantage in Lifespan Deprivation (LD) decreases. The later evolution is driven by a very rapid decrease in men's LD by 0.19 pp each year (vs 0.09 pp for women). Meanwhile, the annual changes in the AD are close across gender (+0.05 and +0.03 pp per year for women and men, respectively). We also notice that on the entire period (1969-2016), the GDI of men decreases by 0.14 pp each year on average while for women the decrease amounts to 0.06pp. Therefore, it can be deduced that the increase of Income deprivation is more compensated for men than for women by the decreasing behavior of the LD.

The relative contributions of mortality and poverty to the overall deprivation are not the same over the entire period. The lifespan component influenced more the GDI especially for men before the 1990s while the importance of Income deprivation became more evident for

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Figure 4: Evolution of the lifespan (LD) and alive deprivations (AD)
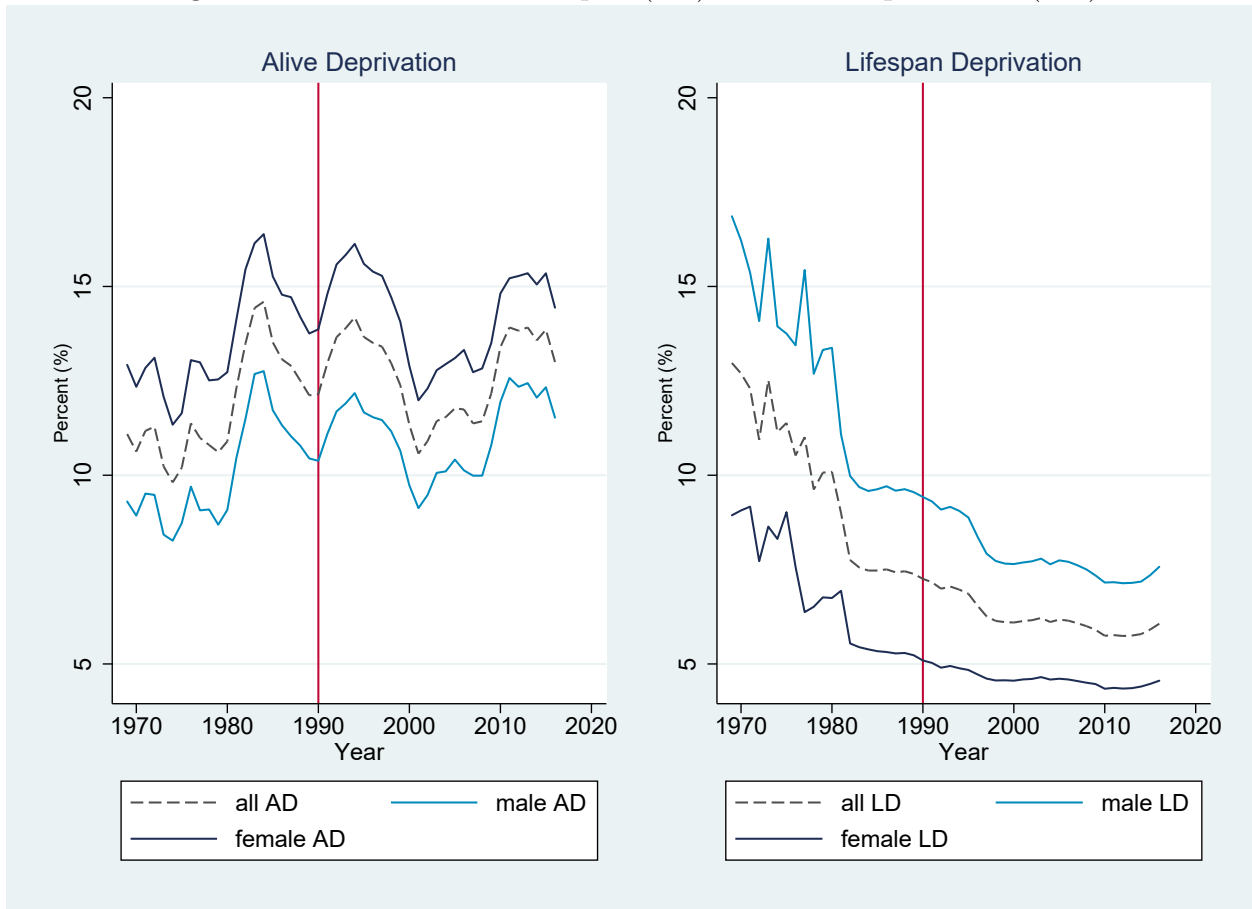
Note: These figure decompose the GDI in Figure 3 into the lifespan and alive deprivations components

both men and women thereafter. In the beginning, in 1969, the lifespan deprivation rate of men was 8pp higher than that of women (17% and 9% for men and women, respectively). At the same time, women's income deprivation rate was 4 pp higher than men's (13 and 9% respectively). Figure 3 and 4 highlight that the declining trend in men' LD from 17% in 1969 to 9.4% in 1990 (-0.4 pp annually) led their GDI to decrease by 0.2 pp each year on average.[18] Besides, the decline in women's LD (-0.2pp per year) was fully absorbed by an increase of income deprivation (+0.2pp) so that there was no remarkable variation in their total deprivation (GDI). The period from 1990 onward is characterized by both a lower rate of decline and lower variability in LD, such that the GDI curves replicate the behavior of the AD.

Overall, throughout the entire period, men tended to benefit more than women from advancements in medicine and public health programs, as indicated by the decreasing gap in lifespan deprivation. This trend may be attributed to the initially higher mortality rates

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[18]the low marginal change of GDI is due to the increase in AD for both gender groups

Table 2: Average annual change of deprivation rates (percentage points)

	Before 1990			After 1990			All years (1970-2016)		
	AD	LD	GDI	AD	LD	GDI	AD	LD	GDI
ALL									
All	0.16**	-0.31**	-0.15**	0.00	-0.05**	-0.05	0.04**	-0.14**	-0.10**
Men	0.16**	-0.40**	-0.24**	0.03	-0.08**	-0.06	0.05**	-0.19**	-0.14**
Women	0.16**	-0.22**	-0.06	-0.02	-0.02**	-0.04	0.03*	-0.09**	-0.06**
Whites									
All	0.17**	-0.29**	-0.12**	0.02	-0.03**	-0.01	0.06**	-0.13**	-0.07**
Men	0.17**	-0.37**	-0.20**	0.03	-0.05**	-0.02	0.06**	-0.17**	-0.11**
Women	0.17**	-0.20**	-0.04	0.00	-0.01*	-0.00	0.05**	-0.08**	-0.03*
Blacks									
All	0.10	-0.45**	-0.35**	-0.21**	-0.18**	-0.39**	-0.15**	-0.23**	-0.38**
Men	0.08	-0.54**	-0.46**	-0.12*	-0.25**	-0.37**	-0.10**	-0.30**	-0.40**
Women	0.11	-0.35**	-0.24**	-0.30**	-0.11**	-0.41**	-0.20**	-0.17**	-0.36**
Hispanics									
All				-0.18**	-0.18**	-0.37**			
Men				-0.14*	-0.25**	-0.39**			
Women				-0.23**	-0.11**	-0.34**			
Whites NH									
All				0.01	-0.00	0.01			
Men				0.03	-0.02**	0.01			
Women				-0.00	0.01**	0.01			

Note: This table reports the average annual change of each indicator in percentage points. Growth is computed by running an OLS regression of the indicator on year. White includes Hispanic and White No Hispanic (White NH). Data for Hispanic origin are available from 1990. AD: Alive Deprivation; LD: Lifespan Deprivation; GDI: Generated Deprivation Index; HCR: Head Count Ratio. */** next to the coefficient indicates significance at the 5%/1% level.

among men, particularly due to heart disease and strokes, compared to women (K. M. Murphy & Topel, 2006). In terms of income poverty, despite women facing initial disadvantages, there were no significant changes observed during the entire period. This lack of change can be attributed to increased rates of singlehood, which diminished the potential positive effects of greater female participation in the labor market (Snipp & Cheung, 2016). In the next section, I delve into racial differences in these patterns.

4.2 Racial differences in deprivation rates

Women in minority groups face both racial and gender (dis)advantages. In this section, I first explore the racial differences in total deprivation and then examine the gender gap within each racial group.

4.2.1 Inter-Racial Disparities in Total Deprivation

Figure 5: Deprivation rates (in percent) by Race
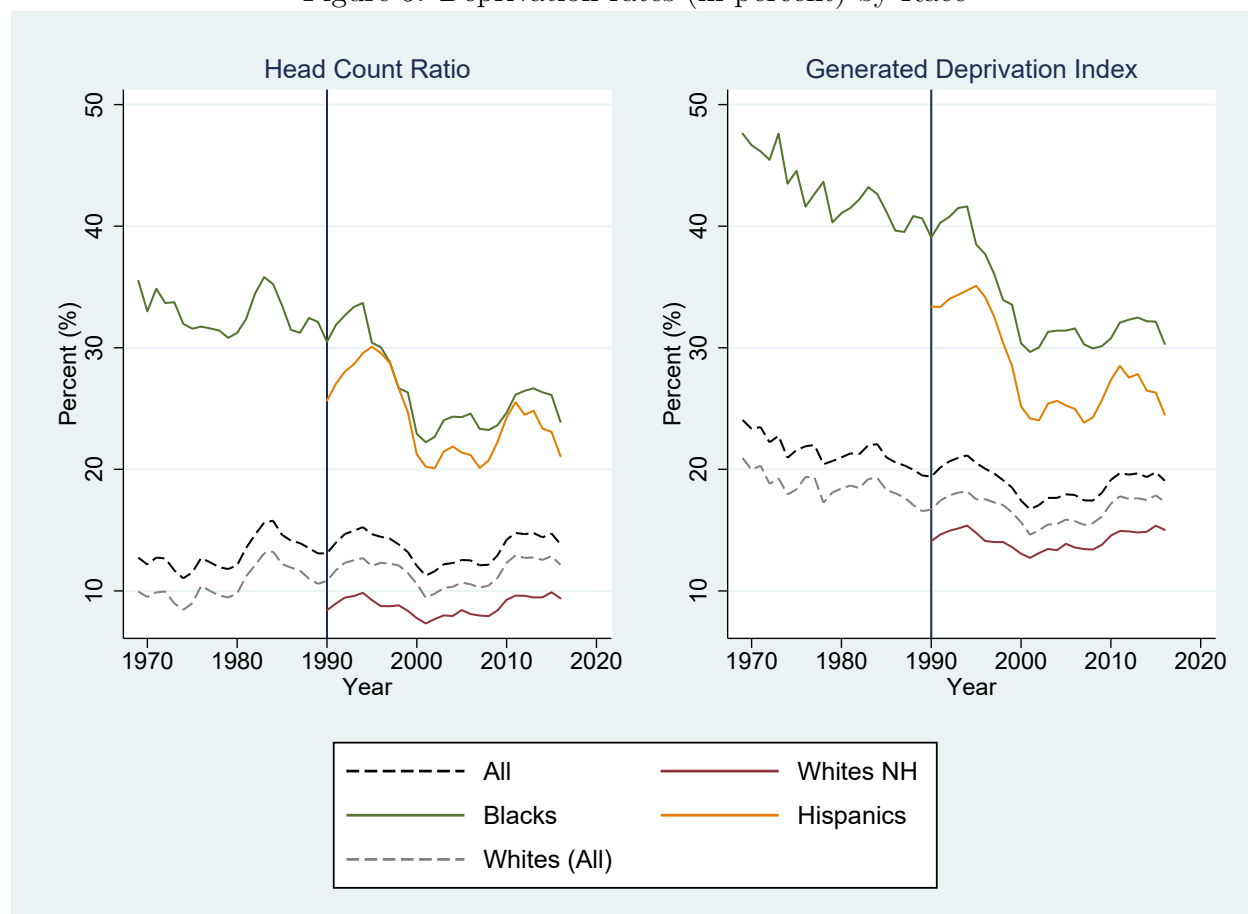
Note: These figures report (in percent) the Generated Deprivation Index (GDI) and the Head Count Ratio for each racial Group. The subdivision between Hispanic and Non Hispanic Whites starts from 1990

Figure 5 (and 14 in the appendix) present the total deprivation (and its components) and the income poverty rates by race. Two key observations emerge. First, the deprivation rates among Minorities (Hispanics and Blacks) are particularly high compared to the majority group (Non-Hispanic Whites). Moreover, the racial disparity in total deprivation is more pronounced than that in income poverty. Second, there seems to be notable progress in the GDI reduction for Hispanics and Blacks, while no significant change is observed among Non-Hispanic Whites. These dynamics contribute to the narrowing of racial inequality, although complete convergence remains elusive.

The decline of GDI among Minorities is predominantly driven by their rapid decrease in mortality (before 1990) and income poverty (more pronounced after 1990), while changes in the Majority group are more modest. To elaborate on this, we first look at the difference between Whites (Hispanics and No-Hispanics) and Blacks and consider Hispanic origin after

1990.[19] The deprivation rate is structurally higher among Blacks (mean 37,8% std 5,7) than Whites (mean 17.6% std 1.4) over the entire period.[20] An important share of these racial disparities is likely attributable to family structure, as Blacks are more prone to live in single-head families (62% in 2016, Table 1) compared to other racial groups. Other factors such as low levels of education and risky behaviors (such as smoking) are also commonly cited as contributors to the high levels of mortality and poverty among Blacks (Montez et al., 2011, Schünemann et al., 2017)

Among Whites, the total deprivation rate is the highest for Hispanics (mean 28.4% std 4%) compared to Whites NH (mean 14.1% std 0.8%). Nonetheless, despite the net advantage of White NH in AD, the decreasing rates in AD (-0.18pp per year) and LD (-0.18pp) are the highest for Hispanics such that the intra-Whites difference in GDI has been reduced significantly (by 0.38 pp on average each year since 1990, Table 4 in the appendix). The stagnation in deprivation dimensions among Whites NH can be attributed to the deteriorating labor market opportunities for those without a college degree (Case & Deaton, 2017). Inside the Minority group, we observe that Blacks (compared to Hispanics) have been at a disadvantage in HCR and GDI since 1990.

In the remainder of this study, given the unavailability of data before 1990, I limit the analysis from 1990 to 2016 and focus on the three main racial groups: White Non-Hispanics (NH), Blacks, and Hispanics.

4.2.2 Deprivation gender gap in each racial group

To analyze intra-race gender inequality in total deprivation, Figure 6 presents the ratio of deprivation of women to that of men in each group. These ratios provide cross-race comparable insights in the gender inequalities, as they are less influenced by scale differences compared to absolute gaps. Absolute deprivation rates by gender are detailed in Figures 15 and 16 in the appendix. In Figure 6, the left panel depicts the Head Count Ratio, while the right panel focuses on the Generated Deprivation.

The right panel of Figure 6 highlight more pronounced gender inequality against women within the Hispanic and Black groups, whereas the curve of Whites NH reveals permanent women's advantage in total deprivation since 1990 (for several years the deprivation rate of White NH women represents on average 95% of the rate of men). In addition, the Hispanic group has the largest gender difference in the total deprivation. In absolute terms (see Figure 15 in the appendix), the GDI among White NH women is, on average, 0.75 pp lower than that of men, and the gap does not change over the period. In contrast, Hispanic women have always experienced higher deprivation rates than men (1.47pp), and the gap has been increasing since 1990 by 0.05pp each year on average. In the group of Black, the gender

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[19]The ethnic distinction between Hispanics and Whites NH starts in 1990

[20]Besides, the annual decreasing rate in GDI is higher in absolute value for Blacks (-0.38pp vs -0.07pp for Whites, Table 2) and, this reduces the gap between these two racial groups.

Figure 6: Gender (women/men) Ratio by Race
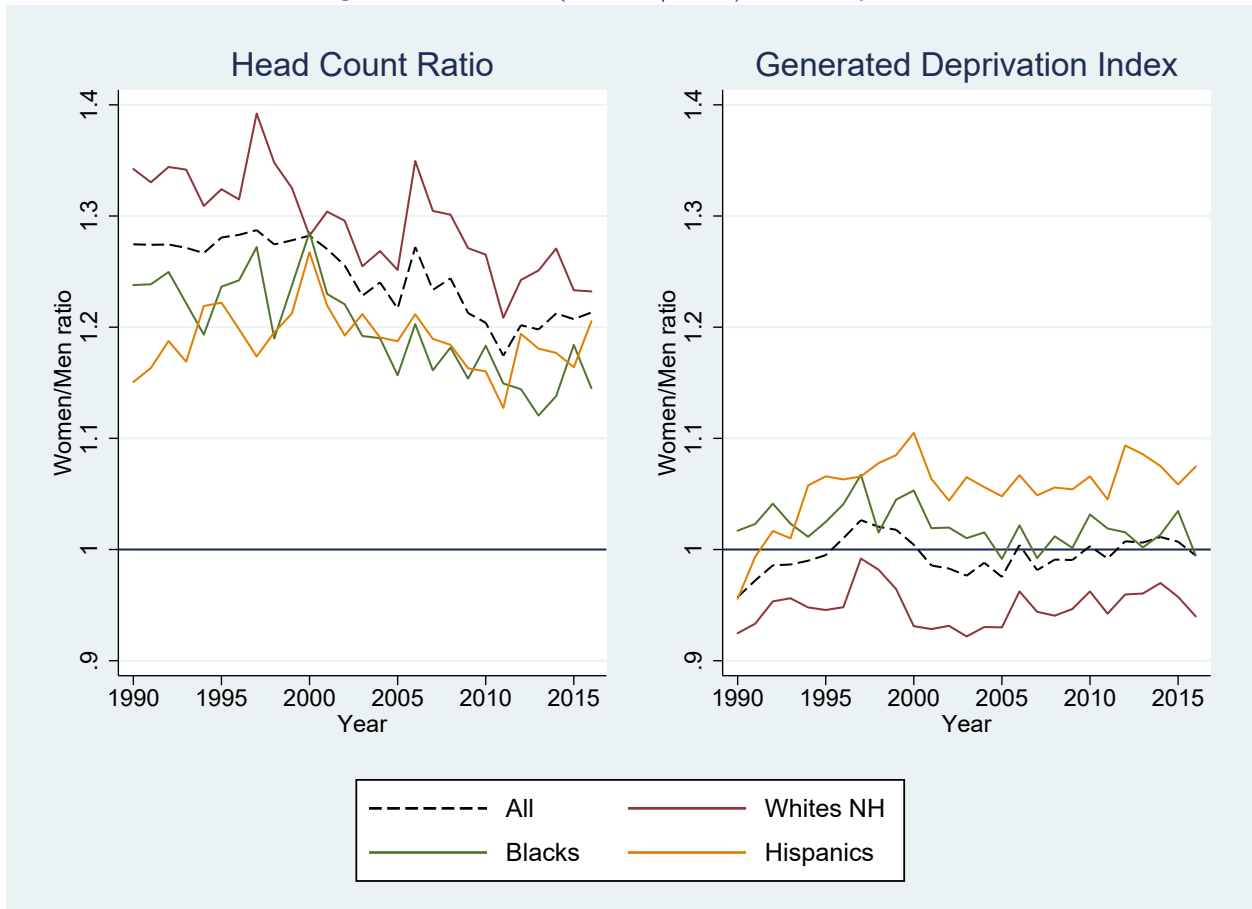
Note: These figures present for each racial group the ratio of women's deprivation over men's. For the deprivation, we consider the Head count ratio (HCR) and the generated deprivation index (GDI) The ratio of 1 means perfect gender equality

difference is low (0.7pp) and has been decreasing by 0.04 each year on average (Table 3 in the appendix).

The relative contribution of premature mortality and income deprivation in shaping the GDI gender gap varies across races. While on average, in all racial groups, women are at a disadvantage in AD and an advantage in LD, the magnitude of the gender gaps and their annual variations are different (Table 3 in the appendix). In Minorities (Black and Hispanics), for the average year, the relative advantage of women in LD (4.95 for Blacks and 3.31 for Hispanics) is not sufficient enough to compensate for their gap in AD (5.65 and 4.77 for Blacks and Hispanics, respectively). As a consequence, women in Minorities are in the worst position in total deprivation compared to men while in the Majority group, the contrary is observed. Regarding the evolution, in the group of Blacks, women experience a higher decline in AD, whereas men's LD falls more rapidly. Given these facts, we observe negligible gender differences in the GDI annual change (0.37 pp for men and 0.41 for women).

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In the pre-1990 period, men were more deprived, but the gender difference in LD reduction (in favor of men) dominated the gap in AD decline (in favor of women) in the way that the gender gap in GDI (in favor of men) has been low in the group of Blacks during the post-1990 period.[21] The historical disadvantageous position of women in the Hispanic group results from the fact that, since 1990, men have always experienced a sizable decline in both AD and LD, such that the GDI has been at their advantage. In the group of Whites NH, men's advantage in income deprivation has never been high enough to compensate for their disadvantage in mortality. Therefore, White NH women have been less deprived than men since 1990.

The most interesting point is that these racial differences described above are almost reversed if we would focus on AD or HCR only (left Panel of Figure 6): Whites NH appear as the group with the highest women disadvantage while Hispanics and Blacks exhibit the lowest (gender bias for Hispanics and Blacks are close). In fact, AD and HCR gender ratios for Whites NH are always above the national level and women's deprivation rates represent for some years more than 140% of the rates of men. These findings are consistent with Snipp & Cheung (2016)'s paper which revealed that, in the US, the highest wage gender gap is found in the Whites NH group. The reversal in the income poverty and total deprivation gender ratios stems from the fact that men in minority groups benefited more from a decrease in racial inequality in premature mortality compared to women.[22]

As illustrated in Figure 1, Blacks initially experienced a notably low level of life expectancy, largely attributed to the high prevalence of major causes of mortality in the US, such as cancer, homicide, and heart diseases (Schwandt et al., 2021). Over the entire period, Black men notably benefited from programs targeting vulnerable groups, resulting in a reduction in their mortality rates. In 2016 (as shown in Column 6 of Table 1), 67% of Black women and 42% of Hispanic women lived in single-head families, compared to 57% of Black men and 37% of Hispanic men. Once again, this highlights the historical disadvantage faced by women in terms of income poverty, as family structure tends to weaken the impact of anti-poverty initiatives, particularly for vulnerable groups like women in Minorities.

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[21]On average, the gap between Black men and women is 0.7pp, decline of -0.04 pp each (Table 3)

[22]To elaborate on this, consider the intra-gender racial gap for the mean year as presented in Table 4. Hispanic men and women have a racial advantage in LD (compared to Whites NH) of 0.42 and 0.60 pp, respectively. The average annual increase in the gap represents 0.23pp for men and 0.13pp for women. The following year, in relative terms, the racial advantage will increase by 0.54% and 0.22% for men and women, respectively. Using the same logic with AD, the relative decrease in the AD racial gap is 0.0123% for men and 0.0144% for women. By combining AD and LD, the racial gain for men is greater than that for women, which turns the gender difference in GDI in favor of men.

4.2.3 Gender and Race disadvantage of women in Minorities

An important strand of literature in Sociology has investigated women's double jeopardy hypothesis (Greenman & Xie, 2008). According to this hypothesis, women in Minorities accumulate the double disadvantage of being at the intersection of the most vulnerable groups (*Minority* and *woman*). These studies usually omit the net women's advantage in life expectancy. The question is whether once we take into account the lifespan deprivation component, could the conclusion about the double jeopardy change? From the previous findings, the highest women disadvantage in Minorities compared to the Majority group is consistent with higher race bias for Black and Hispanic women than men.[23]

This leads to a follow-up question: How do women in minorities accumulate gender and racial disadvantages? Greenman & Xie (2008) reviewed two possibilities. On one hand, women in Minorities may accumulate in an additive manner meaning that their disadvantage is the sum of race and gender penalties. On the other hand, the intersectionality perspective suggests that the size of the race penalty may differ across gender (or gender differs across race). In this regard, women's disadvantage will be different from the simple addition of race and gender penalties. I address this question in the following lines by exploring the evolution of the racial penalty by gender. I proceed as in Greenman & Xie (2008) to determine the racial penalty in Minorities. I first compute each gender and racial group deprivation ratio with respect to Whites NH men considered as reference. The idea is that in the absence of intersectionality, men's race penalty should be the same as women's in the minority group.[24]

Figure 7 plots these intra-gender racial penalties. The left panel of Figure 7 for income poverty (HCR) and shows that for both Hispanics and Blacks, men's penalties are greater than women's in the majority of cases, meaning that Minority women pay lower racial penalties compared to men.[25] There is, however, a slight diminishing tendency of these gender differences in racial penalties. The right graph considers the total deprivation and highlights opposite evidence. For both Hispanics and Blacks, the race penalties are higher for women than men suggesting that the additive assumption does not hold. This is particularly due to a higher decline in premature mortality for men in Minorities. This confirms the

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[23]It is important to note that the racial gaps in the total deprivation are more alarming than the intra-race gender gap (see more details in Tables 3 and 4 in the appendix). For instance, the deprivation rate (GDI) of females Blacks is, on average, 20.19 pp higher than that of Whites NH (18.79 pp for males), while the intra-black gender difference is lower than 1pp. For Hispanics, the racial gap among females (compared to Whites NH) reaches 15.31 pp on average, whereas the gender gap represents 1.47pp. The racial gap between Hispanics and Blacks is less severe, and stems primarily from the net advantage of Hispanics (men and women) in terms of lifespan deprivation.

[24]For better understanding, let us imagine that the ratios are 1 and 1.5 for Whites NH Men and Women respectively while for Minority, the ratio is 2 for men. In the absence of intersectionality women ratio in the Minority should be equal to 3 (1.5*2) meaning that men and women suffer a race penalty of 100%. The distance between men's and women's race penalties will provide an idea of intersectionality.

[25]We could also interpret that, Minority women pay lower gender penalty than White NH.

Figure 7: Minority men and women racial penalties (with respect to White Non-Hispanic Men)
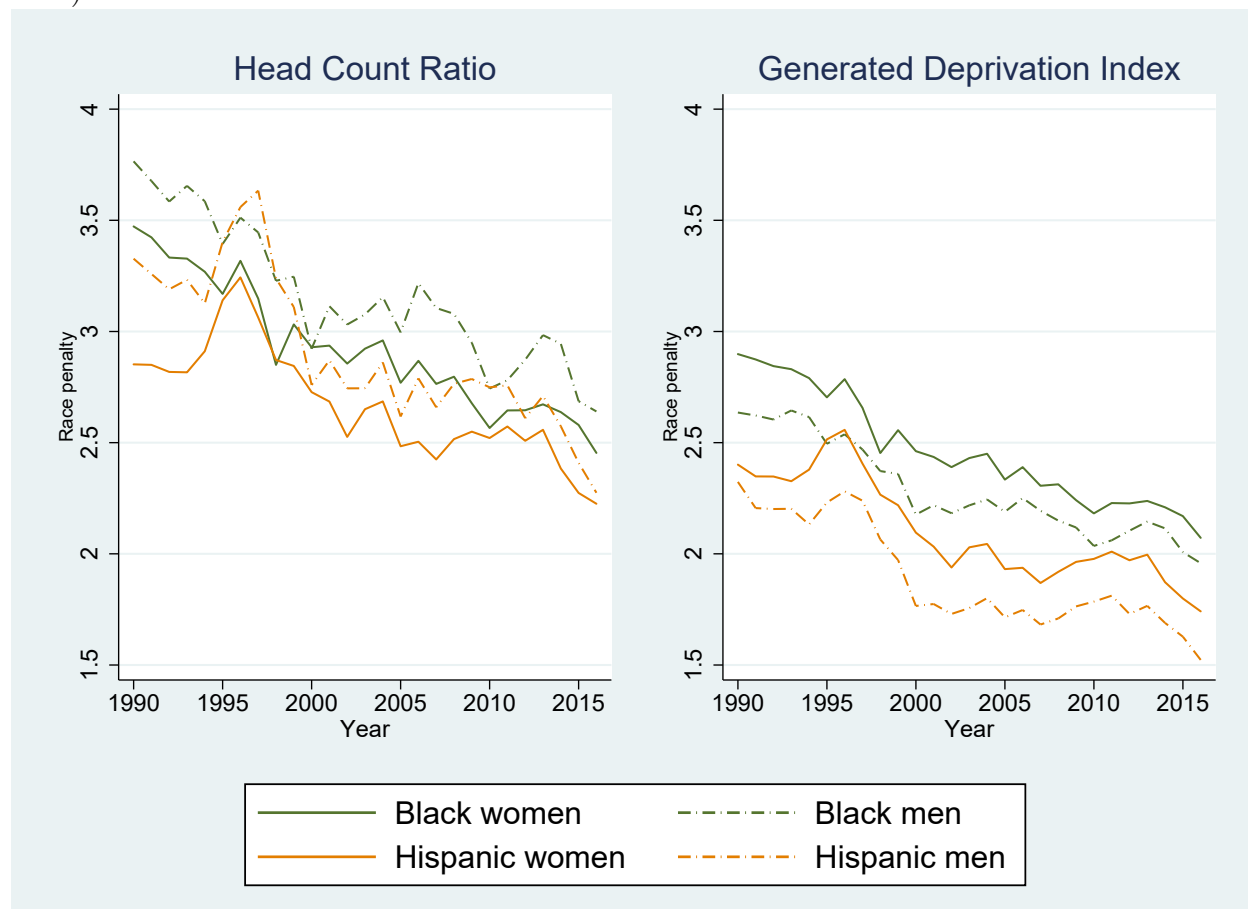
Note: These figures plot racial penalties for each gender group in minority with respect to Whites NH men. The penalty is computed as the ratio between the deprivation rate (GDI and HCR) in the considered group and the group of Whites non-hispanic men considered as the reference. The higher the curve, the greater the race penalty.

previous findings that, in relative terms, the reduction of the intra-gender racial disparity in mortality is more pronounced for men than for women. Furthermore, we note that the gender differences in racial penalties are more marked in the Hispanics group compared to Blacks. Hispanic men and women have experienced a sizable reduction in mortality such that the racial difference has been at their advantage (their LD rate is lower than the White NH's) but the decline rate has been significantly higher for men than women.

To sum up this section, an overview of deprivation in the United States by gender and race reveals important disparities. Both income poverty and total deprivation rates are higher among Minorities compared to Non-Hispanic Whites. Among minorities, women generally experience a higher level of total deprivation compared to men, although this gender gap is less pronounced compared to the case in which we would only consider income. The

largest most gender gap is observed in the group of Hispanics, where men have experienced a substantial decrease in both income poverty and premature mortality. Since 1990, Non-Hispanic White women have consistently exhibited lower total deprivation rates than men, due to their advantage in life expectancy which offsets their income disadvantage. Note that the picture is reversed if we would consider income poverty only: the relative position of women would be more favorable in Minorities than Whites NH.

5 Sensitivity analysis

In this section, I analyze how sensitive are the results presented above to the choice of the weight and age line. I also explore the influence of some "missed individuals (prisoners)" in the poverty universe on the findings. Finally, given the measurement issues discussed previously, I estimate deprivation indices using alternative definition of poverty.
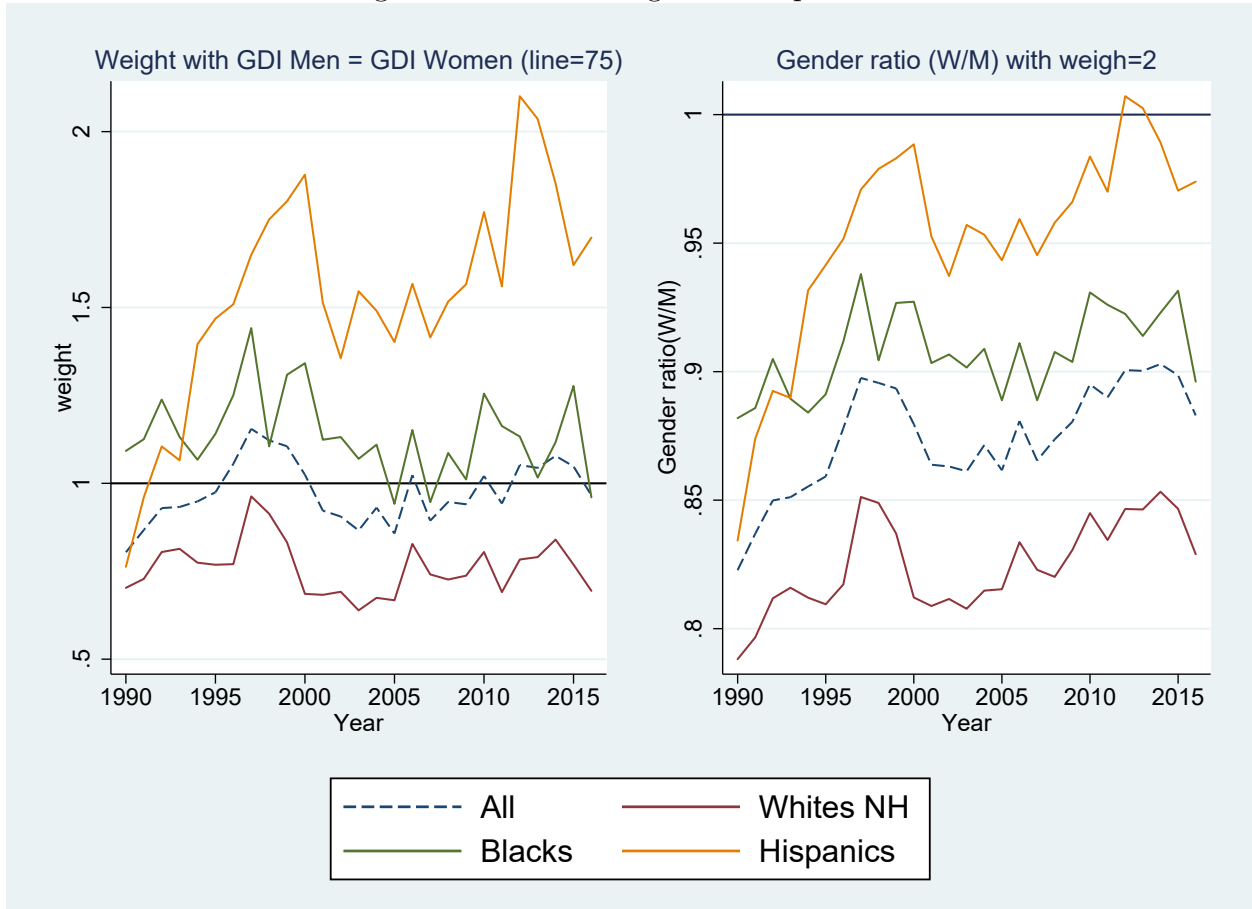
5.1 Relative Weight and Deprivation

Let us remind that the weight represents the relative importance of lifespan deprivation over income deprivation and was set to 1 in previous estimates. Figure 8 reports, on the one hand, the weight needed to attain perfect gender "equality" in deprivation and the sensitivity of the gender ratios to the weight, on the other hand. The weight below 1, in the left panel, means that gender equality would be obtained even if lifespan deprivation is considered as less important than economic poverty. Overall, before 1995, the obtained weight is below 1, indicating that even with a low weight attributed to premature death, the lifespan advantage of women could compensate for their disadvantage in terms of income deprivation. After 1995, the weight fluctuates around 1 (with a maximum of 1.15 in 1997). Consistent with previous results, in the group of Whites NH, premature mortality has to be less important than income poverty to achieve gender-balanced deprivation rates while in the Minorities, more relative weights (higher than 1) should be given to lifespan deprivation. Since it is commonly believed that individuals generally give more value to life than income (weight higher than 1), the conclusion about gender parity when lifespan is included in total deprivation is robust to the choice of weight.[26]

The right panel of Figure 8 shows it more clearly: if premature death is twice as detrimental as income deprivation, the relative position of women in all racial groups is always better than that of men (gender ratio below 0.9). However, racial differences remain striking. Gender differences in Hispanic groups are always higher and increasing over time meaning that for some periods, women would be more deprived than men even if living is considered twice as important as not being poor. The ranking of curves by race also reinforces the

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[26]The HCR will yield the same gender ratio as the GDI if the weight is below 0.1. This weight value is is unlikely

Figure 8: Relative weight and deprivation

Note: The first figure (left) displays at national level the relative importance of lifespan deprivation (relative to alive deprivation) needed to ensure perfect gender equality in GDI. The second highlights the gender ratio with the weight of 2

finding that women in the Majority groups are in the best relative position compared to those in Minorities.

5.2   Age line and Gendered Deprivation

I explore in Figure 9 the sensitivity of the results to the age line chosen to define premature mortality (set at 75 years). I explore alternative age lines of 60, 70, and 75 years, noting that, generally, as the age line increases, the gender ratio decreases. This tendency is a consequence of the higher men's mortality rates in the retirement ages (above 65 years generally). With lower age lines (60 and 70), the ratios are very often above 1 indicating the relative advantage of men over women. The gender-balanced deprivation rate is revealed with the age line of 75 which is close to the average life expectancy in the USA (76.5). It is important to emphasize that in all racial groups whatever the age line considered, the gender

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Figure 9: Age line and deprivation gender ratios
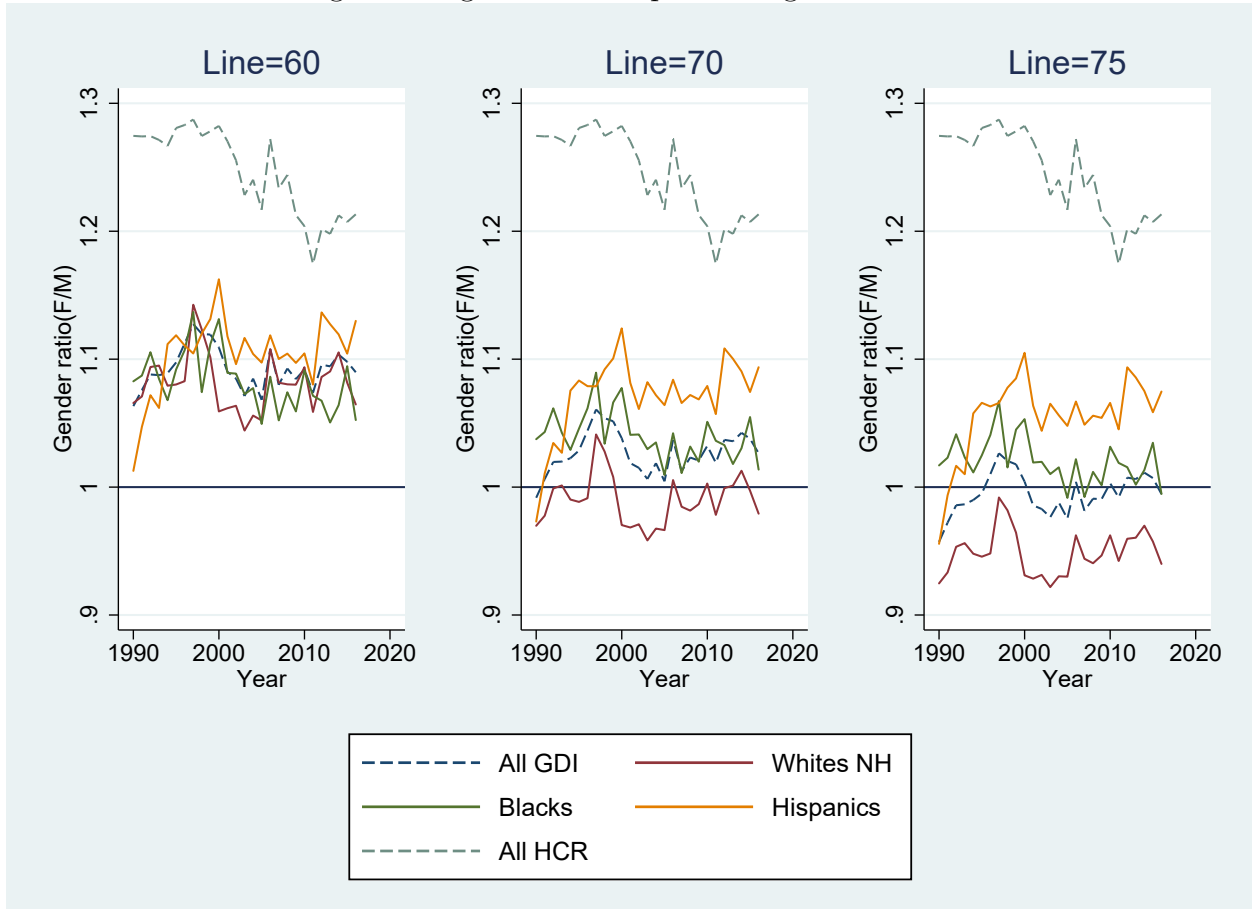
Note: These figures report GDI gender ratios using different age lines. Recall: The age line considered in previous analysis was 75.

ratio with income poverty is always over-estimated as compared to that of total deprivation.

Moving on to racial differences in gender inequalities, two main facts are observed: First, the gap between Minorities and Whites NH narrows with lower age lines and, second, regardless of the age line women relative deprivation is the highest in the Hispanic group. With the age line of 60 years, Whites NH women become more deprived than men with ratios close to those observed in the group of Blacks.[27] It is commonly believed that in developed countries, not living beyond the retirement period (typically above 60 years) should be viewed as deprivation. Consequently, the result highlighting the disadvantaged relative position of women in Minority groups, compared to men, remains robust across to the age line.

Figure 10: Taking into account prisoners
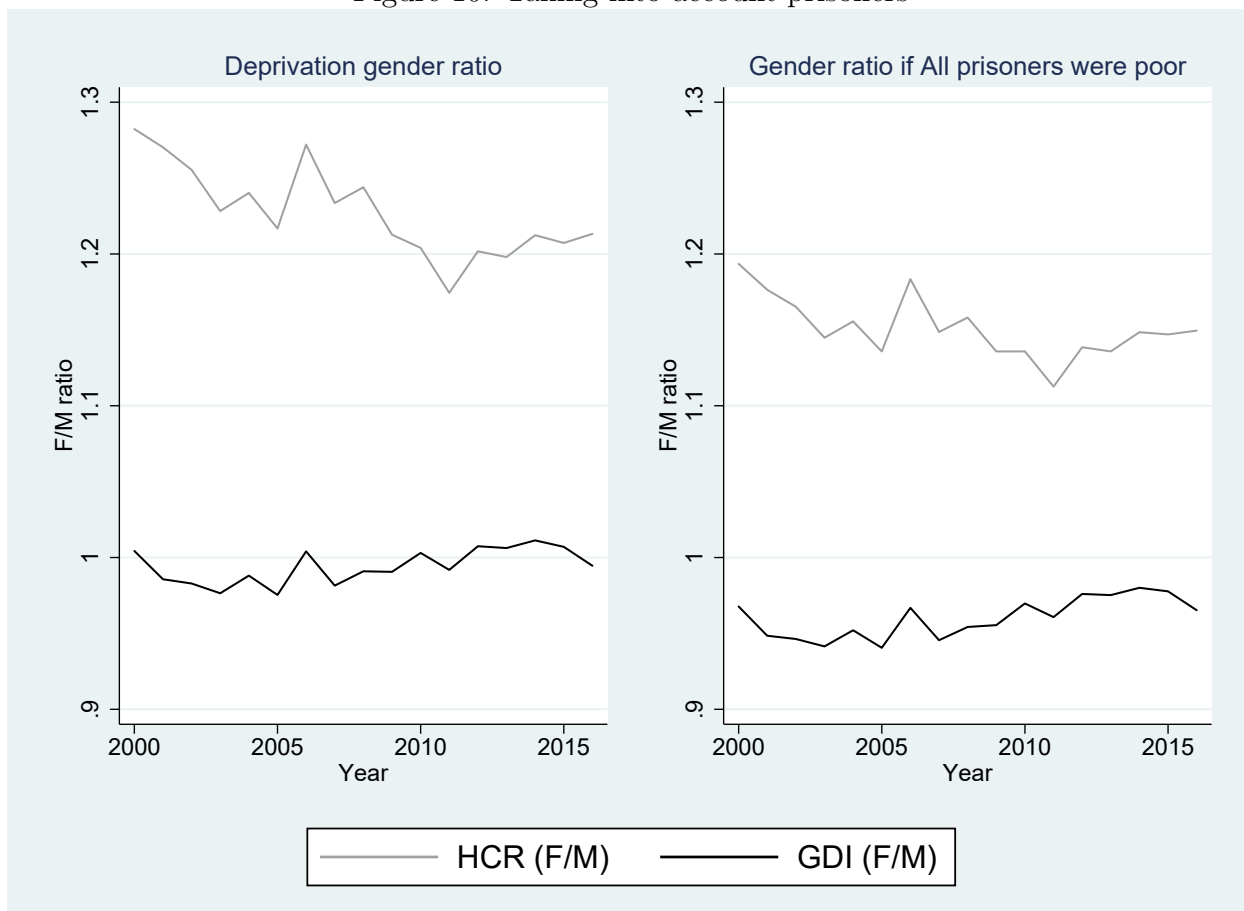
Note: The first figure (left) displays the current deprivation gender ratio (women/men). The second presents how could be the gender ratio if all prisoners (men and women) were considered as being poor. Data are reported from 2000 due to unavailability of prisoners' data.
Source: The Bureau of Justice Statistics (2019)

5.3   Taking into account prisoners

It should be noted that in the United States, some individuals like soldiers, prisoners, and people in college dormitories are not included the poverty surveys. Prisoners constitute the largest group excluded in the poverty universe. A recent paper of Looney & Turner (2018) showed that poor and jobless individuals were more likely to be incarcerated in the US. For instance, only 49% of men in prison were employed three years prior to the incarceration and their median income (USD 6250) was largely below the full-time minimum wage (USD 15000). Based on this evidence, I hypothesize that all prisoners are poor and observe how the gender difference behave. Given the gender distribution of incarcerated population, the deprivation rate among men is likely to increase more than the women's rate. In fact, more

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[27]Note that with age line of 50, the race ranking about gender differences is the same for both GDI and HCR.

than 6% of the living men population is in prison while this share represents less than 1% for women (see Figure 17 in the appendix).

Figure 10 reports the gender ratios based on this hypothesis and shows a marked reduction of gender difference based on HCR (the ratio is close to 1). The effect on the GDI ratio is more nuanced, but we observe that from 2000 all the ratios fall below 1; men being considered as more deprived than women. This pattern is also observed in the group of Whites NH and Blacks while for Hispanics, women are still more deprived than men (see Figure 18).[28] Furthermore, it follows from Figure 18 in the appendix that women in the Majority group remain in a better relative position than those in Minorities.

5.4   Individual poverty within households

The most challenging limitation of these analyses is that the available poverty data in the US do not account for intra-household inequality in resource distribution. When considering that resources within households are pooled and equally distributed, any gender disparities in poverty rates can only stem from the gender composition in single-head households. This holds because, in husband-wife households, men and women tend to exhibit similar poverty rates, as illustrated in Figure 13. In a comprehensive literature review, Ponthieux & Meurs (2015) presented evidence in all OECD countries, poverty rates for married men were consistently overestimated, while those for women were underestimated when assuming equal resource distribution within households.

To account for intrahousehold inequality, Cherchye et al. (2012) exploited information on consumption of private and public goods within the household and used the collective consumption model[29] to compute individual poverty rates. Unfortunately, I am unable to replicate this approach due to the unavailability of detailed information on consumption patterns within households (to the best of my knowledge). Hence, I rely on the "second-best" solution proposed by Corsi et al. (2016). In their approach, they computed the individualized financial dependency rates (FDR) in Europe considering an individual as poor if his own income is below the poverty line. The absence of sharing rules and economy of scales in the FDR leads to an overestimation of women's poverty as sharing generally enhances their situation (Cherchye et al., 2012), given their lower income compared to men. As a consequence, the FDR provides an upper bound value of the gender gap whereas the traditional headcount ratio (HCR) gives the lower bound; the actual gap being between the HCR and FDR ratios. In the following analyses, I compute the FDR for individuals with recorded personal incomes.[30] Moreover, I use the official poverty line for a household of one member

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[28]The unequal distribution of prison population (dominated by black) is responsible for the heterogeneous effect of this hypothesis on different racial groups

[29]This model takes into account individual preference and the sharing rules that dictate intra-household distribution of resources

[30]Children under 15 years are excluded because they have no labor income. This exclusion should not bias

to define financial dependency status (poverty with FDR approach).[31]

Figure 11: Gender Ratios (women/men) with the Financial Dependency Rate (FDR) and the Generated Deprivation Index
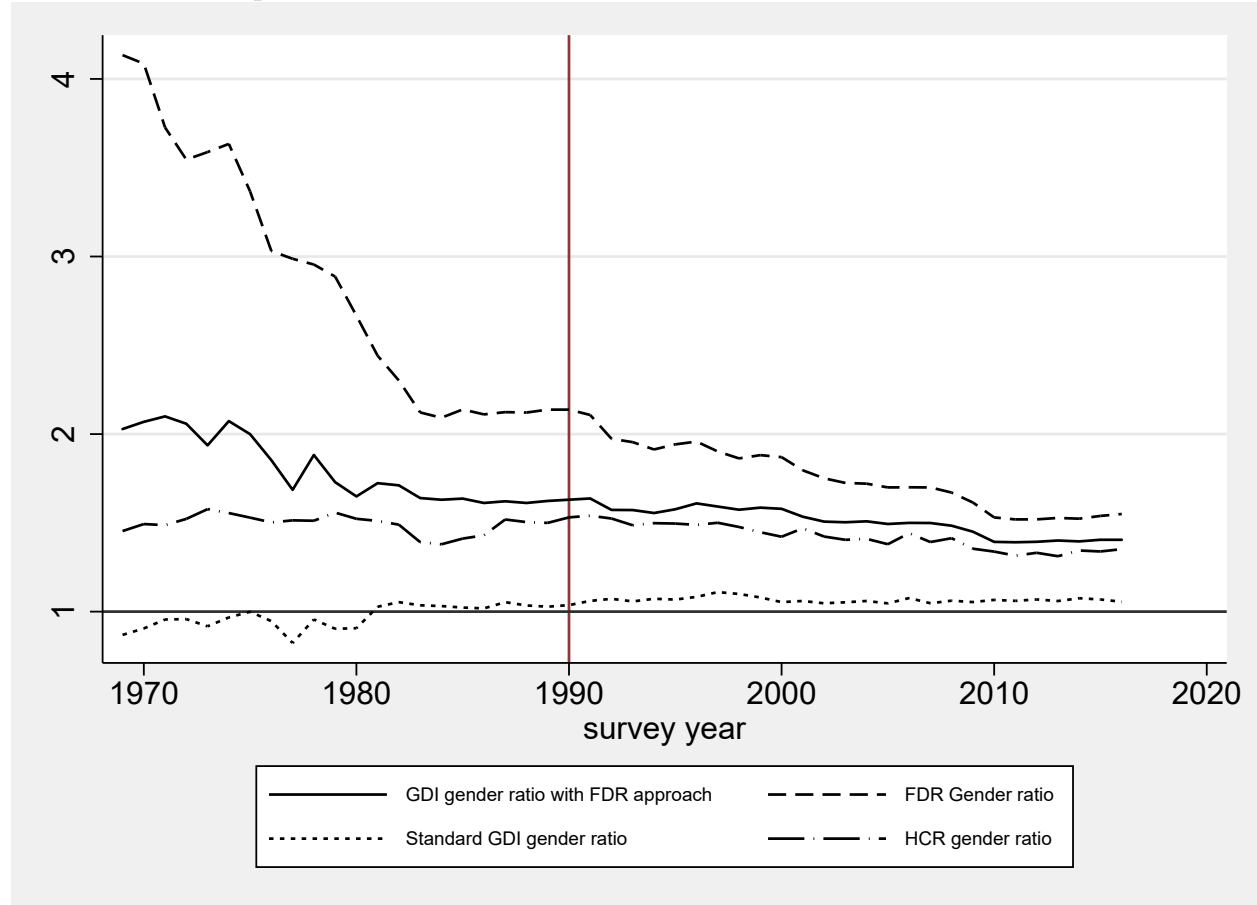
Note: This figure presents deprivation gender ratios (women/men) using various measures. 'GDI gender ratio with FDR approach' represents the total deprivation gender ratio, assuming that an individual is poor if his personal income falls below the threshold for a one-member family. 'FDR Gender ratio' indicates the income poverty gender ratio, assuming that an individual is poor if his personal income falls below the threshold for a one-member family. 'Standard GDI gender ratio' (and 'HCR gender ratio') refer to gender ratios as computed in previously analysis, assuming all family members are poor if the pooled family income is below the family poverty line.

Two main observations emerge from Figure 11. First, as expected, the gender gap in income poverty is generally higher with the financial dependency rates (FDR) compared to the standard poverty measure as computed previously (HCR). Second, women are always more deprived than men if we rely on the alternative poverty measure (FDR) to compute the total deprivation rate (GDI with FDR approach). Nevertheless, as expected, gender

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the results, assuming gender-balanced poverty and mortality rates among children under 15.

[31]In other words, I analyze whether an individual would be considered poor (and thus financially dependent) if they were living alone with the same income

ratios with total deprivation are always lower than the ones found when considering income poverty uniquely regardless of the poverty measure. The nuance that should be stressed here is that the real gender ratios are between the standard GDI ratio curve and that of the GDI gender ratio with the FDR approach (meaning they are more likely to be above 1, indicating the disadvantage of women). In summary, Figure 11 strengthens and shades the previous conclusion: *In the United States, with total deprivation, women are still more deprived than men but the gender bias is less severe than the one estimated with income poverty only.*

Regarding the racial differences, Figure 19 in the appendix shows that with the alternative measure (FDR), as for income poverty (HCR), women in Minorities are in a better relative position in terms of total deprivation compared to those in the Majority group. The evolution of the family structure may explain the difference between standard and alternative deprivation measures. In fact, the bias with the standard poverty measure should be greater for Whites NH since the large share of women in this group live in couples while those in Minorities present higher rates of singlehood (Iceland, 2013). Notwithstanding this nuance, the conclusions regarding the situation of women in Minorities still hold for two reasons. First, as mentioned earlier, the alternative approach (FDR) overestimates women's poverty given the absence of sharing in the household that might benefit more for Whites NH women, since they have more relative bargaining power (more educated). Second, the racial differences in deprivation rates are still alarming, and this reflects the hardships experienced by women in Minorities.

6   Concluding remarks

The main objective of this paper was to draw a picture of the gendered pattern of total deprivation in the United States. In this regard, I used the generated deprivation index, an indicator that combines poverty and premature mortality as components of total deprivation (Baland et al., 2021). This indicator is best suited for making gender comparisons regarding the total deprivation in the US since poverty and mortality yield opposite trends of the gender gap: women are poorer and have lower mortality rates than men.

The contribution of this paper is twofold. First, from 1970 to 1990, American men were more deprived than women, but since the 1990s, deprivation in the two gender groups has evolved closely. Before 1990, the larger reduction in the gender gap in mortality along with the lack of significant progress in gender disparity in income poverty resulted in a greater decline in total deprivation among men. Since the 1990s, there has been an almost perfect compensation process across genders between lifespan and income deprivation, so that the gap between men and women has been almost filled.

The second contribution is that this near gender equality in total deprivation hides important cross-race differences: in contrast to income poverty, recent trends in total deprivation show that the gender gap against women is the highest in Hispanic and Black groups (Mi-

norities) as compared to Whites Non-Hispanics (Majority). The finding also suggest that Hispanic and Black women accumulate the double disadvantage of being females and in the minority in a non-additive fashion. Over time, men in Minorities have experienced a notable reduction in racial disparities in lifespan deprivation compared to women, possibly due to advancements in medicine and health programs targeting vulnerable populations. However, the historical disadvantage faced by women in Minorities in income poverty persists, as singlehood often weakens the effectiveness of anti-poverty initiatives targeting them.

This paper has two implications. First, development policies that aim to reduce gender inequalities should prioritize targeting women in Minorities, as they are the most vulnerable when combining income poverty and premature mortality in a single indicator. Second, considering the recent stagnation in terms of mortality reduction, the trend of gender differences in total deprivation is entirely dictated by the gap in terms of economic poverty. Therefore, efforts should be made to reduce the income gap between men and women to achieve gender equality.

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Appendix: Additional Tables and Figures

Table 3: Gender Gap by race

| Gender Gap (Women-Men)	All	Whites NH	Blacks	Hispanics
Averages (and Std. Dev.)				
Alive Deprivation	3.20	2.37	5.65	4.77
	(0.47)	(0.33)	(1.59)	(0.93)
Lifespan Deprivation	-3.30	-3.12	-4.95	-3.31
	(0.53)	(0.30)	(1.25)	(1.20)
Generated Deprivation	-0.10	-0.75	0.70	1.47
	(0.31)	(0.24)	(0.62)	(0.88)
Head Count	2.94	2.23	4.79	4.18
	(0.42)	(0.32)	(1.33)	(0.74)
Annual Variation (pp)				
Alive Deprivation	-0.05**	-0.03**	-0.18**	-0.09**
Lifespan Deprivation	0.06**	0.03**	0.14**	0.13**
Generated Deprivation	0.01	0.00	-0.04**	0.05*
Head Count	-0.04**	-0.03**	-0.15**	-0.05**

Note: This table reports the average gender gaps (women-men) for deprivation indicators in each racial group in percentage points (pp) from 1990 to 2016, and the coefficients of the regression of the gap in each indicator on the year. AD: Alive Deprivation; LD: lifespan deprivation; GDI: Generated deprivation index; HCR: Head Count Ratio. Standard Deviations in parentheses, **/* next to the coefficient means significant at 1/5%

Table 4: Racial Gap by gender group (percentage points)

Racial Gap	Blacks-WNH			Hispanics-WNH			Blacks-Hispanics		
	All	Men	Women	All	Men	Women	All	Men	Women
Averages (and Std. Dev.)									
Alive Deprivation	15.80	14.01	17.29	14.69	13.51	15.92	1.11	0.49	1.37
	(2.41)	(1.88)	(2.96)	(2.47)	(2.24)	(2.72)	(1.40)	(1.32)	(1.64)
Lifespan Deprivation	3.78	4.73	2.90	-0.44	-0.42	-0.60	4.22	5.15	3.51
	(1.43)	(1.90)	(0.97)	(1.61)	(2.01)	(1.12)	(0.56)	(0.66)	(0.45)
Generated Deprivation	19.57	18.74	20.19	14.25	13.09	15.31	5.33	5.64	4.88
	(3.67)	(3.52)	(3.80)	(3.62)	(3.74)	(3.48)	(1.21)	(1.19)	(1.44)
Head Count	17.91	16.42	18.98	15.53	14.55	16.50	2.37	1.87	2.48
	(3.10)	(2.66)	(3.48)	(2.89)	(2.75)	(3.01)	(1.48)	(1.39)	(1.72)
Annual Variation (pp)									
Alive Deprivation	-0.22**	-0.14**	-0.30**	-0.20**	-0.17**	-0.23**	-0.03	0.02	-0.07
Lifespan Deprivation	-0.18**	-0.23**	-0.12**	-0.18**	-0.23**	-0.13**	0.00	-0.01	0.01
Generated Deprivation	-0.40**	-0.38**	-0.42**	-0.38**	-0.39**	-0.35**	-0.02	0.02	-0.07
Head Count	-0.31**	-0.24**	-0.36**	-0.26**	-0.24**	-0.27**	-0.05	0.01	-0.09*

Note: This table displays the racial gap in each gender. The first six columns compare Blacks and Hispanics men and women to Whites NH, while the three last compare Hispanic and Blacks. The second part of the table presents coefficients of an OLS regression of the racial gap in each indicator on year. We say for instance that between 1990 and 2016, the Alive Deprivation gap between Blacks and Whites NH men decreased by 0.14pp on average each year. Standard Deviations in parentheses, */** means significant at 5%/1%

Figure 12: Poverty rate by household structure
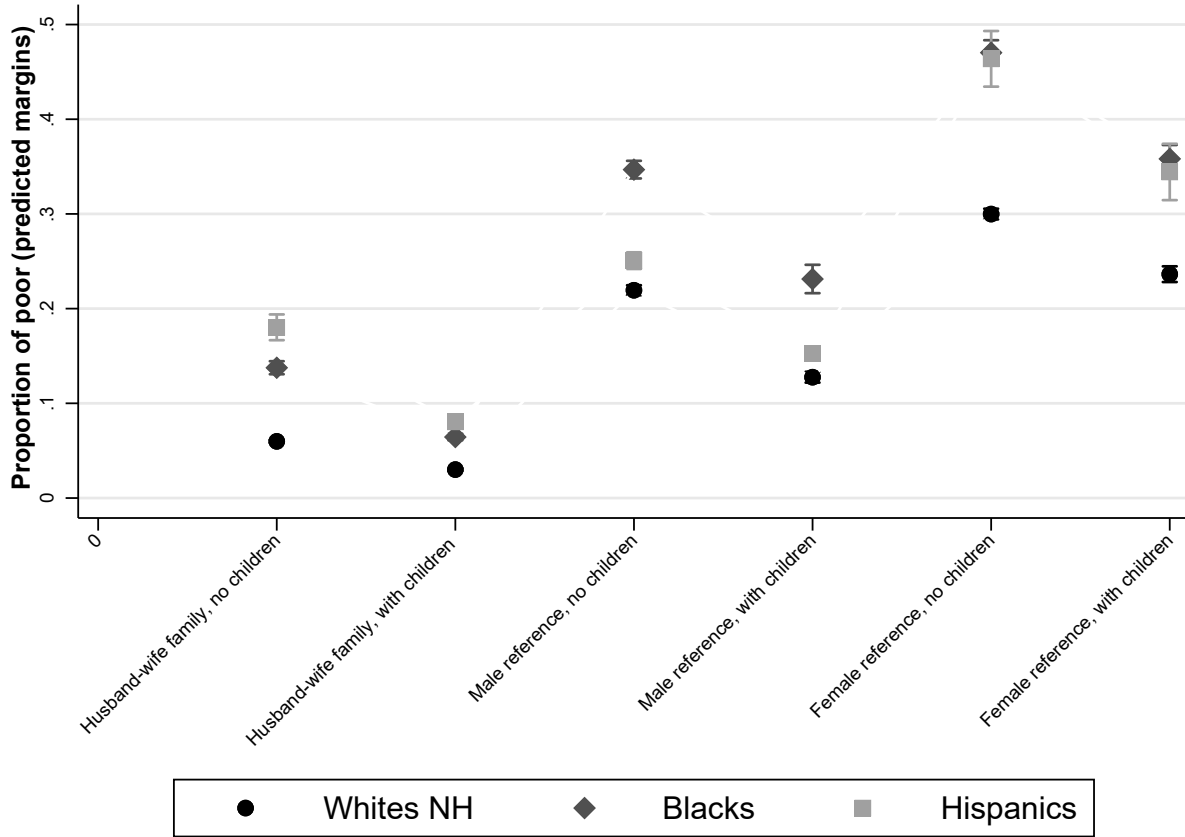
Note: This figure presents poverty rates by family type and race, reporting predicted margins from OLS estimation of the following equation:

$$Y_i = \alpha \ * Family\_type_i + \beta \ * Race_i + \delta \ * Family\_type_i * Race_i + \theta \ * X_i + \varepsilon_i$$

where $Y = 1$ if the individual is poor. The vector X includes controls such as education, marital status, age, number of children, citizenship status, foreign-born status, year fixed effects, and state fixed effects. Estimations are based on American Current Population Surveys data from 1976 to 2016.

Figure 13: Poverty rates by family type
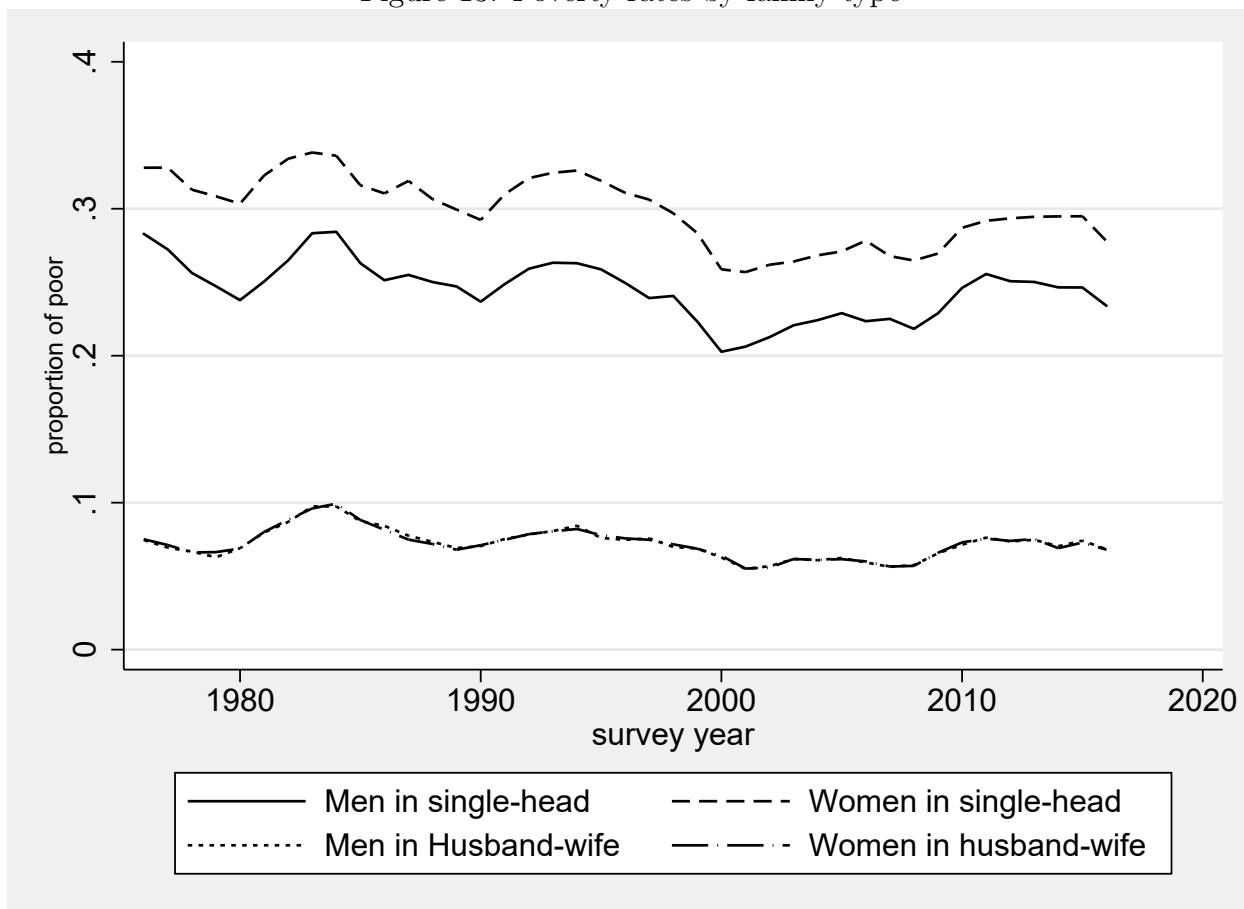
Note: This figure presents poverty rates by family type, using data from the American Current Population Surveys (CPS). Single-head Family refers to a family with only one head (either a man or a woman, with or without children), while Husband-Wife Family denotes a family consisting of a husband and wife.
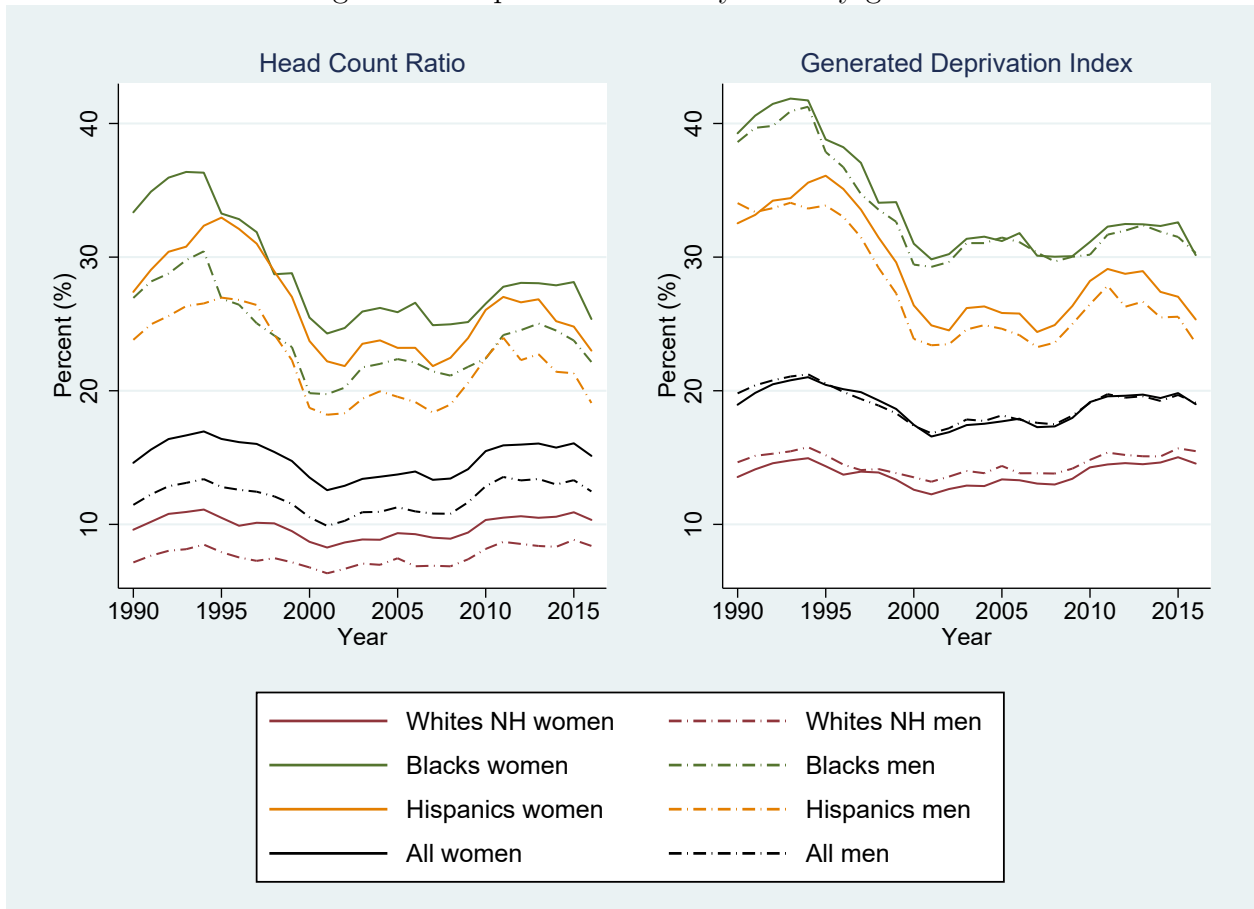
Figure 14: Alive (AD) and lifespan (LD) deprivation Components by Race, (in percent)
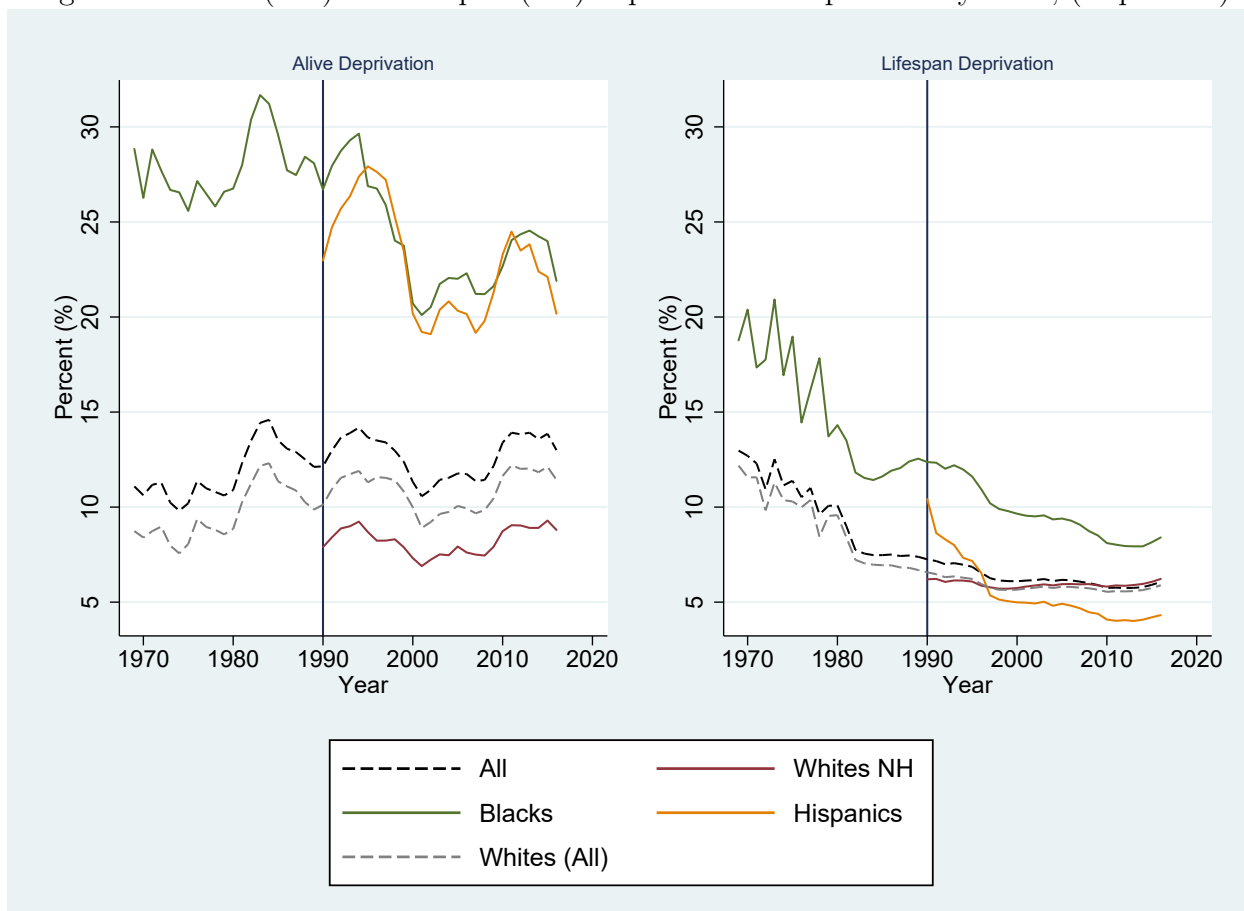
Note: These figures present the Alive and Lifespan Deprivation components (of GDI) for each racial Group. The subdivision between Hispanic and Non Hispanic Whites starts from 1990
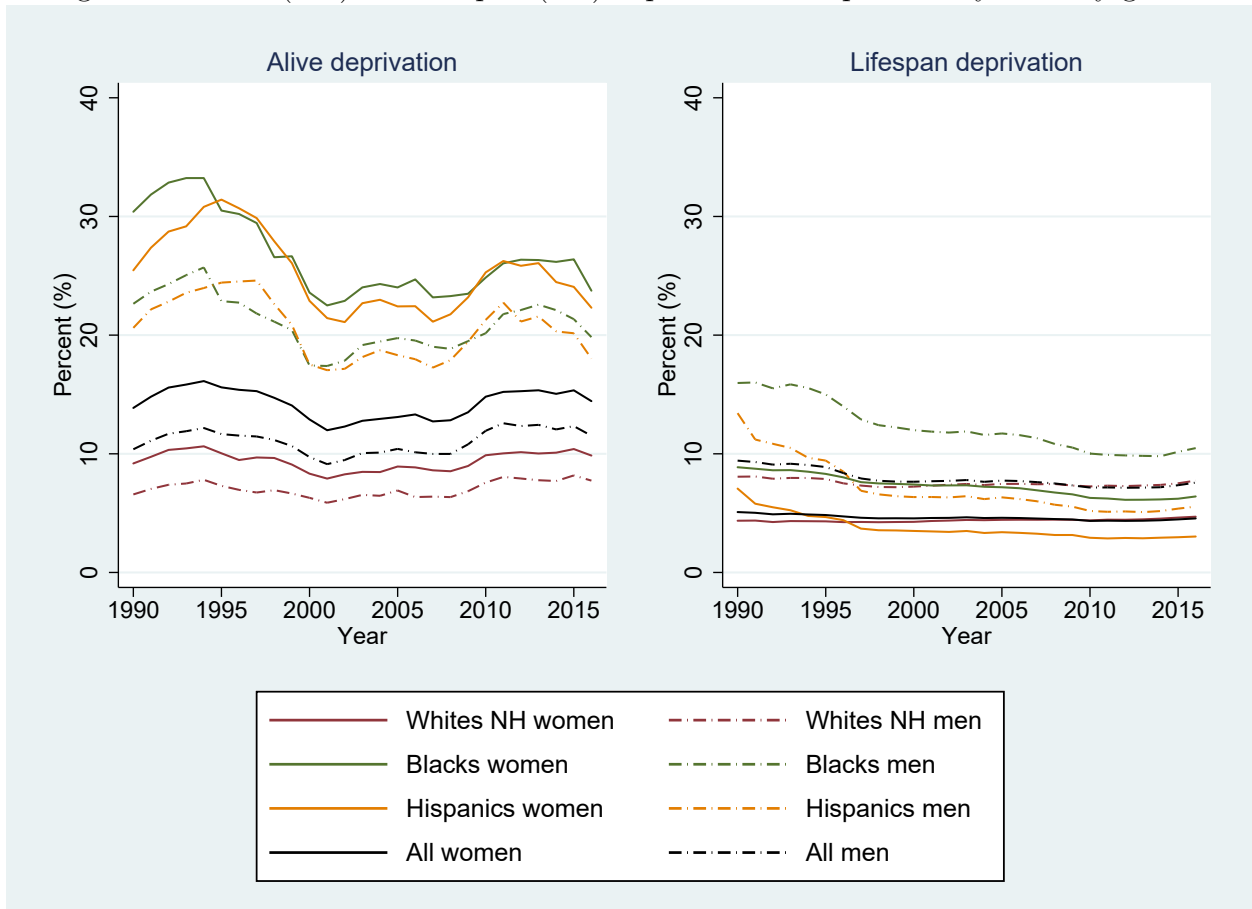
Figure 15: Deprivation rates by Race by gender

Note: These figures report the Generated Deprivation Index and the Head Count Ratio for each racial Group and for each gender group. The subdivision between Hispanic and Non Hispanic Whites starts from 1990

Figure 16: Alive (AD) and lifespan (LD) deprivation Components by Race by gender

Note: These figures report the alive and lifespan deprivation components of the Generated Deprivation Index for each racial Group and for each gender group. The subdivision between Hispanic and Non Hispanic Whites starts from 1990

Figure 17: Prisoner Population

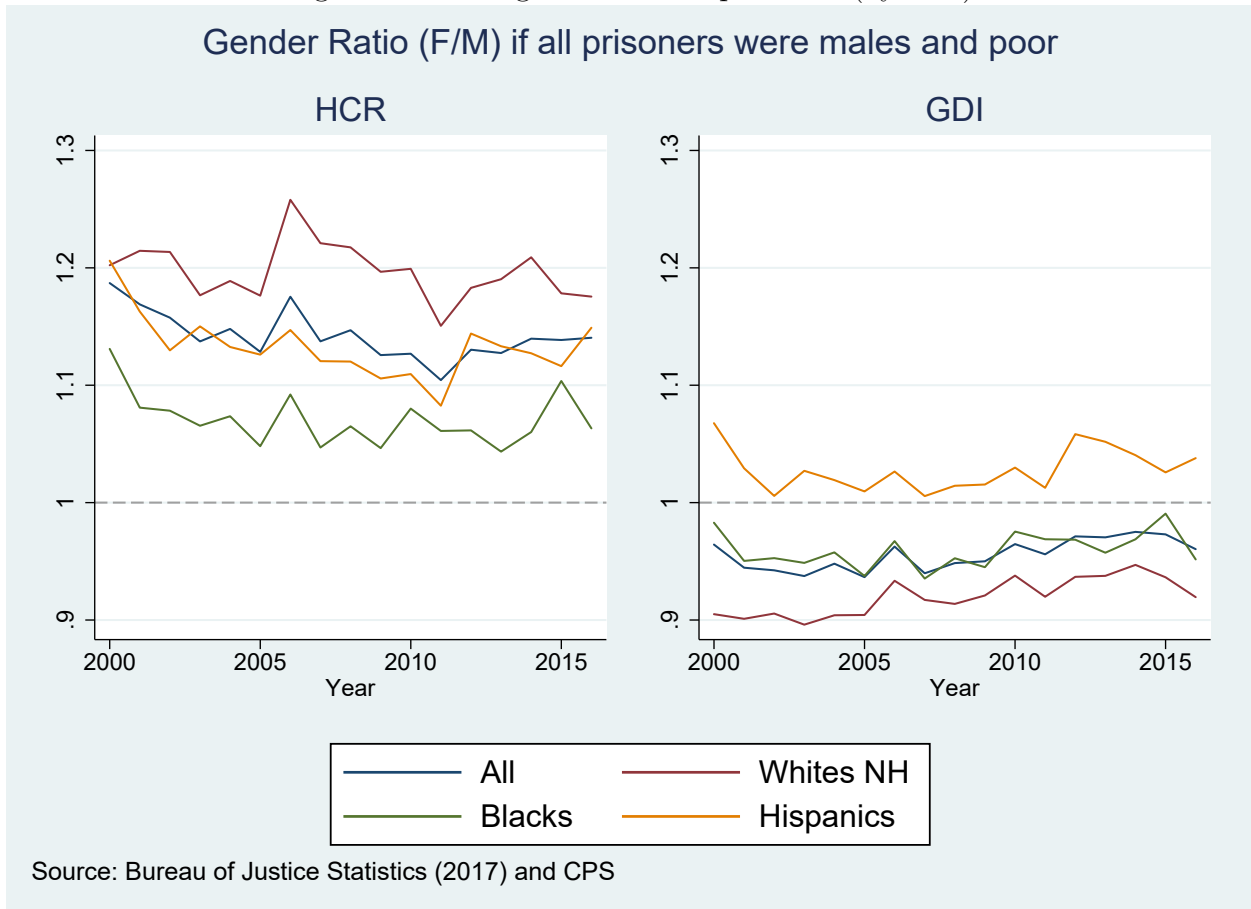**Share of prisoners in the total population by gender**

Note:
This figure displays the share of prisoners among men and men. Data are reported from 2000 due to unavailability of prisoners' data
Source: Bureau of Justice Statistics (2017) and IPUMS CPS

Figure 18: Taking into account prisoners (by race)

Gender Ratio (F/M) if all prisoners were males and poor

| HCR | GDI |

Legend: All, Whites NH, Blacks, Hispanics

Source: Bureau of Justice Statistics (2017) and CPS

Note: These figure display deprivation (HCR and GDI) gender ratio (men/women) by race if all prisoners were considered as being poor and men. The existing data do not provide gender distribution of prison population by race.

Figure 19: GDI Gender Ratios (W/M) by race with alternative poverty measures
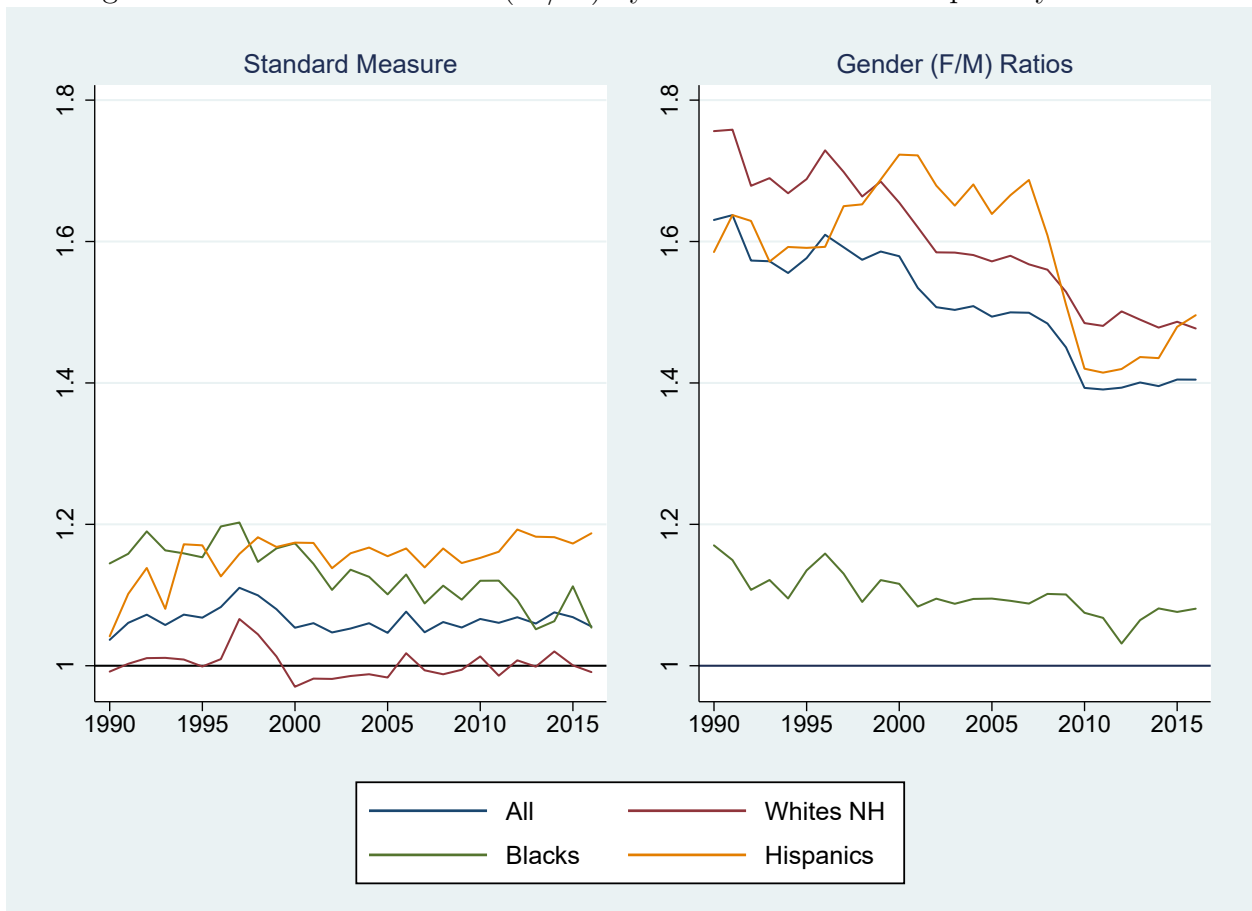
Note: These figures display total deprivation (GDI) gender ratios by race using alternative poverty measures. Data are reported from 2000 due to unavailability of income data