Black and White Fertility, Differential Baby Booms: The Value of Civil Rights

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Abstract

We present new data on the fertility of blacks, from 1820 to 2000, and whites, from 1800 to 2000, by state. We also present new data on schooling by race and cohort from 1840 to 2000. We also present data on mortality for whites, from 1800 to 2000, and blacks, from 1820 to 2000, by state. The data indicate remarkable convergence in all three indicators. The secular decline in mortality and fertility are consistent with our previous work, Murphy, Simon and Tamura (2008). However there is a substantial difference in the behavior of fertility during the Baby Boom between whites and blacks. In many states, typically southern, white fertility rose by trivial amounts during the Baby Boom. For blacks, the Baby Boom is dramatically larger, and universal throughout the US. In addition schooling fails to decline for either whites or blacks during the Baby Boom, as predicted by the standard quality-quantity tradeoff of Becker and Lewis (1973). In particular black schooling rose as much or more than whites, despite their much larger Baby Boom. We identify this dramatic increase to the Civil Rights Successes of the 1950s and 1960s. Prior to the Civil War we find that the welfare cost of discrimination in school access was worth between 1.7 times to 10 times black wealth! We find that the welfare cost of discrimination in the south ranges from 1.6 to 4 times black wealth prior to 1960. Further we find that the Civil Rights era was valued by blacks in the South by between 1 percent to 2 percent of wealth. Outside of the South we find significant costs of discrimination prior to 1960, ranging from 8 percent to 100 percent of black wealth! For these regions from 1960-2000 blacks have attained rough parity in schooling access. The welfare magnitudes are similar to the hypothetical gains to blacks if they had white mortality rates.

In this paper we introduce newly constructed data on mortality, fertility and schooling for blacks and whites at the state level. The data provides original estimates of black fertility from 1820 to 1880 by state. For many states, we provide black fertility estimates for 1890 to 1940, hitherto unreported. For whites we construct fertility estimates from 1800 to 2000. The estimates from 1800 to 1890 are novel to this paper.[1]

In addition in this paper we present a model which we view as an identification exercise. Principally we are interested in identifying the forcing variables for secularly declining fertility in the United States

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[1]Our estimates are based on extrapolated mortality values by race and state. The exercise is similar to that which we used to produce state fertility measures over the same period in Murphy, Simon and Tamura (2008). For blacks fertility is even less reported from the census. The black children ever born question is only reported for all states in 1960, and for all but one state in 1950 until 1990, and then are estimated from CPS answers in 1998, 2000, 2002, 2004. From 1890 to 1940, only 23 states report black fertility, and California from 1900 to 1940.

throughout the past 200 years, as well as the Baby Boom. The Baby Boom was a dramatic deviation from the secular trend in children ever born by women. Prior to the Baby Boom the typical American woman had about 2.4 children over her reproductive life. At the peak of the Baby Boom, the typical American woman had 3.2 children over her reproductive life. At the end of the Baby Boom the typical American woman had 2 children over her reproductive life. We use a variant of the model from Tamura and Simon (2010), and Murphy, Simon and Tamura (2008) to calibrate for white fertility in each state. In those papers the forcing variable that induces the Baby Boom is a reduction in the price of space. As in these papers, we have a variable that affects the cost of schooling. This allows for schooling to rise even with a dramatic event like the Baby Boom. We demonstrate in Tamura and Simon (2010) that this variable is closely related, both economically and statistically to the observed data on the US from 1850-2000, as well as the data for the 20 countries that also experienced a Baby Boom.[2]

As with the calibration for whites, we assume identical functional form for preferences of blacks, but with different preference parameters for blacks. In the limit, the preferences of whites and blacks are identical, where the limit is achieved at zero mortality risk. We assume in the model that discrimination against blacks took the form of much higher cost of schooling from 1820-1950.[3] For the earliest period we assume that the cost of schooling was essentially prohibitive for blacks. We assume that black parents faced higher schooling costs for their children than their white counterparts. Since schooling was typically funded through property taxes, we assume that blacks also faced differential housing costs. We compute compensating and equilibrating variations in wealth for both blacks and whites. That is to say, we compute the additional wealth needed for a group (black or white) if they faced black prices for housing and schooling to be at the same level of utility as would arise if they faced white prices for housing and schooling. We also compute how much wealth a group (black or white) would need to give up if they faced white prices for housing and schooling and were indifferent to their situation under black prices for housing and schooling. We model the value of Civil Rights as the dramatic reduction in this cost of schooling to blacks, which allowed for a substitution effect for higher quality, more educated children, and a wealth effect, which introduces a demand for more children. Essentially Civil Rights expansions for blacks in the 1950s and 1960s meant that the lives of children born in that period were going to be dramatically different than those available to the adults of that period. Because black children were able to dramatically improve their schooling quality, parents chose to have many more children and dramatically better educated children.

The paper is organized as follows. In the next section we briefly describe our methodology for estimating mortality risk, as well as fertility. We combine these results with extensions of Turner, Tamura, Mulholland and Baier (2007) which produced estimates of schooling at the state level. Following that we introduce the model used to fit the time series for both whites and blacks and also to capture the change in the cost of schooling for blacks as a result of Civil Rights expansions. We construct the counterfactual experiments of allowing whites and blacks to have each other's prices and mortality risks. We used this variation in prices and mortality risk to compute both compensating variations and equilibrating variations.

On the basis of these computations we find that blacks would have to have roughly double their wealth given their prices, to have the same utility they would have enjoyed if they could faced white prices.

[2]These 20 countries are: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, and the UK. Some of these countries had a Baby Boom in that fertility deviated from the secular decline in fertility rather than having an absolute increase in fertility.

[3]Obviously there was discrimination against blacks in the marketplace. However for simplicity we assume that the only form of discrimination occurred in the market for housing and the education sector.

From 1960 onward, we find that blacks have roughly attained parity with whites in the prices they face. In particular, while blacks in the three southern census regions appear to be benefitting from reverse discrimination.[4] In the south the better prices are worth between .8 percent and 1.8 percent of wealth.

We also compute the compensating and equilibrating variations for differential mortality risk. For all years, blacks would again need roughly double their wealth to be equally well off with their mortality risk compared to white mortality risk. Prior to 1960, blacks would have needed roughly 2.7 times more wealth with their mortality risk to have the same utility if they had faced white mortality risk. Since 1959, we estimate that higher black mortality risk would require about 3 percent more wealth to have the same utility under white mortality risk. Thus we find that black discrimination in schooling has roughly the same utility cost as differential mortality risk.

1 Data

In this section we present new data on mortality risk, fertility and schooling for blacks and whites. We used the same methodology as in Murphy, Simon and Tamura (2008). For all states we used census data on children ever born, and mortality life tables when states became death registration states. Loosely speaking, this provides state fertility measures for roughly half of years, from 1890 - 2000 by race. From 1920 onward essentially every state was a death registration state, and both white and black life tables are typically available. Finally for years that are not covered by the census, we back forecast mortality for whites and blacks. Typically we back forecast for the state life table until 1800. We then used the overlapping years of data, for all states, to estimate the relationship between state life tables and race specific state life tables. We then used this to project black and white mortality based on our projections of state mortality.

With estimates of state mortality, we then used estimates of the number of infants under the age of 1, and children between the ages of 1 and 4, inclusive, as well as the number of women of child bearing years to construct estimates of children ever born by race, for each state from 1850-1880. Finally we used estimates of children under the age of 10, relative to women of child bearing age to estimate children ever born from 1800-1840 for whites, and 1820-1840 for blacks.

The results of these calculations are presented in Figures 1 - 12, and Table 1. Figures 1 and 2 present the estimates for fertility by region and race. We aggregated the fertility to census regions, in order to facilitate presentation. In all of the analysis, the state is the unit of observation but we cannot present 51 graphs for each variable of interest. There is a general spike in fertility both for blacks and whites in 1890. This is the first year, typically, for about half of the states, when we switched to reporting the children ever born value for women 35 to 44 in the census. Thus there is evidence of survivorship bias, whereas the previous years estimate something like a hybrid of a total fertility rate and children ever born. There is a sharp decline in fertility, white fertility begins at 7 per woman in 1800 before declining to almost exactly 2 per woman in 2000. Black fertility in 1820 is roughly 6, and declines to almost exactly 2 in 2000. There is remarkable convergence across race and states.

Table 1 shows that fertility was higher for whites until 1830, when they became identical. From 1850 onward, black fertility is higher than white fertility. The gap between white fertility and black fertility is largest in 1890, when black fertility is 6.6 per woman, and white fertility is 4.7. The gap in 1880 and 1900

[4]This is only focusing on quantity of schooling and not quality of schooling.

are 1.5 and 1.75, respectively. However the gap shrinks dramatically in the 20th century. By 1950, the fertility gap has declined to .4 children, 2.09 vs. 2.48. It is evident that the white and black Baby Booms are reflected by the differential fertility between women of the 1950 cohort and the 1970 cohort.Recall that fertility is reported as the children ever born to women ever married age 35-44. Thus the 1950 cohort was born between 1906 and 1915. The 1970 cohort was born between 1926 and 1935. The black Baby Boom is larger than the white Baby Boom, 1.07 additional children compared to .80 additional children. White fertility increases by .80 children: increasing by .35 children from 1950 to 1960, and another .45 children from 1960 to 1970. Black fertility rises by .47 children from 1950 to 1960 and .6 children from 1960 to 1970.[5] When we measure the Baby Boom as the percentage increase in fertility, we find that the same regions that were small Baby Boom regions are small proportional Baby Boom regions. All four regions have percentage fertility increases less than 80 percent of the national percentage fertility increase. All five remaining regions have relative Baby Booms that are no less than 1.16 times the national fertility increase percentage.

For blacks, their Baby Boom is uniformly larger than for whites, except for the Mountain region.[6] In every region where whites had a large Baby Boom, blacks also had a large Baby Boom as measured by the increase relative to the black national average fertility increase. However in two of the regions where whites had a small Baby Boom, East and West South Central regions, the Black Baby boom is larger there than the black national Baby Boom. In fact the even in the region with the largest back population, the South Atlantic, the black Baby Boom is 90 percent of the size of the national black Baby Boom.[7]

Table 2 presents the Baby Boom data in greater detail. As we first observed in Murphy, Simon and Tamura (2008), there are differential Baby Booms by census region. This is true for whites, and somewhat less for blacks. Four of nine regions, the three southern regions and the Mountain region have white fertility increases smaller than the white US average. Three northern regions, New England, West and East North Central, and the Pacific region have white fertility increases of about 1 child. The final region, the Middle Atlantic region, has a slightly higher fertility increase compared to the US average. As measured by percentage fertility increase, seven of the nine census regions have percentage black fertility increases equal or larger than the national black fertility increase. Our point is that while there are differing magnitudes of black Baby Booms across the regions, generally speaking the Black Baby boom was more ubiquitous than the White Baby Boom. In eight out of nine regions the absolute magnitude of the rise in fertility is higher for blacks, and in eight out of nine regions, the percentage change in fertility for blacks exceeds the percentage change in fertility for whites.

In Murphy, Simon and Tamura (2008) we presented a theory of suburbanization as an explanation for the Baby Boom. The disparate nature of the Black Baby Boom provides additional information about the theory. Blacks were as rural in the south as whites, and yet in two of those three regions, they had a large Baby Boom. Blacks were as urban as whites in the northern states, and had a slightly smaller decline in population density compared to their white counterparts. Thus there are additional features to the Black

[5]Interestingly there is strong similarity in the share of the increased fertility from 1950 to 1960 and 1960 to 1970 by race. For both whites and blacks roughly 40 percent of the total increase in fertility occurred between 1950 and 1960, and 60 percent of the total increase in fertility occurred between 1960 and 1970.

[6]By far the region with the smallest black population is the Mountain region. In 1950 there are almost exactly 15 million blacks in the United States. In the Mountain region, there are only 66,500 blacks. In one state there is only 1050 blacks!

[7]Out of 15 million blacks in 1950, almost exactly one third reside in the South Atlantic, 5 million. In the Middle Atlantic and the East North Central, the black populations are 1.9 million and 1.8 million, respectively. In the East and West South Central states, the black populations are 2.7 million and 2.4 million, respectively. These four regions contain almost 60 percent of the black population.

Baby Boom perhaps compared to the White Baby Boom.

We turn now to present the results for schooling. The next set of figures, Figures 3 and 4, present the schooling by cohort, by race and state. Again there is dramatic evidence of convergence in schooling, perhaps not quite as strong as for fertility. These graphs do not account for migration, which will be dealt with in future versions of the paper. Schooling of the 2000 cohort is forecast to range from 15 to 16 years for both whites and blacks. However blacks begin in 1840 with an average of 0 years of schooling, whereas for whites they average closer to 3 years in 1840.

Tables 3 and 4 present the similar evidence on schooling of cohorts as for fertility. We first present the time series of schooling by race, cohort and region in Table 3. In Table 3 we see the rise in schooling from 1850 to 2000.[8] Observe that for every region, except the East South Central, the White Baby Boom 1970 cohort of children have higher schooling than every other cohort except for 2000. For blacks the 1970 Baby Boom cohort has higher schooling than every cohort except 2000 for five of the regions. The 1990 cohort is higher than the 1970 cohort in the remaining four regions. It is surprising that the dramatic rise in fertility during the Baby Boom for both races is not coincident with falling schooling levels, as would be predicted by a standard quality-quantity tradeoff, c.f. Becker and Lewis (1973), Becker, Murphy and Tamura (1990).

In the model below, we use a cost of schooling parameter, κ, that varies by race and state over time to fit the time series of schooling for each state and race. There is a dramatic decline in the cost of schooling during the Baby Boom in order to fit the schooling time series.[9]

In Table 4 we present the size of the schooling changes that occurred during the Baby Boom. One thing that stands out is that schooling increased during the Baby Boom. This rising schooling occurred despite the large increase in fertility. There is evidence that the regions with the smaller Baby Boom tended to increase their schooling more rapidly than the national average, South Atlantic and West South Central.[10] Every region that had a large White Baby Boom increased their schooling less than or equal to the national average. When one examines the percentage increase in years of schooling again we find that those regions with smaller White Baby Booms, South Atlantic, East South Central and West South Central, had proportionately larger increases in schooling than the white national average.[11] Everyone of the larger White Baby Boom regions had smaller proportionate increases in their schooling.

For blacks we see that only the South Atlantic region had a larger increase in years of schooling than the national black increase. Recall that this is one of the two smaller Black Baby Boom regions. In proportionate increases, the South Atlantic and the East South Central regions had larger increases than the national average for blacks.

Figures 5-12 present evidence on mortality. For blacks are data only go back to 1820, but for whites we are able to compute mortality risk back to 1800. Figures 5 and 6 contain infant mortality. Figures 7 and 8, the probability of dying before 15. Figures 9 and 10 the probability of dying before 45. Finally Figures 11 and 12 contain the probability of dying before 75.[12] It is obvious from these graphs that mortality

[8] We do not present 1840 as we assume that the measurement of the initial year is likely to have more noise.

[9] In Tamura and Simon (2010) we use the same model to fit the time series of fertility and schooling for 20 countries in addition to the US. We found the same decline in schooling is necessary to fit the 21 countries. We show empirically that the model's cost term time series is strikingly similar, positively and statistically significantly correlated with observed expenditures per pupil relative to per capita income in these countries.

[10] The East South Central had an increase for whites that was 97 percent the national increase for whites, and the Mountain region had an increase of 99 percent of the national increase for whites.

[11] The Mountain region had white schooling increase that was 96 percent the proportional white average increase.

[12] For infant mortality we bound the rate at 37.5 percent, which is binding for many states. For the probability of dying before reaching child bearing years, 15, we bound the rate at 57.5 percent. While this seems high, actual probability of dying before age 15 was 62 percent in the District of Columbia in 1900, when it was a death registration state! As intermediate

risk has declined dramatically across all regions, for all age categories, and that the geographic and racial variation has also diminished. Perhaps surprising to some, the high levels of mortality risk for northerners, white and black prior to World War I or II. However the northern regions were much more urbanized than the southern and western regions. As McNeill (1977) identifies, cities were much more unhealthy than the countryside, and not until modern sanitation methods, waste disposal and modern sewer and water treatment facilities became prominent in the late 19th century did the population of cities become self sustaining![13]

2 Model

In this section we present a model with parental choice of fertility, x_t, human capital of their children, h_{t+1}, a composite consumption good, c_t, and space, S_t.[14] Parents choose the number of children to have in an environment of young adult mortality. Parental preferences are:

$$\alpha \left(c_t^{\psi} S_t^{1-\psi}\right)^{\varphi} \left[(1-\delta_t)x_t - a\right]^{1-\varphi} + \Lambda(Zh_{t+1})^{\varphi}(1 - \frac{\beta_t \delta_t^{\nu_t}}{\left[(1-\delta_t)x_t - a\right](1-\delta_t)}), \tag{1}$$

where ν_t is a time varying preference parameter that becomes constant by 1950.[15] We assume that the young adult mortality rate is δ_t. Further we assume that expected net fertility is what parents care about, $(1-\delta_t)x_t - a$, $a \geq 0$. Thus we model the parental fertility choice similar to Jones (2001), where elasticity of substitution of net expected fertility with human capital investments is greater than 1. This in turn exceeds the elasticity of substitution between net expected fertility and space, 1. The final term, with $\nu_t > 0$, in the preferences captures something like a precautionary demand for fertility as in Kalemli-Ozcan (2002, 2003) and Tamura (2006). Notice that it also depends on the level of human capital of the child. The more productive the economy, the more costly young adult mortality is from the perspective of utility. With falling young adult mortality rates, which in the limit reach 0, the final term in preferences disappears.

The budget constraint facing the typical parent is given by:

$$pc_t + r_t x_t S_t = Zh_t \left[1 - x_t \left(\theta + \kappa_t^i \tau_t\right)\right] \tag{2}$$

where Z is the constant total factor productivity in production, θ is the time cost of rearing children, τ_t is the time spent educating children, κ_t^i is the time efficiency of education time, $i = b, w$, p is the price of consumption and r_t is the price per unit of space.[16] This is where discrimination falls for blacks in this

steps, we bound the probability of dying before 5 at 45 percent, the probability of dying before 10 at 52.5 percent. We added these bounds so that cumulative mortality risk was strictly increasing in age.

[13]For more on the importance of water treatment see Melosi (1999), and Troesken (2004).

[14]We used a similar set of preferences in Tamura and Simon (2010). The results of the numerical solution for the United States were used in Murphy, Simon and Tamura (2008) in order to identify the relevant price of space. The only difference was that the precautionary demand term did not multiply the utility term for child income, but rather only the TFP. That paper compared the model solution for the required time series on price of space with measures of population density. This model also was used in Tamura and Simon (2010) to capture secular fertility decline and Baby Booms in the US and 20 industrialized countries. From examination of cross country fertility data, these are the only countries that exhibited a Baby Boom of any magnitude. No central or eastern European country evidenced a baby boom after World War 2. No Latin American country, nor African country produced a Baby Boom. Finally outside of Japan, Australia and New Zealand, no Asian country produced a Baby Boom. The one possible exception is South Korea, for whom we have no fertility data prior to 1950.

[15]In the appendix we will indicate the state specific graphs what the time series for (β_t,ν_t) are. As in Tamura and Simon (2010) there are state specific preferences, as well as black and white differences. From 1960 onward $\nu = .5$.

[16]Alternatively we could have specified the first term in preferences as depending on a composite of space, S, and all

model. We assume that for the bulk of history, $\kappa_t^b > \kappa_t^w$. Thus whites face a lower cost of schooling in comparison to blacks. With the Civil Rights Revolution of the late 1940s, 1950s and 1960s, we model this as a dramatic decline in κ_t^b relative to κ_t^w.[17] Finally we assume that the human capital accumulation technology is given by:

$$h_{t+1} = A\overline{h}_t^{\rho} h_t^{1-\rho} \tau_t^{\mu} \tag{3}$$

This accumulation technology is from Tamura (1991, 2006). We assume that the most educated state is the frontier human capital state. Substituting (3) and (2) into (1) and differentiating produces the two Euler conditions determining optimal choices of fertility and human capital investments:

$$\frac{\partial}{\partial \tau} : \frac{\psi\alpha c_t^{\psi\varphi-1} S_t^{(1-\psi)\varphi} \left[(1-\delta_t)\, x_t - a\right]^{1-\varphi}}{p} = \frac{\mu Z^{\varphi-1} A^{\varphi} (\overline{h}_t^{\rho} h_t^{1-\rho})^{\varphi} \tau_t^{\mu\varphi-1} (1 - \frac{\beta\delta_t^{\nu_t}}{[(1-\delta_t)x_t - a](1-\delta_t)}))}{h_t x_t \kappa_t} \tag{4}$$

$$\begin{aligned} \frac{\partial}{\partial x} &: \psi\varphi\alpha c_t^{\psi\varphi-1} S_t^{(1-\psi)\varphi} \left[(1-\delta_t)\, x_t - a\right]^{1-\varphi} \frac{w h_t \left[\theta + \kappa_t \tau_t\right] + r_t S_t}{p} \\ &= (1-\varphi)\, \alpha c_t^{\psi\varphi} S_t^{(1-\psi)\varphi} \left[(1-\delta_t)\, x_t - a\right]^{-\varphi} (1-\delta_t) + \frac{Z^{\varphi}\beta\delta_t^{\nu_t}}{x_t^2 (1-\delta_t)^{\varepsilon}} \end{aligned} \tag{5}$$

$$\begin{aligned} \frac{\partial}{\partial S} &: \psi\varphi\alpha c_t^{\psi\varphi-1} S_t^{(1-\psi)\varphi} \left[(1-\delta_t)\, x_t - a\right]^{1-\varphi} \frac{r_t x_t}{p} \\ &= \alpha\, (1-\psi)\, \varphi c_t^{\psi\varphi} S_t^{(1-\psi)\varphi-1} \left[(1-\delta_t)\, x_t - a\right]^{1-\varphi} \end{aligned} \tag{6}$$

We can solve for c_t as a function of S_t and x_t. This produces:

$$c_t = \left(\frac{\psi}{1-\psi}\right) \frac{r_t x_t S_t}{p} \tag{7}$$

Substituting this into the budget constraint produces:

$$r_t x_t S_t = (1-\psi)\, Z h_t \left[1 - x_t \left(\theta + \kappa_t \tau_t\right)\right]$$

Substituting this back into the objective function produces the following problems facing the household:[18]

$$\max_{x_t, \tau_t} \left\{ \begin{array}{c} \alpha \left(\frac{\psi}{p}\right)^{\psi\varphi} \left(\frac{1-\psi}{r_t x_t}\right)^{(1-\psi)\varphi} \left(Z h_t \left[1 - x_t \left(\theta + \kappa_t \tau_t\right)\right]\right)^{\varphi} \left[(1-\delta_t)\, x_t - a\right]^{1-\varphi} \\ + \Lambda (Z h_{t+1})^{\varphi} (1 - \frac{\beta_t \delta_t^{\nu_t}}{(1-\delta_t)} \left[(1-\delta_t) x_t - a\right]^{-1}) \end{array} \right\} \tag{8}$$

What is interesting to us is the decline in the fertility rate with the decline in young adult mortality, δ_t, as well as the relationship between the price of space, r_t, and fertility. Due to the interaction of fertility with both space as well as human capital investments, the budget constraint facing the typical parent is not convex. As a consequence, the comparative static exercise does not lead to any nice analytical results. We thus utilize numerical solution methods to examine the interaction of the precautionary demand for

other consumption goods, c, and net expected fertility: $\alpha X^{\varphi} \left[(1-\delta)x - a\right]^{\lambda-\varphi}$, where $X = \left\{\sigma c^{\frac{1}{\rho}} + (1-\sigma) S^{\frac{1}{\rho}}\right\}^{\rho}$. If ρ were negative, so that goods were stronger complements than the Cobb-Douglas case examined here.

[17] In 1948 President Truman integrated the US Army. In 1954 the US Supreme Court in *Brown vs. Board of Education* ruled that separate but equal was unconstitutional. In 1964 the US Congress passed sweeping legislation allowing for the federal guarantee of voting rights, and non discrimination in housing and employment. All of these landmark events were preceded by continuous work by seminal individuals, most notably Dr. Martin Luther King.

[18] Observe that the problem is homogeneous of degree φ in (h_t, h_{t+1}). We will use this result to compute approximations to compensating and equilibrating variations.

fertility and human capital investments in the long term. Also the numerical solutions presented below indicate the requisite decline in the price of space in order to induce a baby boom. Thus in the numerical solutions, we produce the secular decline in fertility arising from the rising survival rate, or falling mortality rate, as well as the rising levels of human capital investment. Furthermore one possible mechanism of the baby boom is the falling price of space. We are able to replicate the broad pattern of fertility as well as human capital investment.

We also use the parameter κ_t to produce the appropriate secular rise in human capital investment time. We use information on years of schooling by cohort from above as a measure of τ_t. We assume that a period length is 40 years, so that $40\tau_t$ is the years of schooling for the typical individual born in year t.[19] Beyond the scope of this paper is intrastate migration.[20] Thus we used the efficiency of time for schooling, κ_t, as a means to control for these counterfactual schooling levels.

3 Numerical Solutions

We use a similar method to that of Tamura and Simon (2010). We grid possible fertility values from 0 to a biological maximum, θ^{-1}. For a given value of fertility, the problem is concave in the remaining choice variables. We then pick the fertility that maximizes the objective. The figures below present the solutions to the calibrated model. We allowed for preferences to vary, that is we allowed β_t and ν_t to vary by race, state and time, with ν_t becoming constant at .5 no later than 1950.[21] We chose race, state and time varying cost of schooling, κ_{it}^j , $i = 1, ..., 51, j = b, w$, in order to fit black and white schooling at the national level.[22]

Figures 13-17 contain the model solutions compared to the data. In these graphs we present the data, (represented by the solid lines), the state specific model solutions, (represented by triangles), as well as the regional and national model solutions (represented by smaller squares and circles, respectively). Generally all models fit the race specific aggregate fertility and schooling data reasonably. The largest errors occur for regional and national preferences for blacks over the 1860-1950 period, and for regional and national preferences for whites over the 1880-1920 period. Figure 13 shows that the state model can fit both black and white fertility and schooling time series of the US aggregate. All the models, and in particular the state model, capture both the secular trend in fertility for both races, as well as the Baby Boom. The white Baby Boom is produced by the large decline in the price of space. In 1950 the white population density, price of space, is 3.38 and in 1970 it is 2.32.[23] For blacks there is no decline in the price of space between 1950 and 1960, 4.49 and 4.50, and an increase in the price of space in 1970 to 5.02![24] The decline in the

[19] In the numerical solutions we assume that the nonlinear budget constraint provides the possibility that fertility may be at a corner, as in Ehrlich and Lui (1991). Thus our algorithm allows for this, although in practice all choice variables are interior solutions.

[20] There was dramatic emigration from southern US states to northern states in the New England, Middle Atlantic, East North Central and West North Central states from 1920 to 1950. For the moment we are not correcting for this effect.

[21] For whites and blacks separately, we computed regional average values and national average values of β_t and ν_t, weighting by the white and black populations for each time period. We then solved the model with these regional and national preferences in order to judge the robustness of our results on compensating and equilibrating variations.

[22] There are 947 observations on fertility. For the vast majority we used the race specific population density for each state and year. In 85 instances for whites and 55 cases for blacks we used a different value for rental price of space, r than the population density. In the appendix we show that the correlations between the actual population density and the price of space in the model, by race, are very high. The population density for each race and state is computed by averaging the race specific population density of each county in a state, weighting by the race population of the county. This produces a measure of how many people live per square mile for a randomly chosen person in a state.

[23] Interestingly the price of space continues to fall from 1970 to the present, eventually reaching 1.53 in 2000.

[24] In 1980 there is dramatic decline in the price of space for blacks to 3.98 and it remains there, 4.00, in 1990, before declining to 3.76 in 2000.

price of space for whites is one impulse for the white Baby Boom, as their preferences stabilize with $\nu_t = .5$ for 1960 and beyond, and β_t increases from .028 in 1950 to .085 in 1970 before declining again. For blacks, $\nu_t = .5$ for 1960 and beyond, like their white counterparts, but their β_t declines monotonically from 1950 through 1990, and only slightly increases in 2000. Thus for blacks the key feature for their Baby Boom is the decline κ_t. In 1940 the relative κ for blacks was 1.39, and in 1950 it had declined to 1.11. In 1960 it had declined to 1.10 before plummeting to 0.97 in 1970. It falls further in 1980 to .88, stays roughly constant at .90 in 1990 and rises to .98 in 2000. The average values of $\kappa_t^j, j = b, w$, are declining from 1800 and reaching a minimum in 1890. They increase from 1890 until 1950 before declining again until 1970. They rise until 1990 and dip slightly in 2000. Since black price of space is rising during their Baby Boom, and since preferences are not moving towards higher precautionary demand for children, the dramatic decline in κ_t^b over this period is inducing the Black Baby Boom. Figures 18 and 19 present the time series evidence for the price of space,

After producing a model that captures the time series of white and black fertility and schooling, respectively, we move to evaluate the value of improved civil rights to blacks. Recall that we assume that there is no market discrimination in earnings, that is how human capital translates into earnings for an individual. There are differences within states how blacks and whites are treated in housing, and cost of schooling:

$$r_{it}^b \neq r_{it}^w$$
$$\kappa_{it}^b \neq \kappa_{it}^w.$$

In order to compute the welfare loss to blacks of differential prices of space and schooling, we take as inspiration Lucas in his calculations of the welfare cost of business cycles and lower economic growth. Given the identified κ series for whites and blacks, we then conduct counterfactual experiments with both blacks and whites. We ask suppose at a generation t black parents are allowed to have the identical κ_t series that whites faced.[26] We can ask how much additional (less) human capital (wealth) would be needed for a black (white) parent given the prices they faced for space and schooling to have the same utility if they faced white (black) prices for space and schooling. This computes the equilibrating variation. Alternatively we can ask how much additional (less) human capital (wealth) would be needed for a white (black) facing black (white) prices of space and schooling to have the same utility as they had under their historical prices. This computes the compensating variation.[27] Thus all of the value can be captured in the amount of additional human capital a black parent must receive in order to be indifferent between the discriminatory regime and the non discriminatory regime. Let variables denoted by * be the historical (r, κ) regime, and the hat variables be those from the counterfactual regime. Now it is reasonable to ask, what are the nondiscriminatory values of (r, κ) for the nondiscriminatory regime. Since there is considerable variation across states in the price of space as well as in the cost of schooling that produces the model calibration, we chose to use (r, κ) for whites in a state for the blacks in the state. Thus we allow states to vary in (r, κ). Furthermore, since some discrimination in public provision of schooling was done via diversion of black tax dollars and corporate tax revenues to whites, there is some sense that larger black population states would have values of (r, κ) potentially closer to their white counterpart values of (r, κ). erson than when

[26]Here we ignore the possibility that whites tax blacks for schooling and divert the tax revenues from blacks for their own children's education, c.f. Canaday and Tamura (2009).

[27]We can allow blacks to have their own price of space series, r , in order to allow for different residential locations, i.e., urban and rural densities.

they are more populous.

Let $({}_bc^*_{it}, {}_bS^*_{it}, {}_bx^*_{it}, {}_bh_{i,t+1]^*})$ as the optimal choices for state i blacks facing their prices, $(r^b_{it}, \kappa^b_{it})$. Let $({}_b\hat{c}_{it}, {}_b\hat{S}_{it}, {}_b\hat{x}_{it}, {}_b\hat{h}_{i,t+1})$ be the optimal choices for state i blacks facing the prices of their white counterparts, $(r^w_{it}, \kappa^w_{it})$. The equilibrating variation is given implicitly by:

$$v((1+\lambda^b_{eq})_bh_t|r^b_t,\kappa^b_t) = \alpha\left({}_bc^{*\psi}_t\,{}_bS^{*1-\psi}_t\right)^{\varphi}\left[(1-{}_b\,\delta_t)_bx^*_t - a\right]^{1-\varphi} + \Lambda(Z_bh^*_{t+1})^{\varphi}(1-\frac{\beta_{tb}\delta^{\nu_t}_t}{[(1-{}_b\,\delta_t)_bx^*_t-a]\,(1-{}_b\,\delta_t)})$$
$$= v({}_bh_t|r^w_t,\kappa^w_t) = \alpha\left({}_b\hat{c}^{\psi}_t\,{}_b\hat{S}^{1-\psi}_t\right)^{\varphi}\left[(1-{}_b\,\delta_t)_b\hat{x}_t - a\right]^{1-\varphi} + \Lambda(Z_b\hat{h}_{t+1})^{\varphi}(1-\frac{\beta_{tb}\delta^{\nu_t}_t}{[(1-{}_b\,\delta_t)_b\hat{x}_t-a]\,(1-{}_b\,\delta_t)}) \quad (9)$$

Furthermore we can compute the compensating consumption variation for blacks. Again using the notation * to denote the counterfactual (r, κ) regime, and the hat variables be those from the historical regime, the compensating variation is given by:

$$v({}_bh_t|r^b_t,\kappa^b_t) = \alpha\left({}_bc^{*\psi}_t\,{}_bS^{*1-\psi}_t\right)^{\varphi}\left[(1-{}_b\,\delta_t)_bx^*_t - a\right]^{1-\varphi} + \Lambda(Z_bh^*_{t+1})^{\varphi}(1-\frac{\beta_{tb}\delta^{\nu_t}_t}{[(1-{}_b\,\delta_t)_bx^*_t-a]\,(1-{}_b\,\delta_t)})$$
$$= v((1+\mu^b_{comp})_bh_t|r^w_t,\kappa^w_t) = \alpha\left({}_b\hat{c}^{\psi}_t\,{}_b\hat{S}^{1-\psi}_t\right)^{\varphi}\left[(1-{}_b\,\delta_t)_b\hat{x}_t - a\right]^{1-\varphi} + \Lambda(Z_b\hat{h}_{t+1})^{\varphi}(1-\frac{\beta_{tb}\delta^{\nu_t}_t}{[(1-{}_b\,\delta_t)_b\hat{x}_t-a]\,(1-{}_b\,\delta_t)}) \quad (10)$$

Let $({}_wc^*_{it}, {}_wS^*_{it}, {}_wx^*_{it}, {}_wh_{i,t+1]^*})$ as the optimal choices for state i whites facing their prices, $(r^w_{it}, \kappa^w_{it})$. Let $({}_w\hat{c}_{it}, {}_w\hat{S}_{it}, {}_w\hat{x}_{it}, {}_w\hat{h}_{i,t+1})$ be the optimal choices for state i whites facing the prices of their black counterparts, $(r^b_{it}, \kappa^b_{it})$. The equilibrating variation is given implicitly by:

$$v((1+\lambda^w_{eq})_wh_t|r^w_t,\kappa^w_t) = \alpha\left({}_wc^{*\psi}_t\,{}_wS^{*1-\psi}_t\right)^{\varphi}\left[(1-{}_w\,\delta_t)_wx^*_t - a\right]^{1-\varphi} + \Lambda(Z_wh^*_{t+1})^{\varphi}(1-\frac{\beta_{tw}\delta^{\nu_t}_t}{[(1-{}_w\,\delta_t)_wx^*_t-a]\,(1-{}_w\,\delta_t)})$$
$$= v({}_wh_t|r^b_t,\kappa^b_t) = \alpha\left({}_w\hat{c}^{\psi}_t\,{}_w\hat{S}^{1-\psi}_t\right)^{\varphi}\left[(1-{}_w\,\delta_t)_w\hat{x}_t - a\right]^{1-\varphi} + \Lambda(Z_w\hat{h}_{t+1})^{\varphi}(1-\frac{\beta_{tw}\delta^{\nu_t}_t}{[(1-{}_w\,\delta_t)_w\hat{x}_t-a]\,(1-{}_w\,\delta_t)}) \quad (11)$$

We can compute the compensating consumption variation for whites. Again using the notation * to denote the counterfactual (r, κ) regime, and the hat variables be those from the historical regime, the compensating variation is given by:

$$v({}_wh_t|r^w_t,\kappa^w_t) = \alpha\left({}_wc^{*\psi}_t\,{}_wS^{*1-\psi}_t\right)^{\varphi}\left[(1-{}_w\,\delta_t)_wx^*_t - a\right]^{1-\varphi} + \Lambda(Z_wh^*_{t+1})^{\varphi}(1-\frac{\beta_{tw}\delta^{\nu_t}_t}{[(1-{}_w\,\delta_t)_wx^*_t-a]\,(1-{}_w\,\delta_t)})$$
$$= v((1+\mu^w_{comp})_wh_t|r^b_t,\kappa^b_t) = \alpha\left({}_w\hat{c}^{\psi}_t\,{}_w\hat{S}^{1-\psi}_t\right)^{\varphi}\left[(1-{}_w\,\delta_t)_w\hat{x}_t - a\right]^{1-\varphi} + \Lambda(Z_w\hat{h}_{t+1})^{\varphi}(1-\frac{\beta_{tw}\delta^{\nu_t}_t}{[(1-{}_w\,\delta_t)_w\hat{x}_t-a]\,(1-{}_w\,\delta_t)}) \quad (12)$$

In our calibration we allowed for variation in both preference parameters over time and across race, that is to say, β_{it} and ν_{it} are allowed to vary both by race, state and time in order to fit the observed race and state time series of schooling and fertility. In order to get a feel for the robustness of our estimates, we compute the equilibrating consumption variation for whites as well.

The virtue of the data is that blacks and whites faced differential prices of space, given by their respective population densities, r. The observed differences in fertility and schooling produces an estimate of differential schooling costs, for a given set of preferences. From above, we can see that the equilibrating variation for blacks should be similar to the compensating variation for whites, and vice versa.[28]

[28]Except for the limiting case of zero mortality risk, preferences of whites and blacks differ due to differences in the β and

In order to compute the compensating and equilibrating variations, we approximate them using the result contained in the statement of the parent's problem in (8) above. For any fertility, x, and schooling choice, τ, adult consumption, c and space per child, S, are linear functions of parental human capital, h. If there was no spillover in human capital accumulation, then the utility of a parent would be homogeneous of degree φ in h. We use this result to approximate for both $\lambda^i, \mu^i, i = b, w$. Thus we compute these via:

$$\lambda^b \approx \left[\frac{v({}_bh_t|r_t^w, \kappa_t^w)}{v({}_bh_t|r_t^b, \kappa_t^b)}\right]^{\frac{1}{\varphi}} - 1 \tag{13}$$

$$\mu^b \approx \left[\frac{v({}_bh_t|r_t^b, \kappa_t^b)}{v({}_bh_t|r_t^w, \kappa_t^w)}\right]^{\frac{1}{\varphi}} - 1 \tag{14}$$

$$\lambda^w \approx \left[\frac{v({}_wh_t|r_t^b, \kappa_t^b)}{v({}_wh_t|r_t^w, \kappa_t^w)}\right]^{\frac{1}{\varphi}} - 1 \tag{15}$$

$$\mu^w \approx \left[\frac{v({}_wh_t|r_t^w, \kappa_t^w)}{v({}_wh_t|r_t^b, \kappa_t^b)}\right]^{\frac{1}{\varphi}} - 1 \tag{16}$$

We assume in the model that the major source of discrimination is in the unequal cost of schooling, different κ for whites and blacks in the same state. We report the results for three different regimes, state and race specific, region and race specific and nation race specific preferences. For each regime we computed the compensating and equilibrating variations for whites and blacks for three counterfactuals: (1) r, (2) κ, (3) (r, κ). Almost all of the action occurs in the second case, κ, and therefore we only present the results for this case and the (r, κ) case in the figures and tables.

Figures 19 contains the results of the analyses for the nation. We computed the equilibrating variations for blacks, both for κ and (r, κ), and averaged over the states weighting by the state black population. These are the red curves in the top half of figure 19. The solid red curve comes from the state preference model, while the circles and squares come from the nation and region preference models, respectively. These are paired with the compensating variations for whites, both for κ and (r, κ), and expressed relative to black human capital in the state, and averaged over the states weighting by the state black population.[29] There is generally strong agreement with respect to the results obtained via the state preferences relative to those from national or regional preferences. The 1840-1880 period shows the greatest difference between the three models. There is good agreement between the black equilibrating variation and white compensating variation, which provides comfort to us, given that we allowed race specific preferences in values of β and ν. We find that the cost of discrimination peaked during the 1840-1860 period, the height of slavery. For blacks the equilibrating variation was roughly 10 times their wealth during this period! Had whites been subjected to the same discrimination in schooling, their welfare loss would have been on the order of 20 times black wealth. After the end of the Civil War, these costs decline substantially.

In the bottom half of figure 19 we present the equilibrating variation for whites, both for κ and (r, κ), and average over the states weighting by the state white population. We also present the compensating variation

ν terms in the precautionary component. Otherwise the compensating variation and equilibrating variation would be similar except for income differences and the minimum fertility value, a.

[29] We expressed the white compensating differentials relative to black human capital in order to compare the total cost of discriminatory prices in black wealth units for each race. Furthermore we computed the national average of white compensating differentials using black population weights so that the differential residential patterns of whites and blacks do not influence the average.

for blacks, both for κ and (r, κ), and average over the states weighting by the state white population. Since in these cases for most of the years $\kappa_t^b > \kappa_t^w$, the equilibrating variation for whites and the compensating variation for blacks will be negative, but bounded below by -1, we expressed left these as shares of their respective race human capital. Again we are generally pleased that the state model results are robust to aggregation of preferences. For whites the would have been willing to give up roughly 20 percent of their wealth to keep their schooling costs from becoming as bad as those faced by their state counterpart blacks. For blacks they would have been willing to give up roughly 70 percent of their wealth in order to obtain the white prices for schooling in their states.

Figure 20 presents the equilibrating variations for blacks and compensating variations for whites by census region, and figure 21 presents the equilibrating variations for whites and compensating variations for blacks by census regions for the κ case. Figures 22 and 23 repeat the information, but for the (r, κ) case.[30] In order to reduce clutter we only present the results for the state preference model. Much of the information for the national and regional preference model is contained in Tables 8-11. Clearly the most discriminatory regimes were the former Confederate slave states of the South Atlantic, East and West South Central states.

We now turn to Tables 8-11 to examine some of the subperiods in the data. We only present the results for λ_κ^i and $\mu_\kappa^i, i = b, w$ One thing that stands out is that the pairing $(\lambda_\kappa^b, \mu_\kappa^w)$ and $(\lambda_\kappa^w, \mu_\kappa^b)$ do produce similar results. As such we confine are remarks to λ_κ^b and μ_κ^b. For equilibrating variations, for all years, the former Confederate slave states imposed the harshest discrimination on blacks. In these regions, the welfare cost of discrimination ranged from 80 percent of wealth to 250 percent of wealth over the entire history. Outside of these regions, the welfare cost to blacks ranged from a low of .7 percent of wealth (Pacific region) to 40 percent of wealth (West North Central region). Most of these costs are clearly borne by the earliest generations. Prior to the Civil War, the three southern regions imposed welfare costs on blacks that range from almost 5 times wealth to almost 10 times wealth! Outside of these regions the welfare costs range from a low of 1.7 times wealth (New England) to 4.23 times wealth (Mountain). The end of slavery clearly improved welfare for blacks in all regions. Examining the Reconstruction period, defined in the table as 1870-1890, we see that discrimination dropped substantially, but was still horrendous! The welfare cost ranges from almost 3.5 times wealth to 5.8 times wealth! Again outside of the south, the welfare cost ranges from a low .83 times wealth (New England) and a high of 3.0 times wealth (Mountain). Overall for the country, prior to 1870 the welfare cost of discrimination was about 7 times wealth, but over Reconstruction it was 4.5 times wealth. The Jim Crow era, 1900-1950, is interesting because despite continued discrimination, blacks of this era are better off than their counterparts under Reconstruction. In the three southern Confederate regions, the welfare cost ranged from 83 percent of wealth to 170 percent of wealth. Outside of the south, the welfare cost ranged from 3 (Pacific) percent of wealth to 44 percent of wealth (West North Central). Finally in the Civil Rights period, 1960-2000, we find that blacks actually enjoy better costs of schooling than their white counterparts. For the US as a whole during this period, they gained .4 percent of wealth. The largest of these gains are for the three southern regions, ranging from .8 percent of wealth to 1.8 percent of wealth.[31]

[30] As in the previous figures, the equilibrating variations for blacks and the compensating variations for whites are expressed relative to state black human capital. The averages are from black population weights. The equilibrating variations for whites and compensating variations for blacks are expressed relative to their own human capital. The averages are from white population weights.

[31] We believe that this is completely driven by looking only at years of schooling, a quantity measure, and not including quality of schooling. Furthermore if whites choose disproportionately to educate their children in private schools, this raises

When examining the compensating variation for blacks, the μ_κ^b case in Table 11, we seem similar results with one notable exception. During Reconstruction, we do not see much improvement for blacks in the three southern regions. During both the pre Civil War period and the Reconstruction period, blacks in these regions were willing to give up roughly 75 precent of their wealth in order to get equivalent access to education as their white counterparts.[32] As before, however, the Jim Crow era was markedly better for the typical black than their earlier cohort. Similar to the equilibrating variation above, the Civil Rights era indicate that blacks gained in the south roughly .6 to 1.3 percent of wealth due to better schooling opportunities.[33]

We can judge the robustness of these results by examining the results arising from mortality. As previously documented there were strong racial differences in mortality risks. Blacks generally faced much higher mortality risk in every region of the country. We can produce equilibrating and compensating variations for whites and blacks by counterfactually presenting them with different mortality risks. Figures 24 and 25 and Tables 12-15 present the results of this experiment, again for national, regional and state racial specific preferences. Furthermore we breakdown the years in the same manner as the previous tables. We find that the results are quite similar to the results based on discrimination of schooling access.

The major difference is that the highest period of disadvantage occurs during the Reconstruction period, 1870-1890. Here is the beginning of the black movement to more urban areas, and prior to the arrival of modern water treatment.

In the next version of this paper we will add tests relative to the relative human capital of blacks to whites by states using the 1940-2000 censuses. Figures 26-27 contain the time series of human capital of whites and blacks by region.

5 Conclusion

To be added.

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the cost of schooling to them relative to blacks. We further believe that whites in the south were more likely to choose private schooling compared to their northern counterparts. We leave it to the next version of this paper to document this result.

[32] However when examining the white compensating variations and white equilibrating variations, we do observe strong improvements during Reconstruction as opposed to the pre Civil War period.

[33] Again see previous footnote for caveats in this result!

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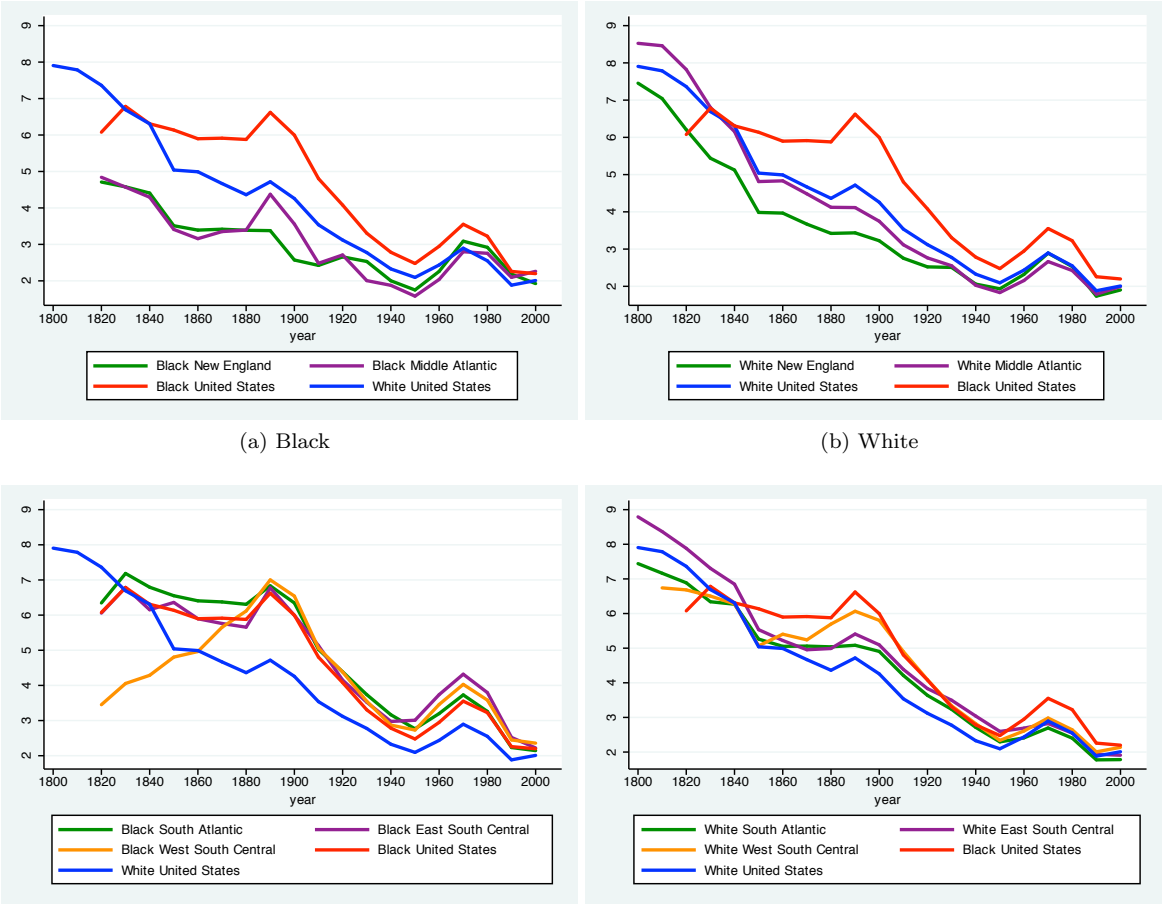


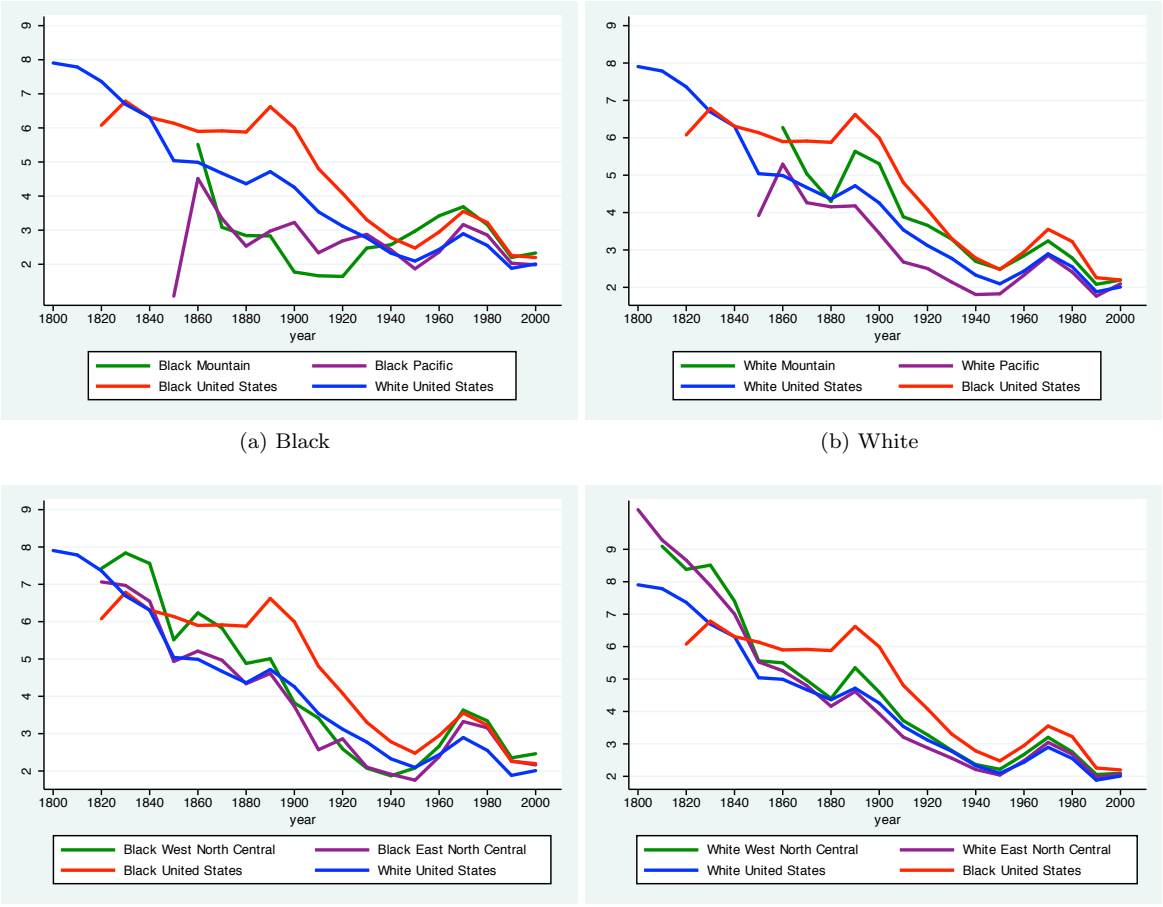
(a) Black

(b) White

(c) Black

(d) White

Figure 1: Cohort Black and White Fertility



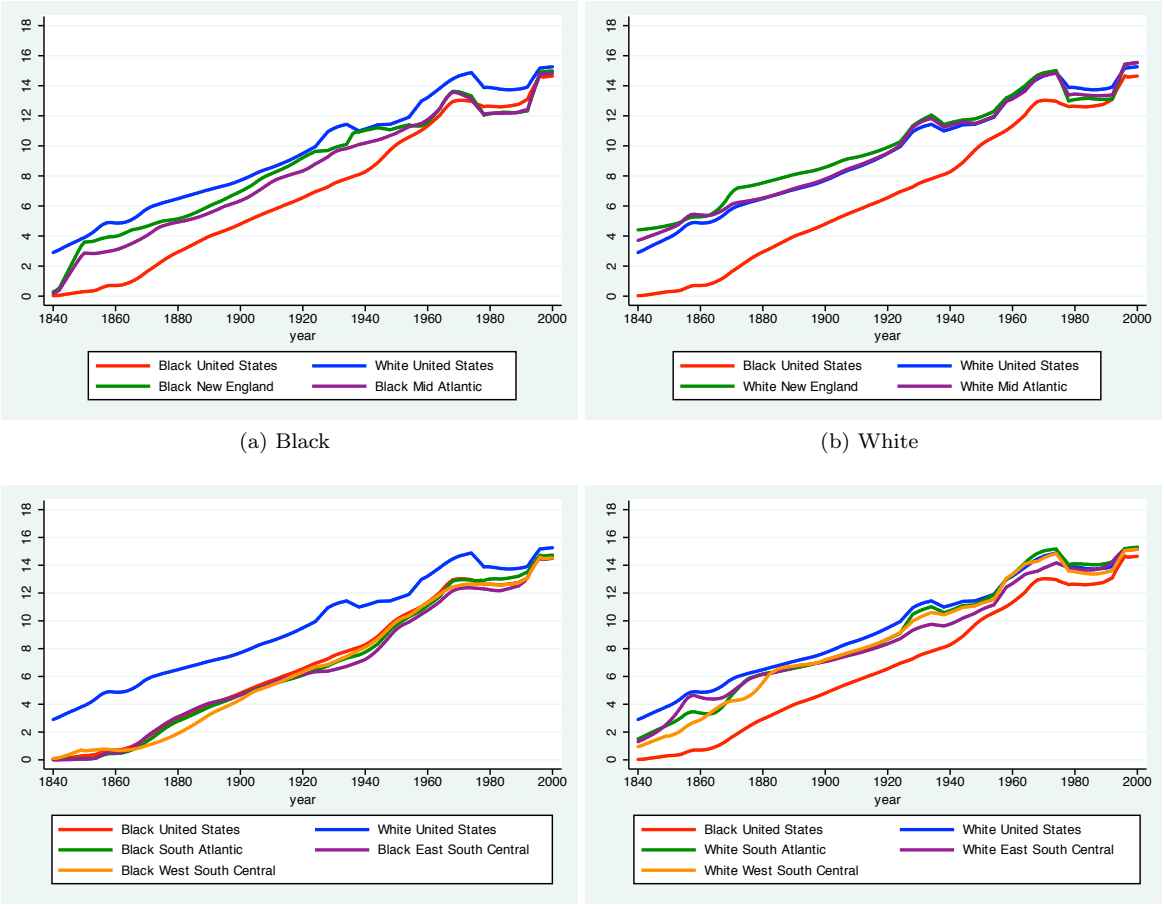
(a) Black

(b) White

(c) Black

(d) White

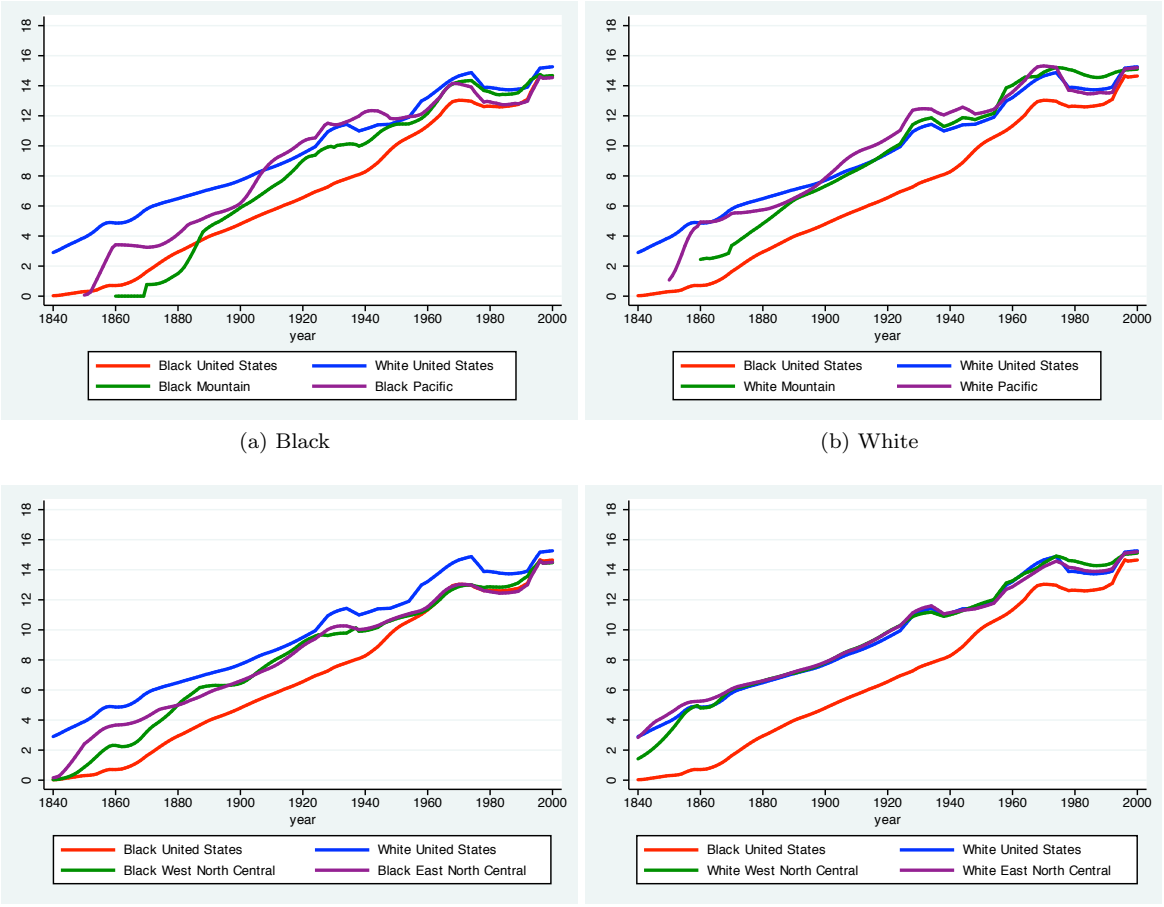
Figure 2: Cohort Black and White Fertility



(a) Black (b) White

(c) Black (d) White

Figure 3: Cohort Black and White Schooling



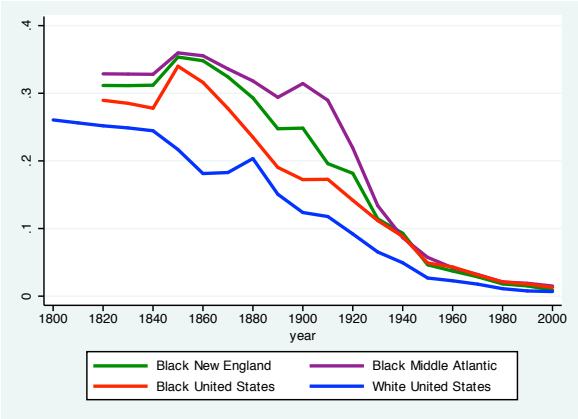
(a) Black

(b) White

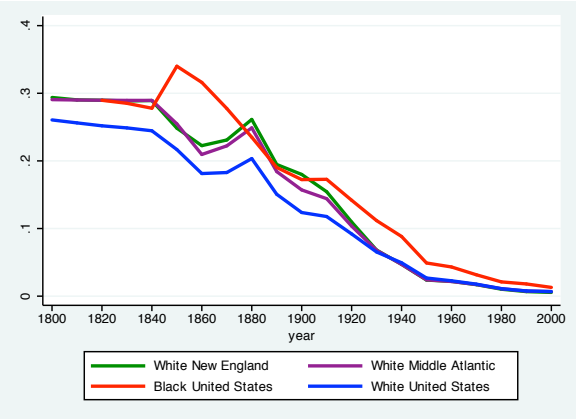
(c) Black

(d) White

Figure 4: Cohort Black and White Schooling



(a) Black



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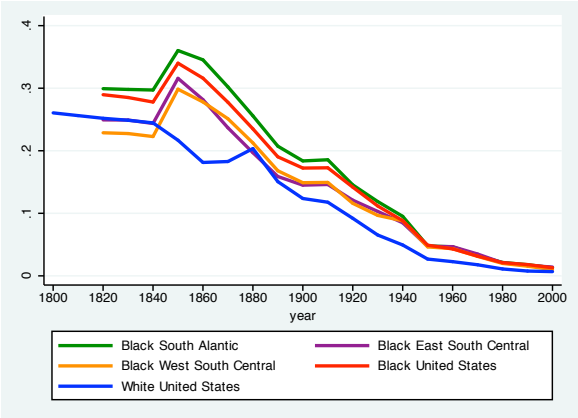

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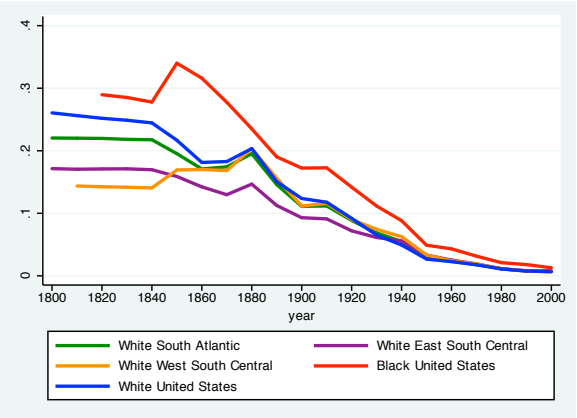
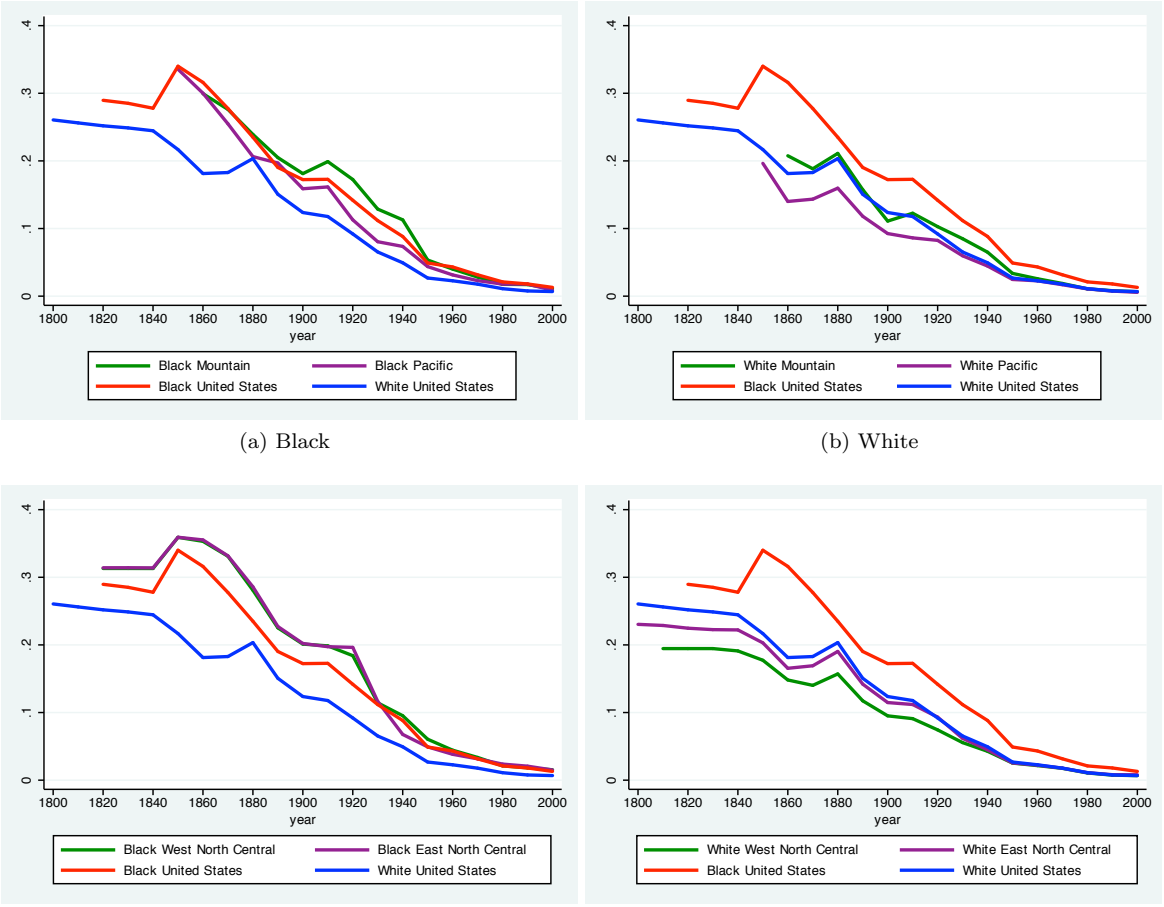


(d) White

Figure 5: Cohort Black and White Infant Mortality



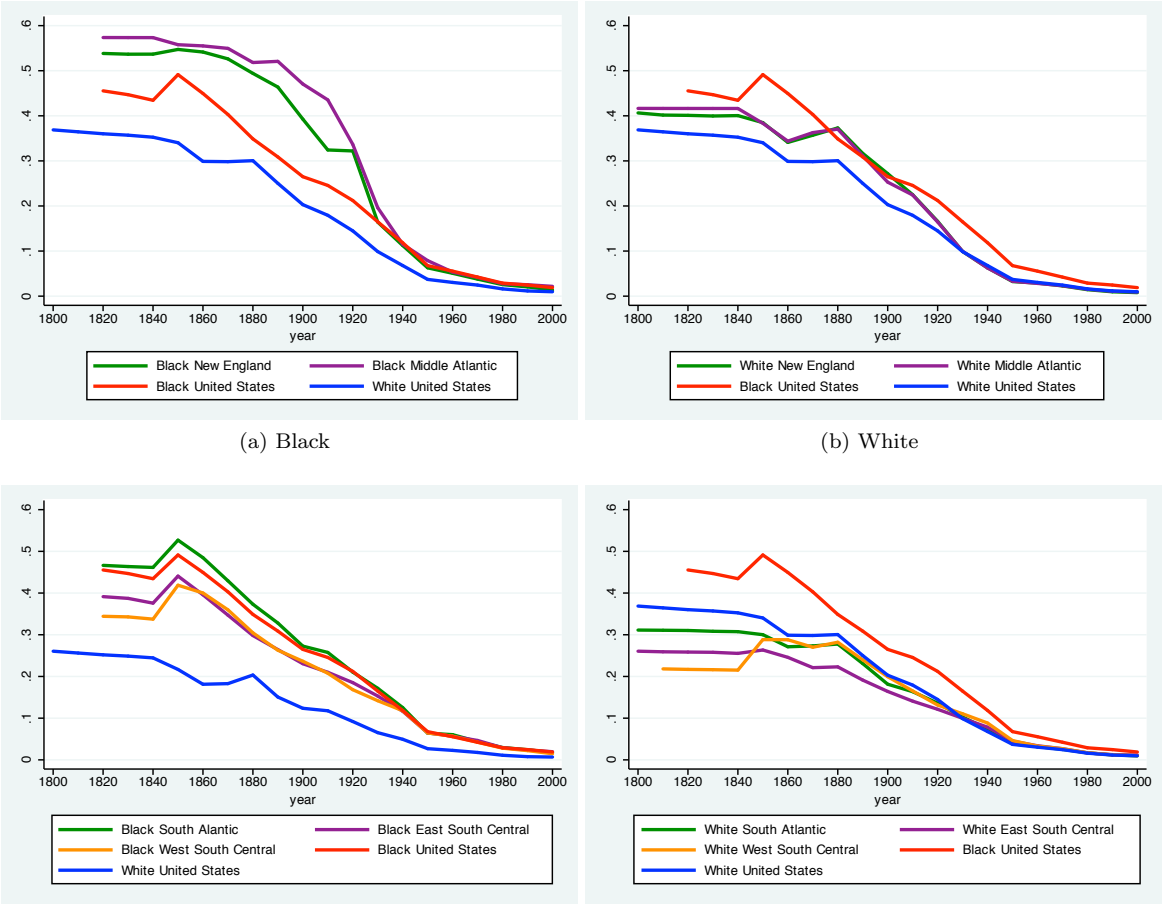
(a) Black

(b) White

(c) Black

(d) White

Figure 6: Cohort Black and White Infant Mortality



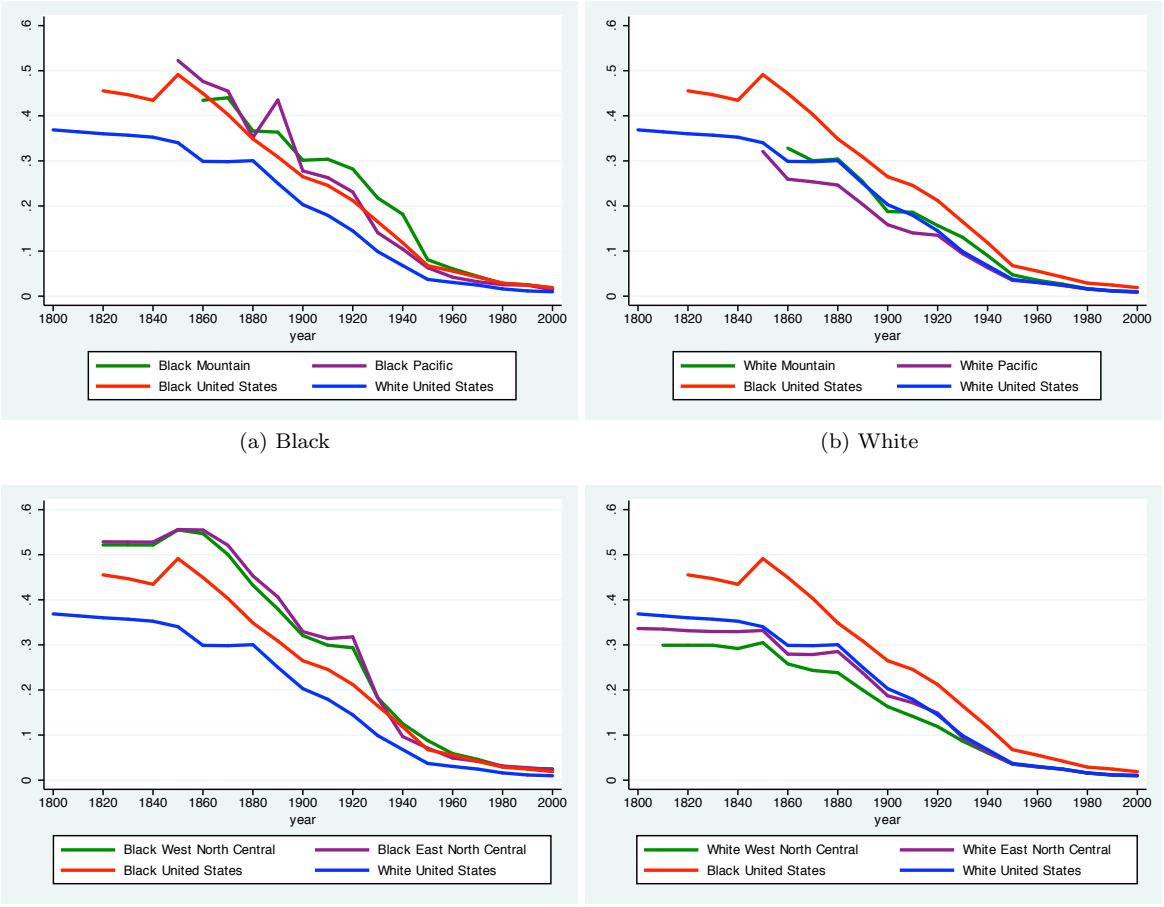
(a) Black

(b) White

(c) Black

(d) White

Figure 7: Cohort Black and White Mortality Before 15



(a) Black

(b) White

(c) Black

(d) White

Figure 8: Cohort Black and White Mortality Before 15

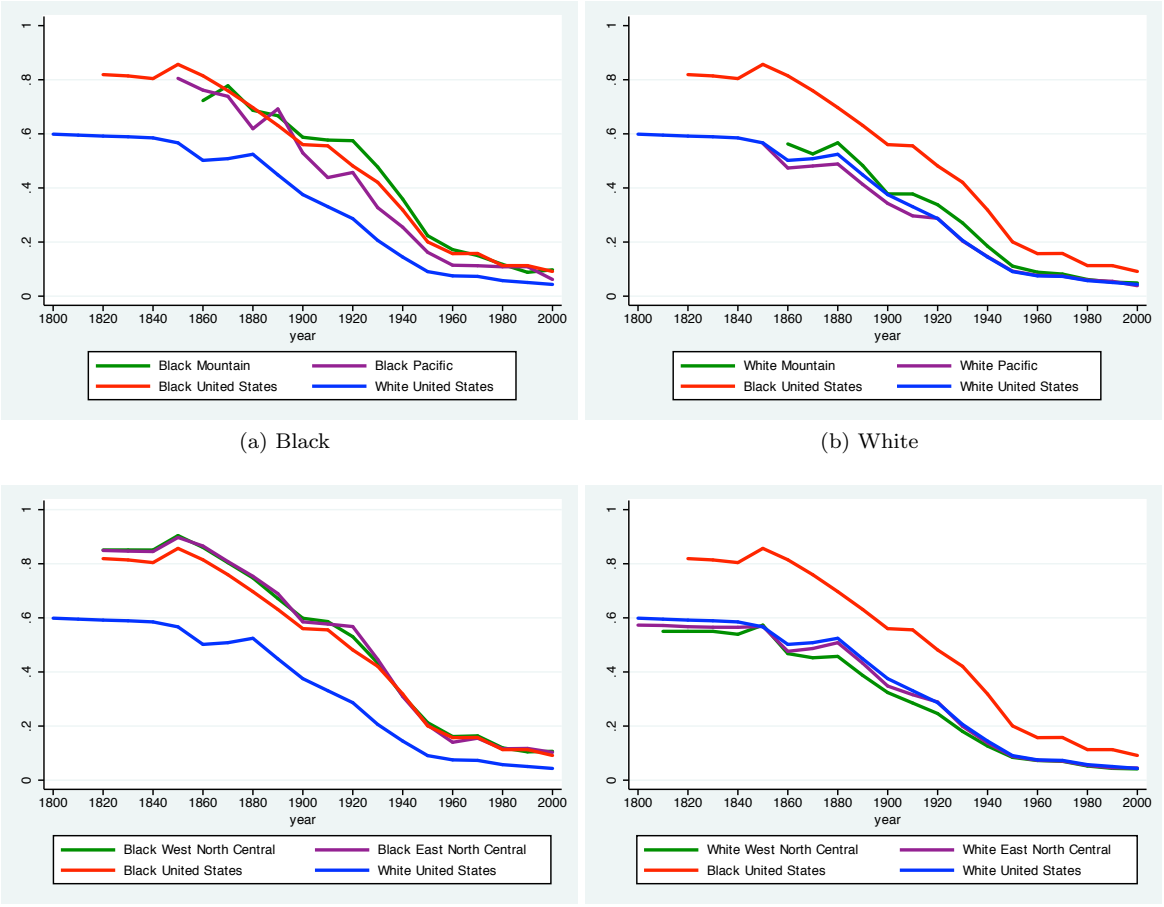
(a) Black

(b) White

(c) Black

(d) White

Figure 9: Cohort Black and White Mortality Before 45



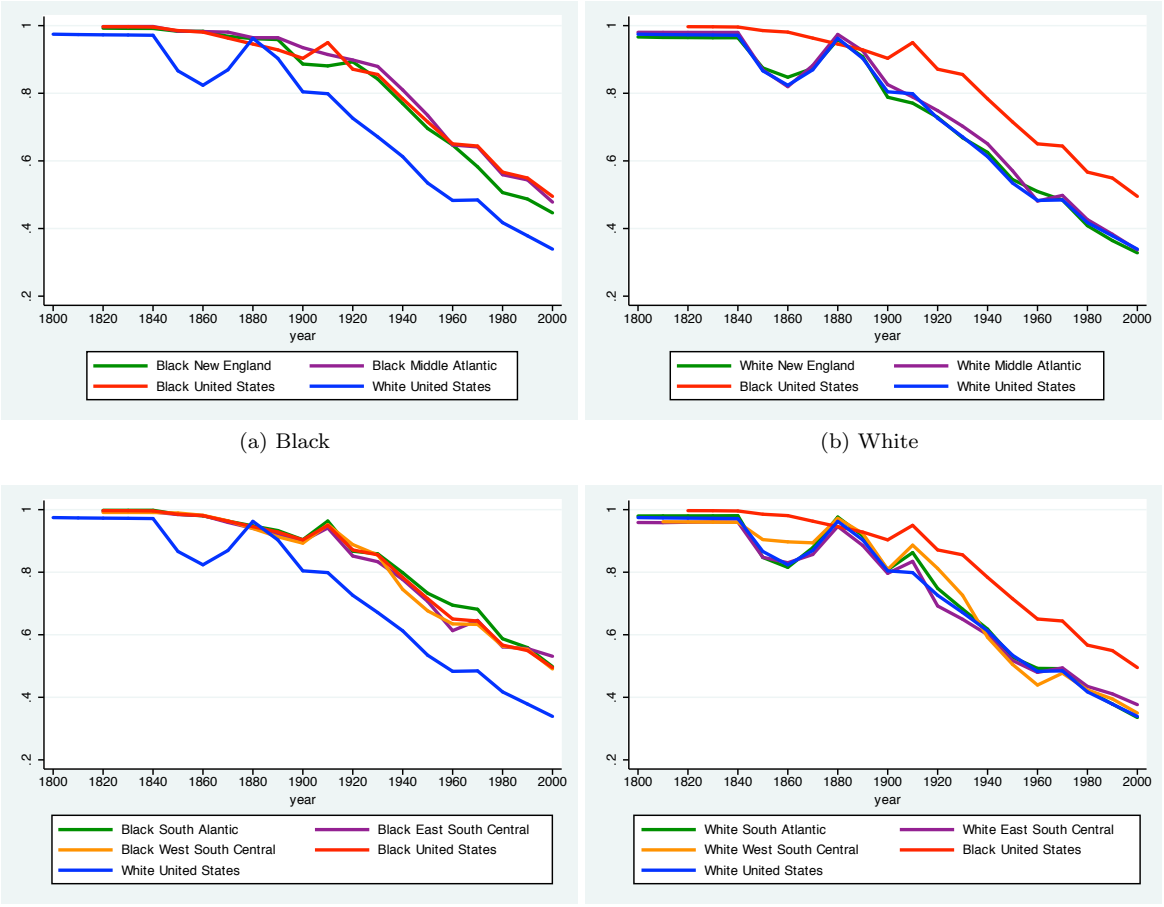
(a) Black

(b) White

(c) Black

(d) White

Figure 10: Cohort Black and White Mortality Before 45



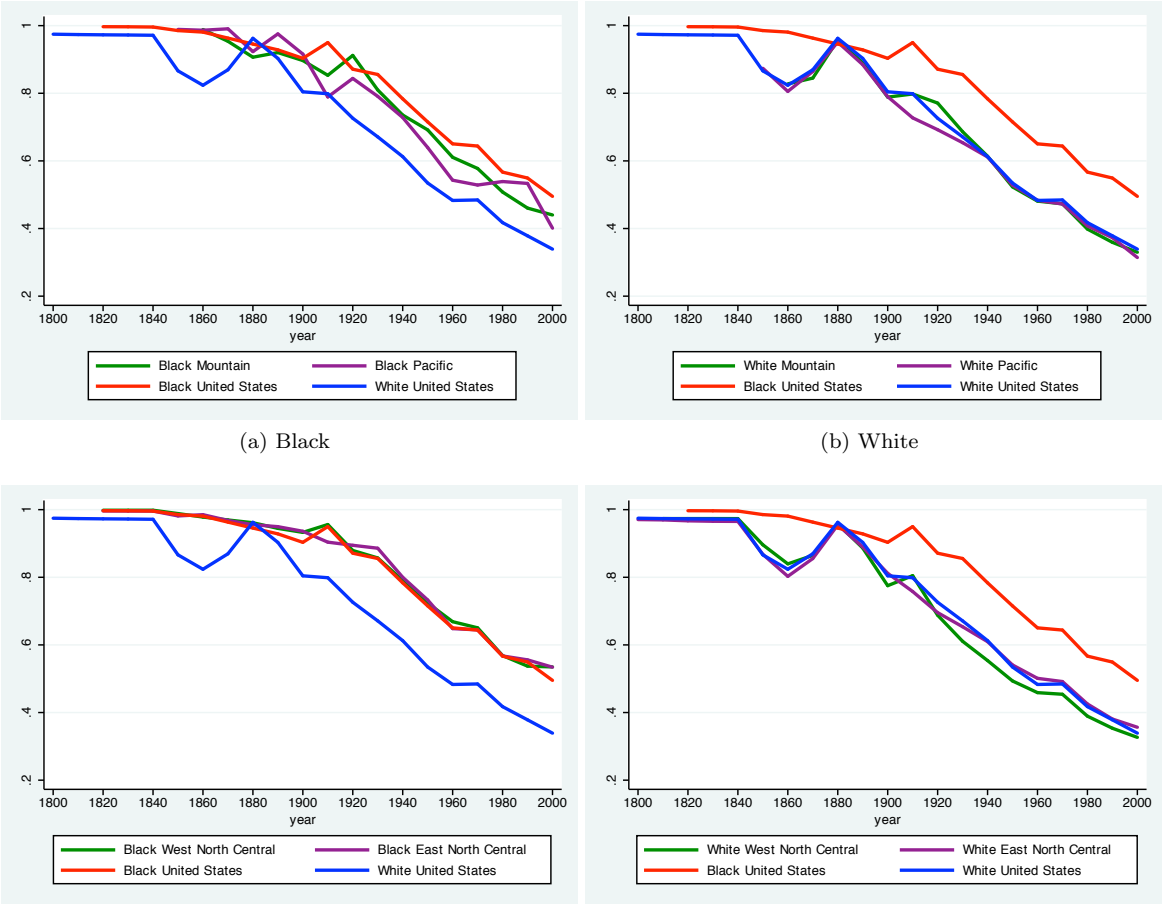
(a) Black

(b) White

(c) Black

(d) White

Figure 11: Cohort Black and White Mortality Before 75



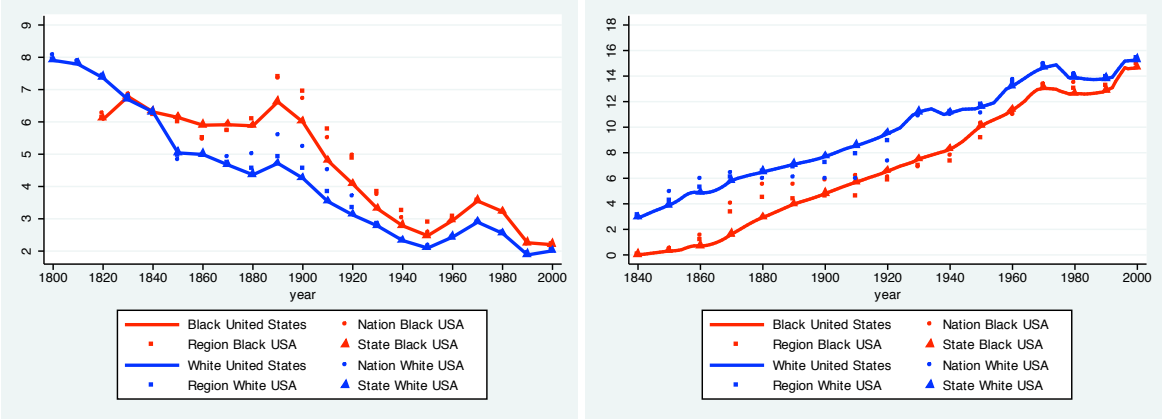
(a) Black

(b) White

(c) Black

(d) White

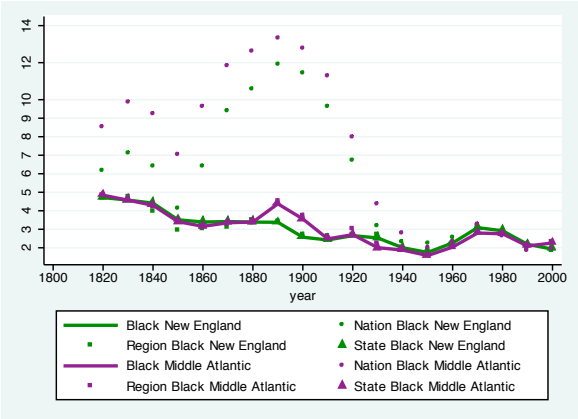
Figure 12: Cohort Black and White Mortality Before 75



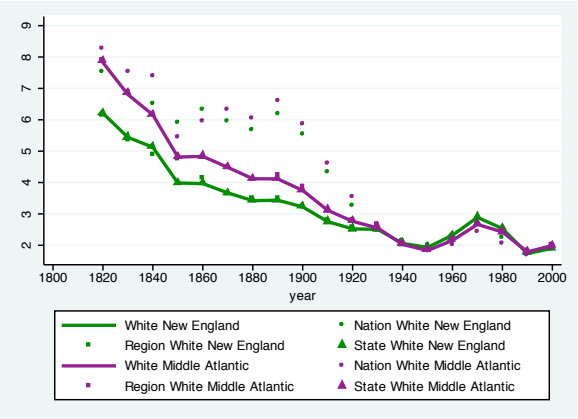
(a) Fertility: Data and Model

(b) Schooling: Data and Model

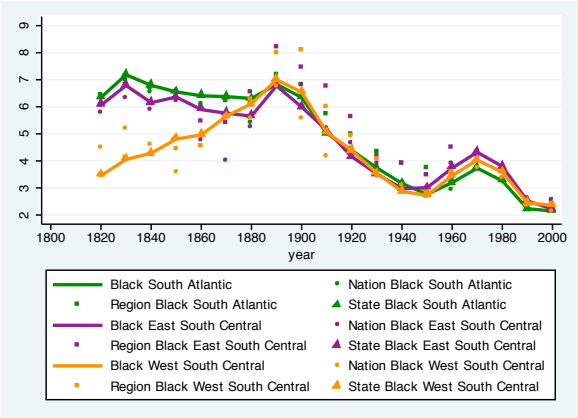
Figure 13: Cohort Black and White Fertility and Schooling



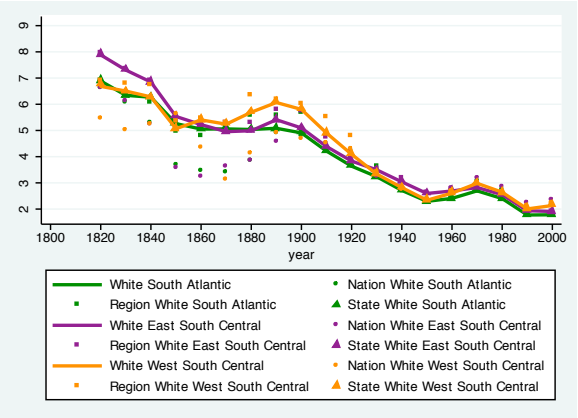
(a) Black



(b) White

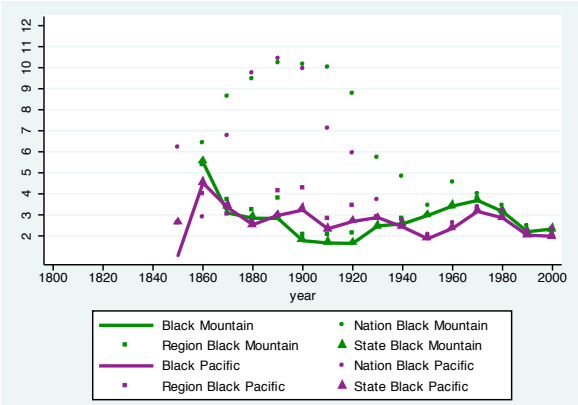


(c) Black

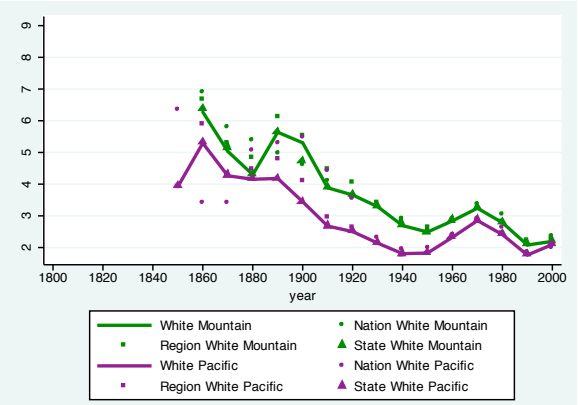


(d) White

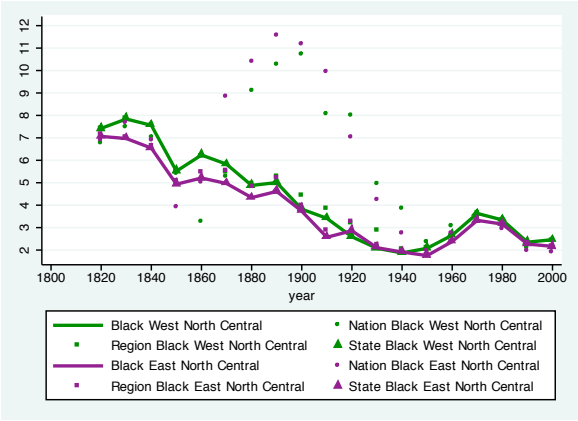
Figure 14: Cohort Black and White Fertility



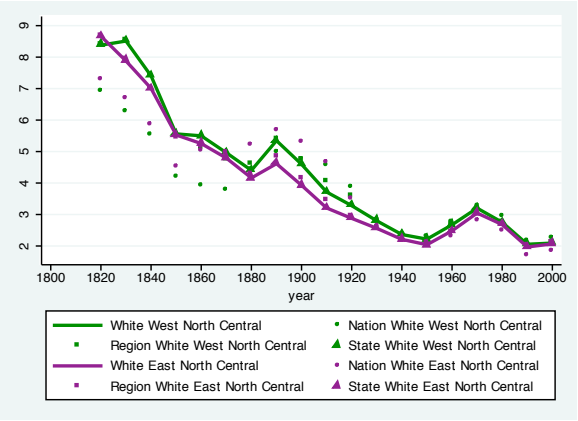
(a) Black



(b) White

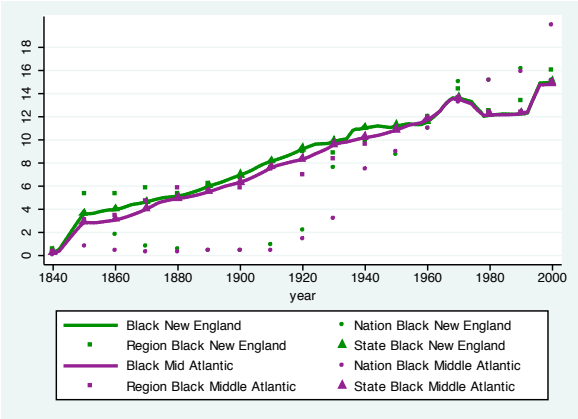


(c) Black

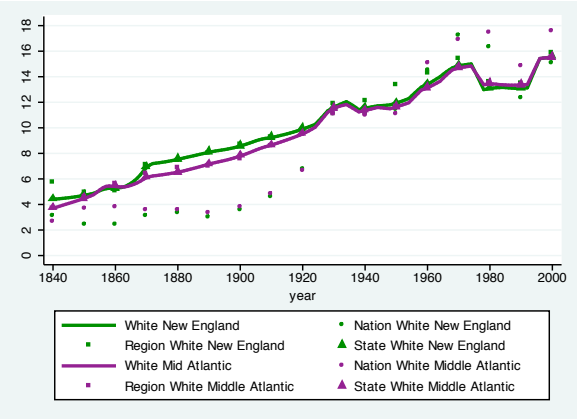


(d) White

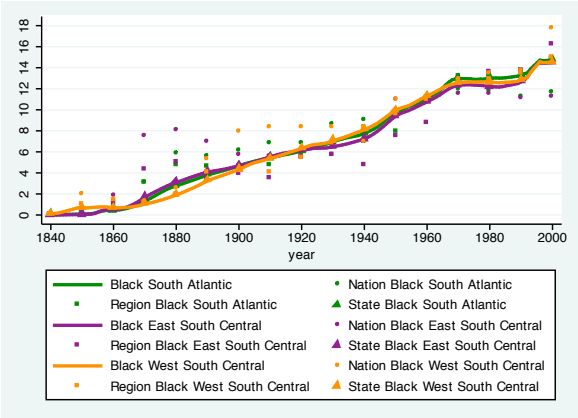
Figure 15: Cohort Black and White Fertility



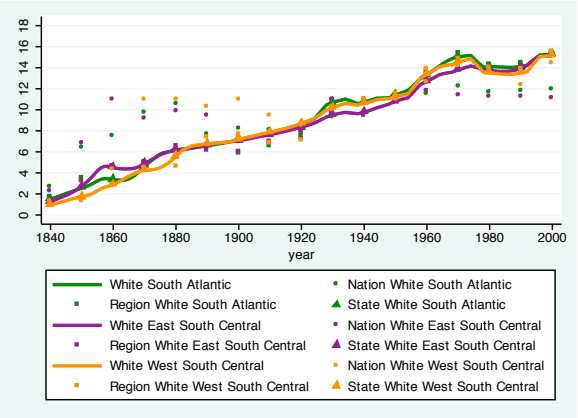
(a) Black



(b) White

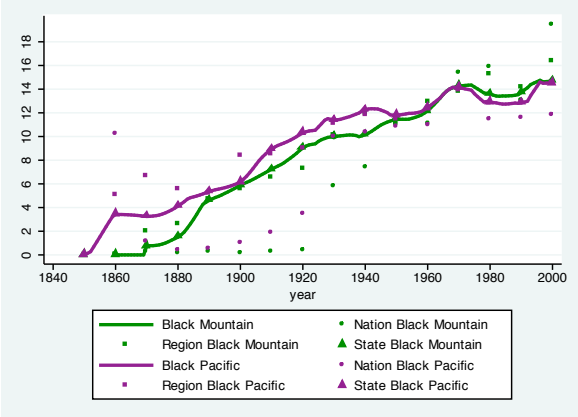


(c) Black

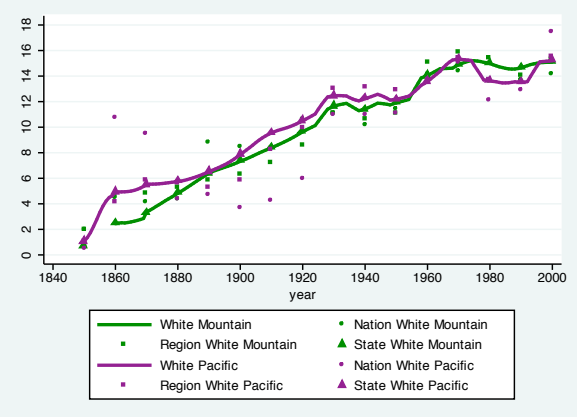


(d) White

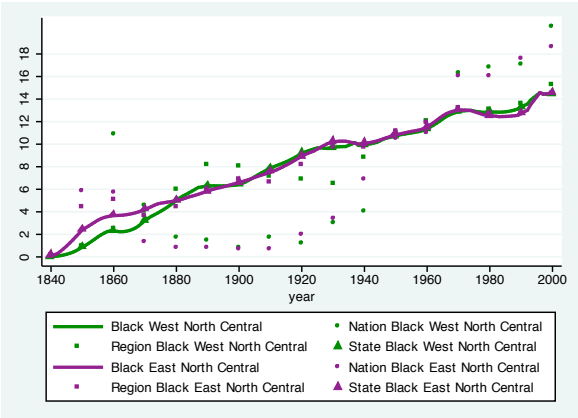
Figure 16: Cohort Black and White Schooling



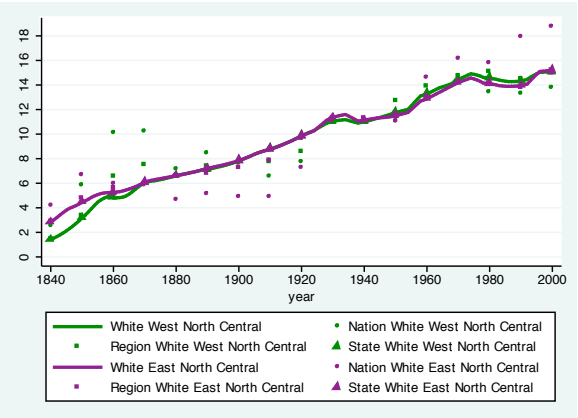
(a) Black



(b) White



(c) Black



(d) White

Figure 17: Cohort Black and White Schooling

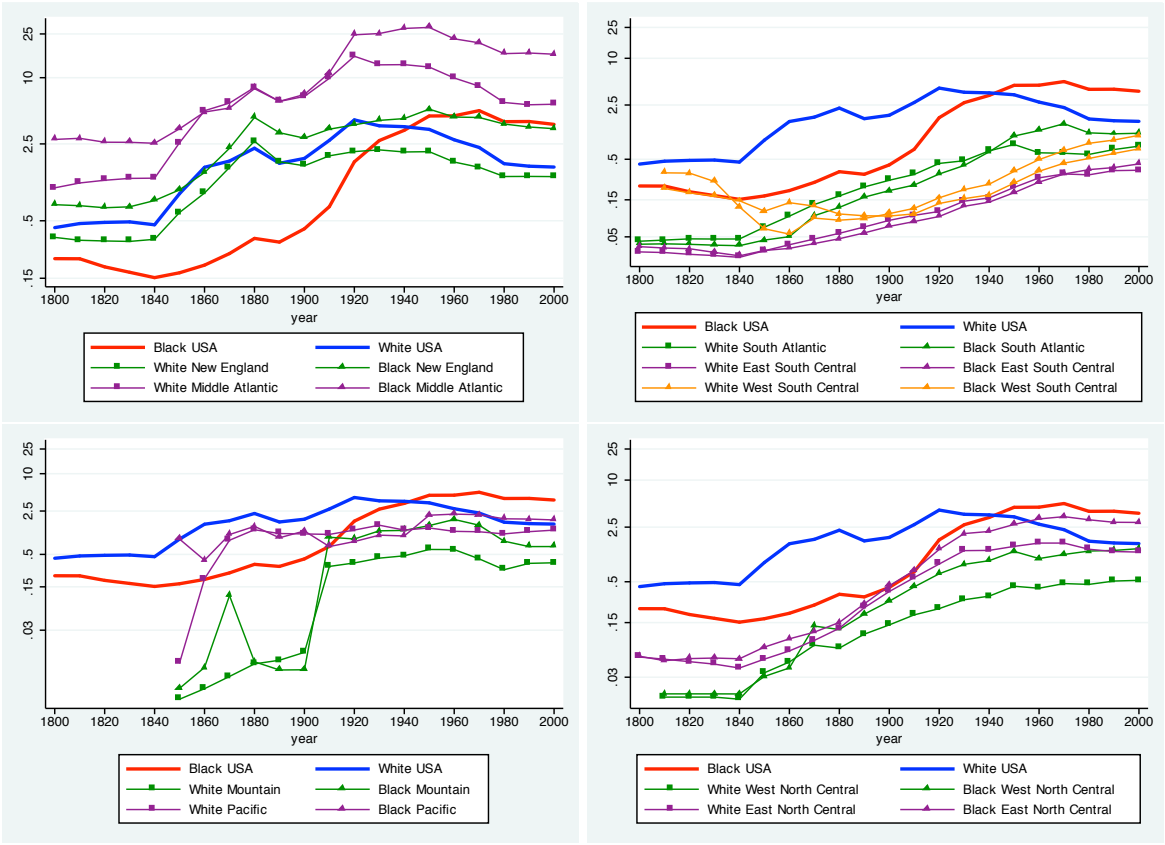


Figure 18: Black and White Price of Space,

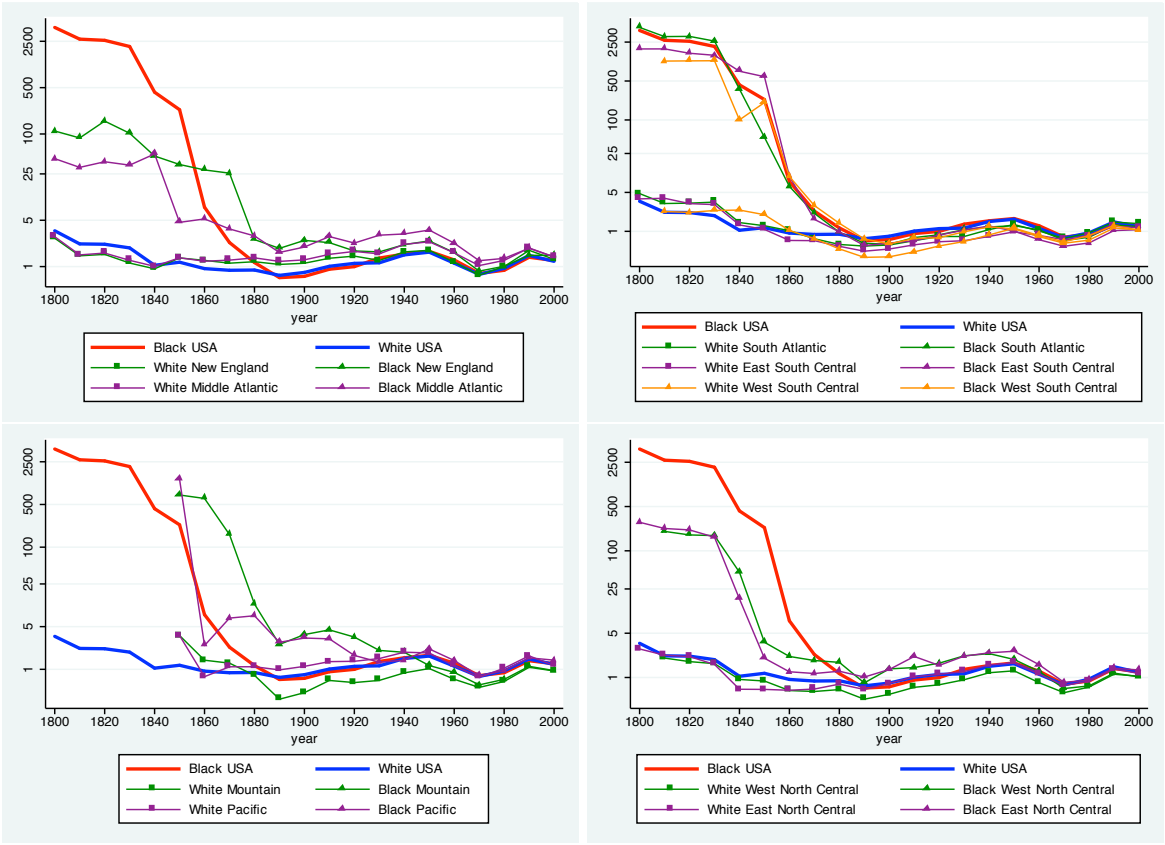


Figure 19: Black and White Cost of Schooling, $\kappa_t^{b,w}$

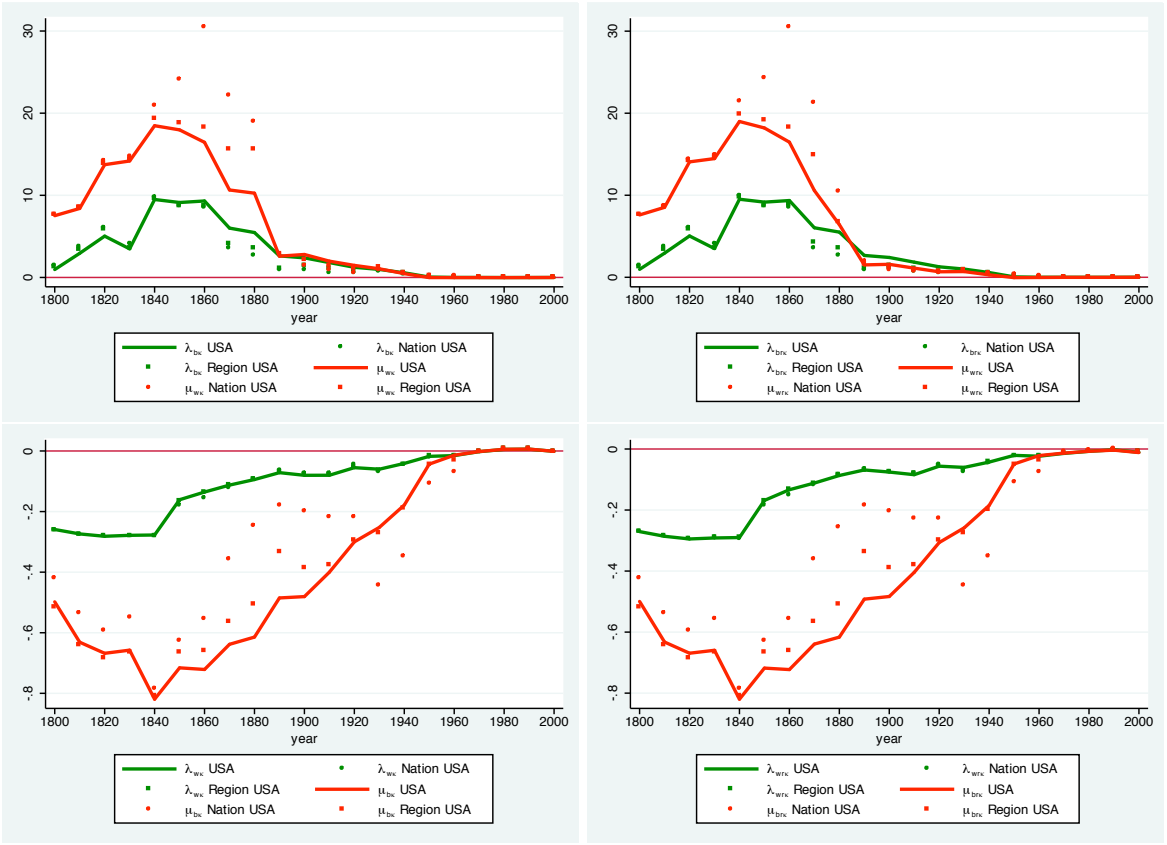
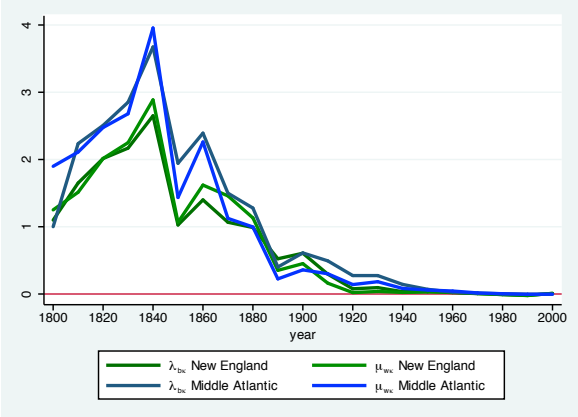
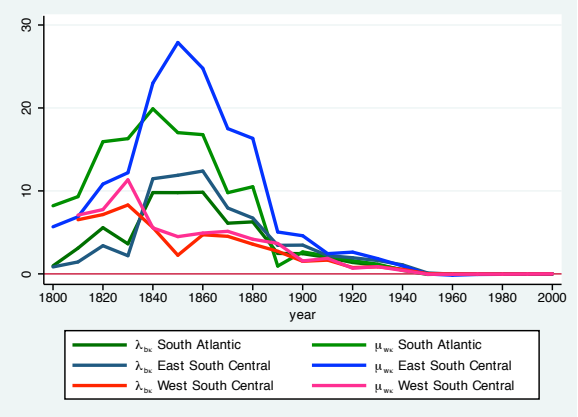


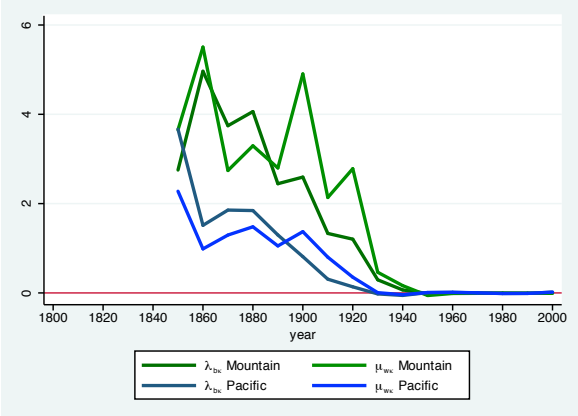
Figure 20: $\lambda^b_\kappa, \mu^w_\kappa, \lambda^b_{r\kappa}, \mu^w_{r\kappa}$



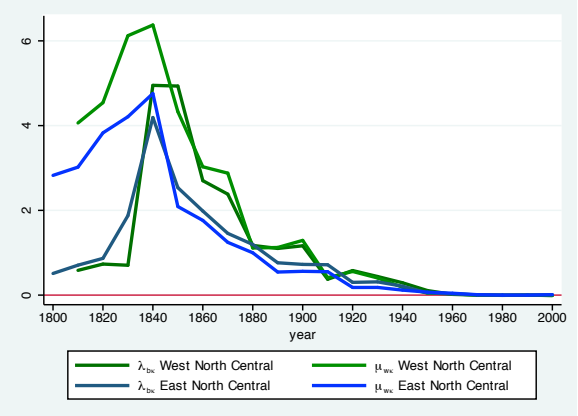
(a) New England and Mid Atlantic



(b) South Atlantic, ESC, WSC

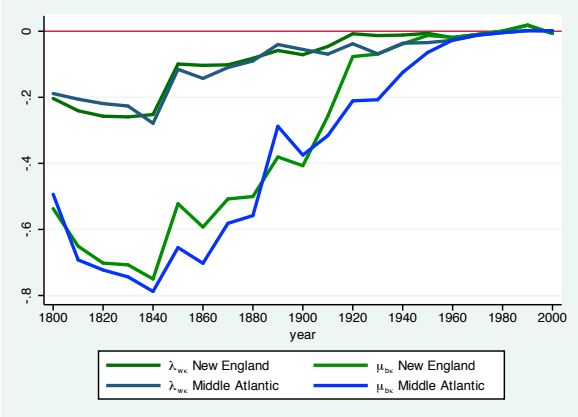


(c) Mountain and Pacific

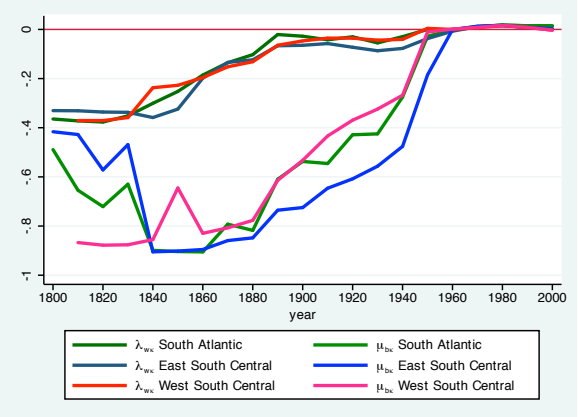


(d) WNC and ENC

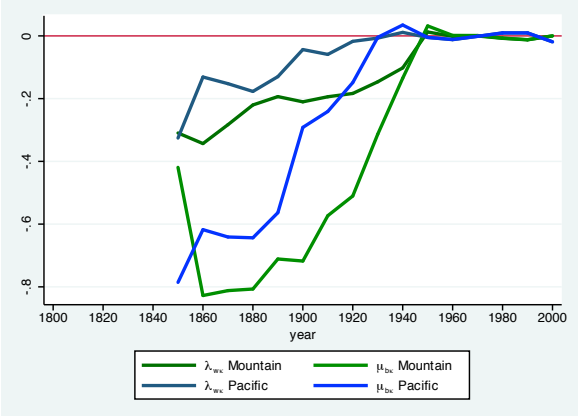
Figure 21: $\lambda_{\kappa}^{b}, \mu_{\kappa}^{w}$



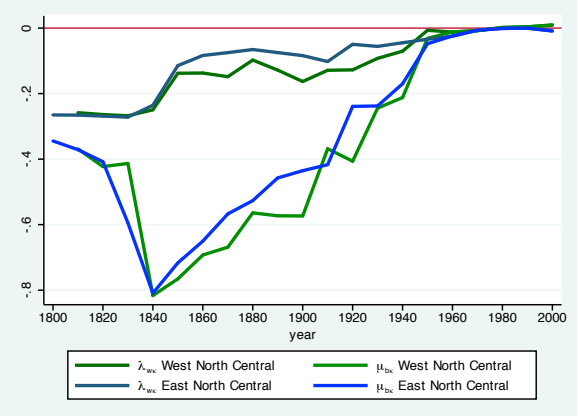
(a) New England and Mid Atlantic



(b) South Atlantic, ESC, WSC

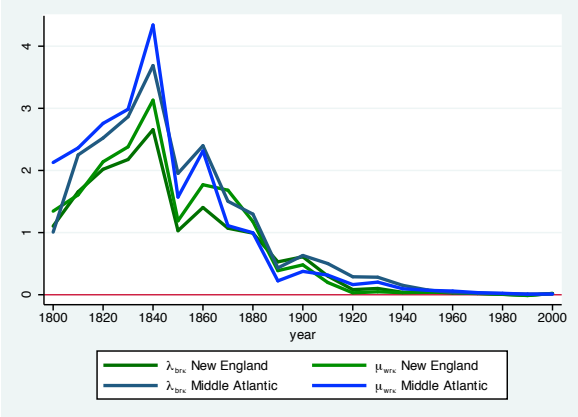


(c) Mountain and Pacific

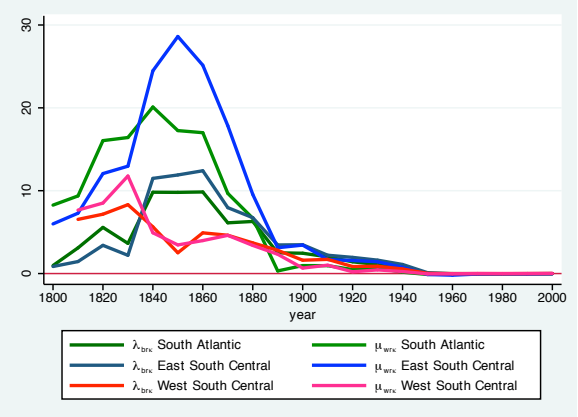


(d) WNC and ENC

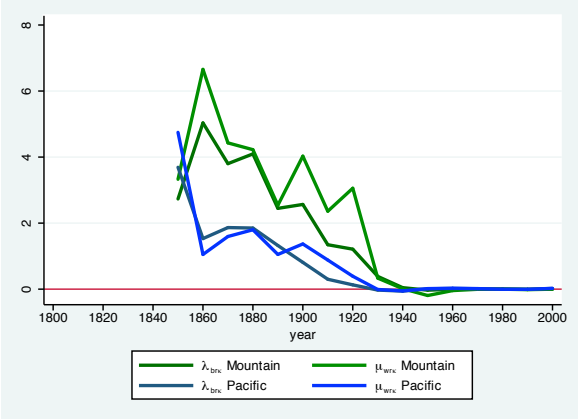
Figure 22: $\lambda_\kappa^w, \mu_\kappa^b$



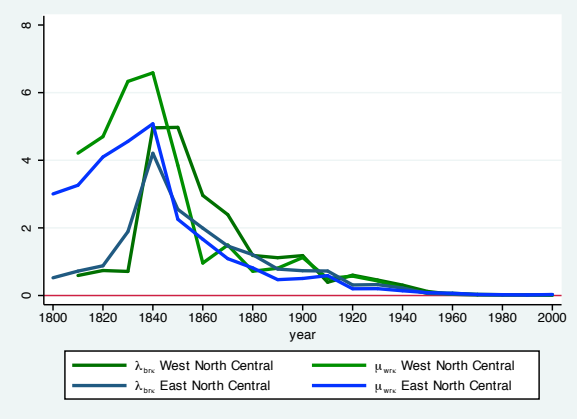
(a) New England and Mid Atlantic



(b) South Atlantic, ESC, WSC

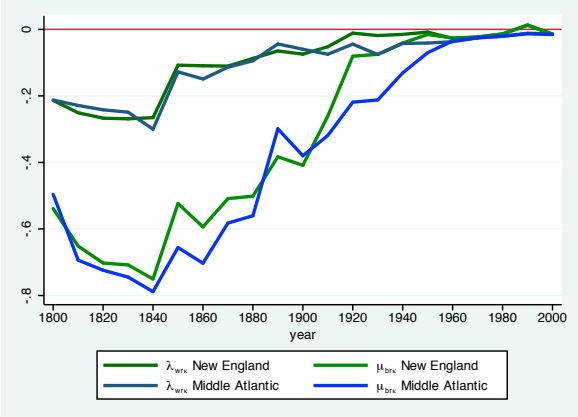


(c) Mountain and Pacific

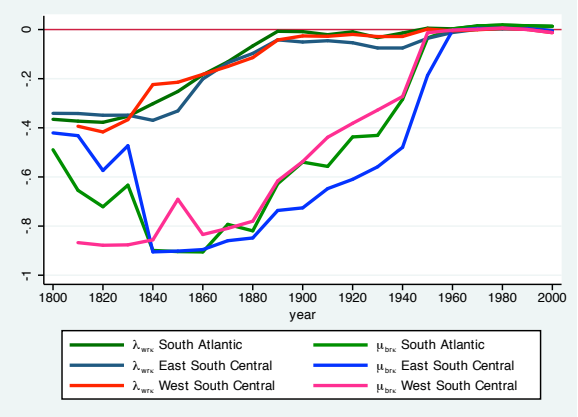


(d) WNC and ENC

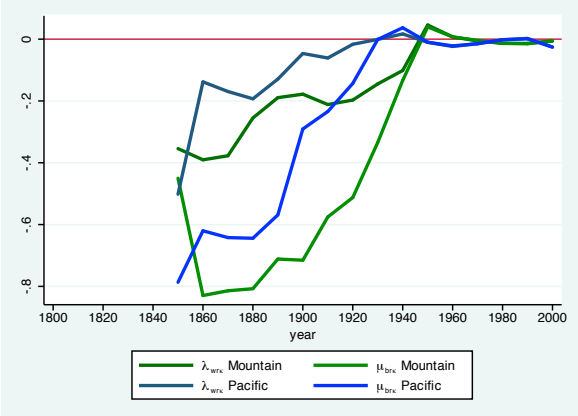
Figure 23: $\lambda^b_{r\kappa}, \mu^w_{r\kappa}$



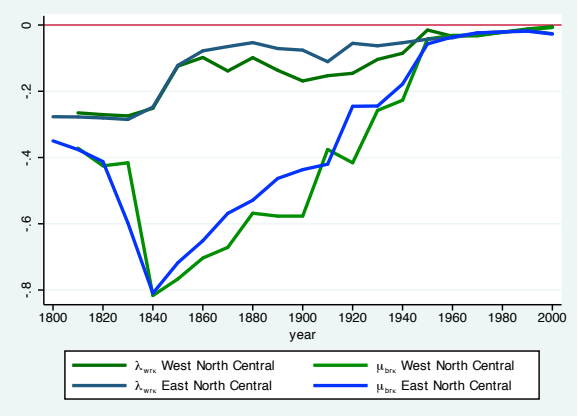
(a) New England and Mid Atlantic



(b) South Atlantic, ESC, WSC

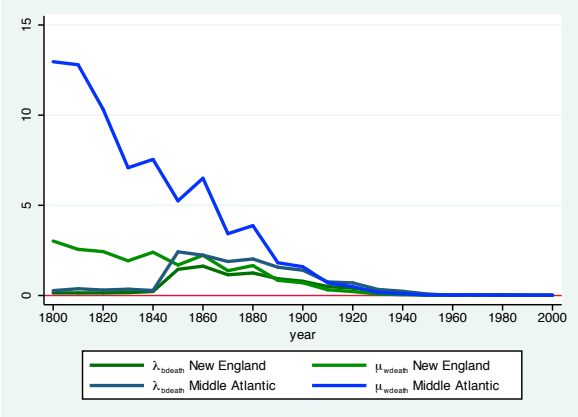


(c) Mountain and Pacific

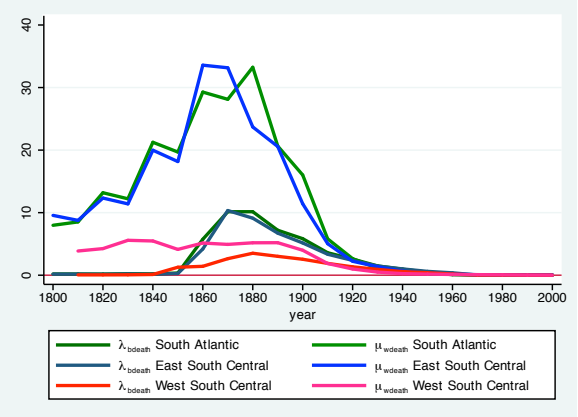


(d) WNC and ENC

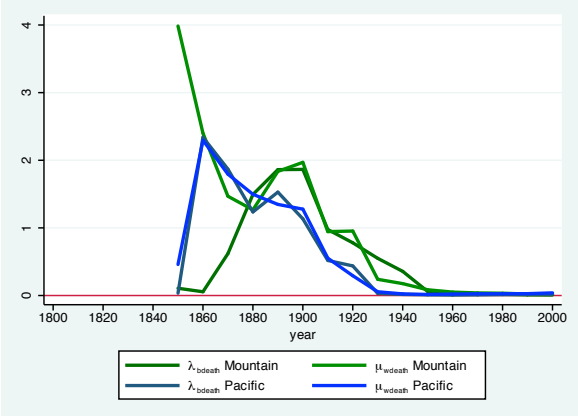
Figure 24: $\lambda^w_{r\kappa}, \mu^b_{r\kappa}$



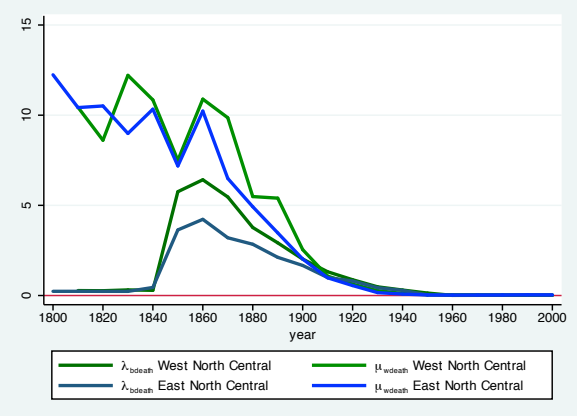
(a) New England and Mid Atlantic



(b) South Atlantic, ESC, WSC

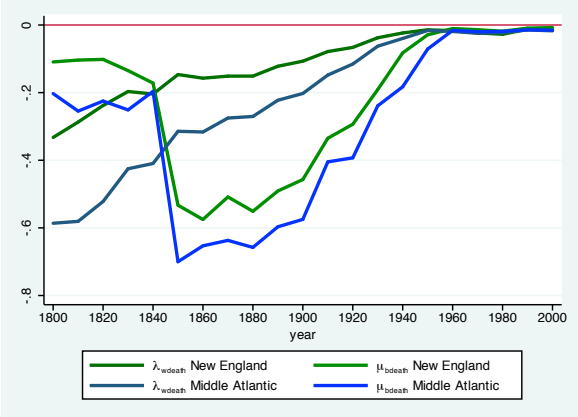


(c) Mountain and Pacific

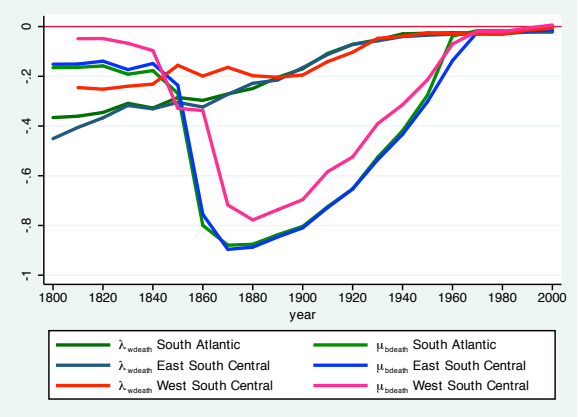


(d) WNC and ENC

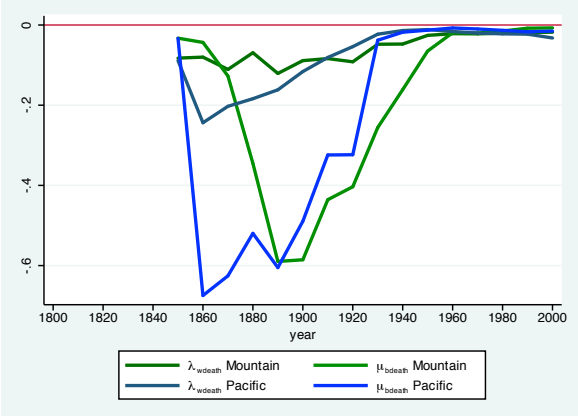
Figure 25: $\lambda^b_{death}, \mu^w_{death}$



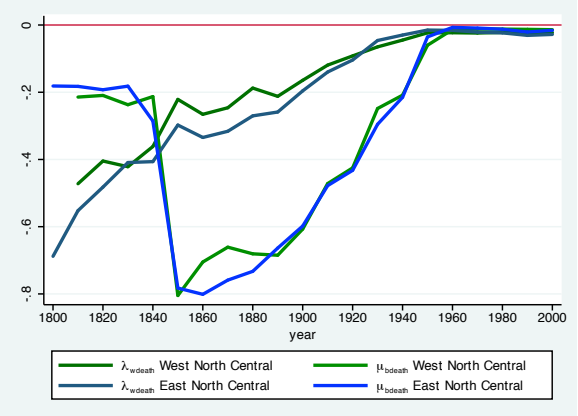
(a) New England and Mid Atlantic



(b) South Atlantic, ESC, WSC

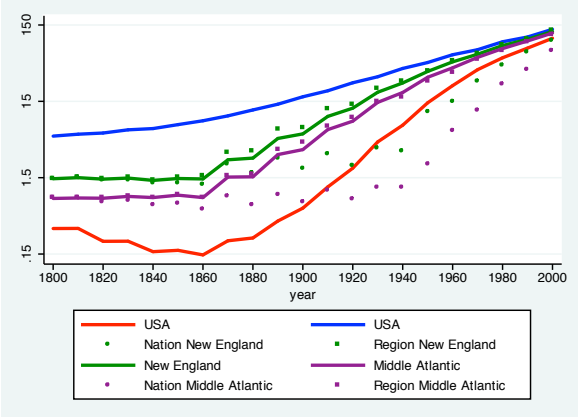


(c) Mountain and Pacific

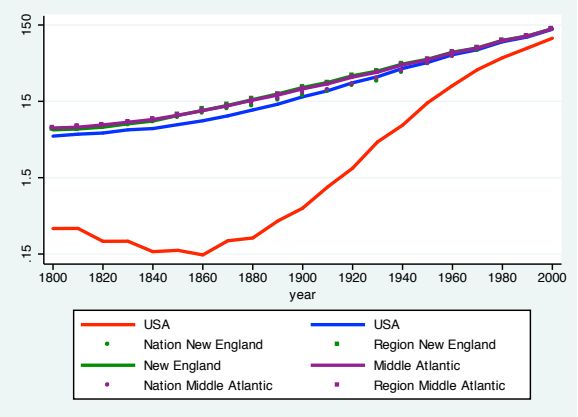


(d) WNC and ENC

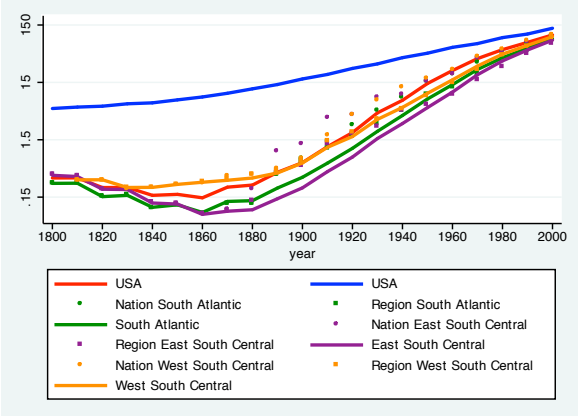
Figure 26: $\lambda^w_{death}, \mu^b_{death}$



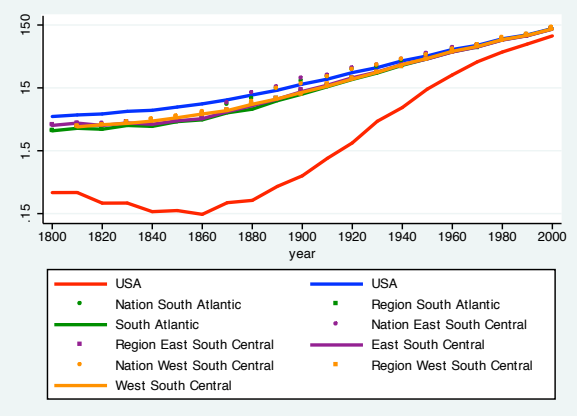
(a) Black



(b) White

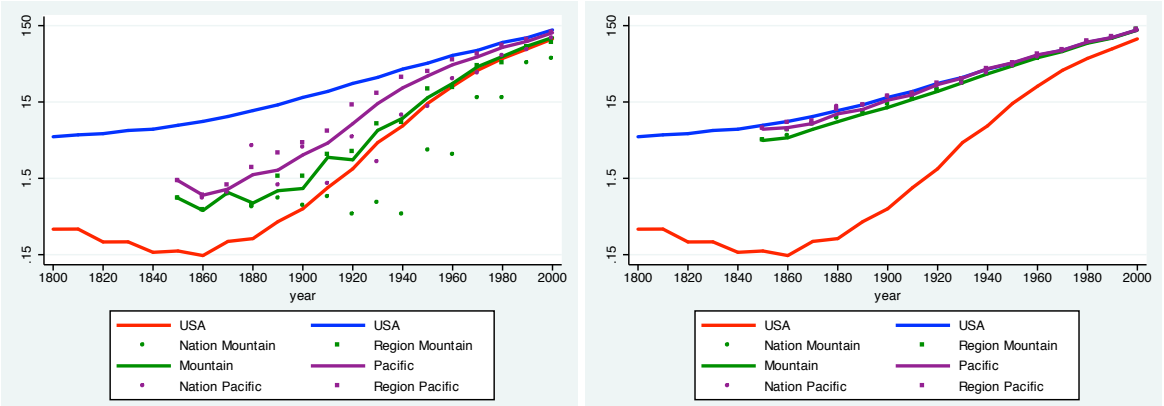


(c) Black



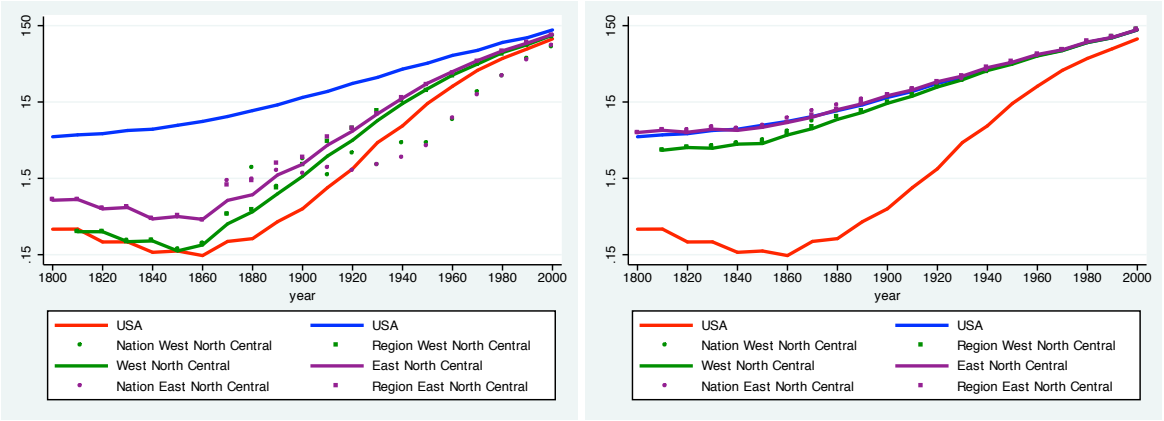
(d) White

Figure 27: Cohort Black and White Human Capital



(a) Black

(b) White



(c) Black

(d) White

Figure 28: Cohort Black and White Human Capital

Table 1: Children Ever Born: By Census Region and Race

Year	NE	MA	SA	ESC	WSC	Mtn.	Pac.	WNC	ENC	US
					white					
1800	7.46	8.53	7.44	8.79	-	-	-	-	10.2	7.91
1820	6.21	7.82	6.89	7.88	6.68	-	-	8.38	8.67	7.36
1840	5.12	6.16	6.27	6.85	6.28	-	-	7.40	7.01	6.31
1860	3.97	4.83	5.05	5.22	5.40	6.28	5.29	5.50	5.25	4.99
1880	3.42	4.12	5.04	4.99	5.70	4.30	4.15	4.40	4.16	4.36
1900	3.22	3.75	4.91	5.10	5.80	5.30	3.45	4.60	3.93	4.26
1920	2.52	2.76	3.64	3.83	4.09	3.66	2.50	3.28	2.88	3.12
1940	2.06	2.03	2.71	3.04	2.82	2.69	1.81	2.36	2.21	2.33
1950	1.93	1.83	2.29	2.60	2.34	2.49	1.83	2.22	2.04	2.09
1960	2.32	2.16	2.41	2.69	2.61	2.84	2.33	2.67	2.48	2.44
1970	2.89	2.66	2.70	2.82	2.98	3.24	2.85	3.20	3.05	2.90
1980	2.53	2.42	2.40	2.55	2.64	2.78	2.41	2.75	2.68	2.55
1990	1.74	1.79	1.77	1.94	2.01	2.08	1.76	2.06	1.97	1.88
2000	1.90	1.99	1.78	1.91	2.14	2.19	2.09	2.09	2.07	2.01
					black					
1820	4.71	4.84	6.35	6.06	3.45	-	-	7.42	7.06	6.08
1840	4.41	4.29	6.79	6.15	4.29	-	-	7.56	6.54	6.31
1860	3.39	3.16	6.41	5.90	4.96	5.52	4.52	6.24	5.21	5.90
1880	3.39	3.39	6.31	5.66	6.12	2.84	2.53	4.88	4.34	5.88
1900	2.57	3.56	6.35	5.99	6.54	1.77	3.23	3.82	3.73	6.00
1920	2.66	2.71	4.39	4.15	4.38	1.64	2.69	2.59	2.86	4.08
1940	2.00	1.88	3.16	2.98	2.87	2.57	2.43	1.87	1.91	2.78
1950	1.75	1.58	2.77	3.01	2.73	2.97	1.87	2.08	1.75	2.48
1960	2.26	2.04	3.20	3.74	3.46	3.42	2.36	2.66	2.38	2.95
1970	3.09	2.80	3.73	4.32	4.03	3.69	3.16	3.63	3.32	3.55
1980	2.92	2.76	3.26	3.80	3.58	3.16	2.86	3.34	3.16	3.22
1990	2.19	2.10	2.23	2.52	2.45	2.20	2.03	2.35	2.27	2.26
2000	1.92	2.26	2.14	2.22	2.36	2.33	1.98	2.46	2.16	2.20

Notes: Table reports our estimates of children ever born from 1800-1880 for whites and 1820-1880 for blacks using the procedure of Murphy, Simon and Tamura (2008). For 1890-1990 we report the values of children ever born to women 35-44 from various censuses. The 2000 value comes from the averaged children ever born to women 35-44 for 1998, 2000, 2002, 2004 CPS.

Table 2: Children Ever Born: By Census Region and Race

Region	Absolute Change from 1950 to 1970	Relative to National Change	Percentage Change from 1950	Relative to National Percentage Change
		white		
NE	0.96	1.19	49.4	1.29
MA	0.83	1.04	45.5	1.19
SA	0.40	0.50	17.5	0.46
ESC	0.23	0.28	8.8	0.23
WSC	0.65	0.81	27.6	0.72
Mtn.	0.75	0.94	30.2	0.79
Pac.	1.02	1.28	56.1	1.47
WNC	0.98	1.23	44.4	1.16
ENC	1.01	1.26	49.3	1.29
US	0.80		38.3	
		black		
NE	1.34	1.24	76.5	1.76
MA	1.22	1.13	77.1	1.77
SA	0.96	0.90	34.9	0.80
ESC	1.31	1.22	43.5	1.00
WSC	1.30	1.21	47.6	1.10
Mtn.	0.72	0.67	24.1	0.55
Pac.	1.30	1.21	69.5	1.60
WNC	1.55	1.44	74.6	1.72
ENC	1.57	1.46	89.4	2.06
US	1.08		43.4	

Notes: Table reports both absolute, proportionate and relative change in fertility during the Baby Boom, by race. In each relative case, we report the changes in comparison to the national change by race.

Table 3: Average Years of Schooling: By Census Region and Race

Year	NE	MA	SA	ESC	WSC	Mtn.	Pac.	WNC	ENC	US
					white					
1850	4.72	4.47	2.54	2.55	1.63	-	2.45	3.17	4.42	3.76
1860	5.28	5.40	3.25	4.27	2.79	2.33	5.05	4.82	5.26	4.72
1870	6.89	6.09	4.63	4.86	4.24	3.26	5.49	6.03	6.06	5.75
1880	7.53	6.52	6.16	6.14	5.55	4.70	5.74	6.61	6.60	6.45
1890	8.09	7.15	6.57	6.71	6.74	6.30	6.51	7.11	7.20	7.05
1900	8.57	7.79	7.13	7.08	7.21	7.26	7.87	7.81	7.85	7.66
1910	9.24	8.64	7.78	7.65	7.87	8.33	9.53	8.78	8.75	8.49
1920	9.90	9.51	8.62	8.36	8.72	9.60	10.5	9.84	9.83	9.42
1930	11.6	11.5	10.6	9.52	10.2	11.6	12.5	11.0	11.4	11.1
1940	11.5	11.3	10.6	9.77	10.6	11.4	12.2	11.0	11.1	11.0
1950	11.9	11.6	11.3	10.8	11.3	11.9	12.3	11.8	11.5	11.6
1960	13.4	13.1	13.3	12.7	13.4	14.0	13.6	13.3	12.9	13.2
1970	14.9	14.7	15.0	13.8	14.5	14.9	15.3	14.4	14.2	14.6
1980	13.1	13.5	14.1	13.7	13.5	15.0	13.7	14.6	14.1	13.9
1990	13.1	13.4	14.1	13.9	13.5	14.6	13.5	14.3	14.0	13.8
2000	15.6	15.5	15.3	15.1	15.2	15.1	15.2	15.1	15.2	15.3
					black					
1850	3.92	2.87	0.09	0.05	0.53	-	0.07	0.88	2.36	0.25
1860	4.23	3.05	0.44	0.50	0.62	0.00	3.32	2.33	3.77	0.65
1870	4.80	4.05	1.32	1.69	1.03	0.50	3.38	3.23	4.21	1.59
1880	5.27	4.93	2.77	3.11	1.92	1.76	4.18	5.00	5.02	2.88
1890	6.15	5.50	3.78	4.05	3.31	5.76	5.77	6.33	5.85	3.92
1900	7.09	6.30	4.65	4.64	4.37	5.73	6.34	6.41	6.64	4.72
1910	8.19	7.53	5.39	5.49	5.39	6.94	9.23	7.89	7.49	5.57
1920	9.24	8.23	6.01	6.08	6.31	9.19	10.3	9.21	8.91	6.33
1930	9.84	9.53	6.85	6.46	7.03	9.37	11.4	9.85	10.2	7.25
1940	11.0	10.2	7.67	7.11	8.10	9.84	12.2	9.94	10.1	8.09
1950	11.2	10.8	9.64	9.33	9.91	11.4	11.8	10.7	10.8	9.95
1960	11.6	11.7	11.1	10.7	11.3	12.2	12.4	11.3	11.5	11.3
1970	13.6	13.5	13.0	12.3	12.5	14.3	14.1	12.9	13.0	13.0
1980	12.1	12.2	13.0	12.2	12.6	13.6	12.9	12.9	12.5	12.6
1990	12.2	12.3	13.3	12.6	12.8	13.7	12.8	13.3	12.7	12.9
2000	15.0	14.8	14.7	14.5	14.5	14.7	14.5	14.5	14.5	14.6

Notes: Table reports our estimates of years of schooling by cohort from 1850-2000 for whites and blacks using the procedure of Murphy, Simon and Tamura (2008).

Table 4: Average Years of Schooling: By Census Region and Race

Region	Absolute Change from 1950 to 1970	Relative to National Change	Percentage Change from 1950	Relative to National Percentage Change
		white		
NE	2.93	0.95	24.6	0.92
MA	3.07	1.00	26.4	0.99
SA	3.69	1.20	32.6	1.23
ESC	2.99	0.97	27.7	1.04
WSC	3.27	1.06	29.0	1.09
Mtn.	3.03	0.99	25.6	0.96
Pac.	3.04	0.99	24.8	0.93
WNC	2.69	0.88	22.9	0.86
ENC	2.69	0.87	23.4	0.88
US	3.07		26.6	
		black		
NE	2.44	0.80	21.9	0.71
MA	2.67	0.87	24.7	0.80
SA	3.32	1.08	34.4	1.12
ESC	2.97	0.97	31.8	1.03
WSC	2.61	0.85	26.4	0.86
Mtn.	2.87	0.94	25.2	0.82
Pac.	2.31	0.75	19.5	0.63
WNC	2.18	0.71	20.3	0.66
ENC	2.20	0.72	20.3	0.66
US	3.07		30.8	

Notes: Table reports both absolute, proportionate and relative change in fertility during the Baby Boom, by race. In each relative case, we report the changes in comparison to the national change by race.

Table 5: Pooled Regressions of Actual Observations on Model Solutions: National Preferences

	base	pre 1900	post 1890	pre 1960	post 1940
			white fertility		
β	0.6165***	0.3307***	0.7012***	0.5397***	0.8401***
	(0.0385)	(0.0595)	(0.0442)	(0.0569)	(0.0479)
α	1.2462***	3.7535***	0.6941***	1.8049***	0.2962**
	(0.2152)	(0.3245)	(0.1544)	(0.3512)	(0.1327)
N	891	342	549	636	304
$\bar{R}^2$	.7695	.8480	.8764	.7651	.9634
p	.0000	.0000	.0000	.0000	.0006
			white schooling		
β	0.3922***	0.2538***	0.4161***	0.3035***	0.2095***
	(0.0488)	(0.0470)	(0.0516)	(0.0442)	(0.0560)
α	6.1041***	3.0352***	7.1346***	5.2934***	11.018***
	(0.8463)	(0.6524)	(0.7860)	(0.7512)	(0.9164)
N	789	240	549	534	304
$\bar{R}^2$	.4485	.4826	.8598	.2101	.9285
p	.0000	.0000	.0000	.0000	.0000
			black fertility		
β	0.1207**	-0.1179***	0.1029*	0.0536	0.6999***
	(0.0514)	(0.0341)	(0.0616)	(0.0517)	(0.0763)
α	2.5407***	5.6635***	2.3850***	3.1045***	0.6137***
	(0.4381)	(0.5066)	(0.3937)	(0.5052)	(0.2569)
N	843	294	549	588	304
$\bar{R}^2$	.4337	.7968	.4717	.4790	.8871
p	.0000	.0000	.0000	.0000	.0000
			black schooling		
β	0.3514***	0.1810***	0.3284***	0.2447***	0.1939***
	(0.0450)	(0.0365)	(0.0321)	(0.0552)	(0.0407)
α	5.8447***	1.8278	7.7246****	4.6486***	10.184***
	(0.7934)	(1.1778)	(0.4334)	(0.9808)	(0.7337)
N	789	240	549	534	304
$\bar{R}^2$	.2910	.	.8757	.	.9397
p	.0000	.0000	.0000	.0000	.0000

Notes: Table reports results from pooled regressions with errors corrected for panel autocorrelation and Prais-Winsten heteroskedastic error correction. The final row, marked p, is the p-value on the null hypothesis that $\beta = 1$ and $\alpha = 0$.

Table 6: Pooled Regressions of Actual Observations on Model Solutions: Regional Preferences

	base	pre 1900	post 1890	pre 1960	post 1940
			white fertility		
β	0.7626***	0.5948***	0.6950***	0.7105***	0.8668***
	(0.0243)	(0.0309)	(0.0351)	(0.0337)	(0.0411)
α	0.7698***	2.1651***	0.7715***	1.1436***	0.2618**
	(0.1425)	(0.1913)	(0.1238)	(0.2022)	(0.1063)
N	891	342	549	636	304
$\bar{R}^2$	.8648	.8771	.9118	.8632	.9696
p	.0000	.0000	.0000	.0000	.0021
			white schooling		
β	0.5315***	0.3566***	0.4700***	0.4961***	0.2766***
	(0.0484)	(0.0330)	(.0515)	(0.0505)	(0.0581)
α	4.6434***	2.8533***	6.3538***	3.8566***	9.9948***
	(0.7089)	(0.4765)	(0.7811)	(0.4854)	(0.9357)
N	789	240	549	534	304
$\bar{R}^2$	.5754	.7068	.8360	.6396	.9433
p	.0000	.0000	.0000	.0000	.0000
			black fertility		
β	0.2864***	0.1206**	0.3217***	0.2242***	0.7243***
	(0.0430)	(0.0571)	(0.0527)	(0.0439)	(0.0729)
α	2.1014***	3.8767***	1.7478***	2.4545***	0.6520***
	(0.2544)	(0.3509)	(0.2400)	(0.2589)	(0.2195)
N	843	294	549	588	304
$\bar{R}^2$	.5957	.7790	.6071	.6089	.8341
p	.0000	.0000	.0000	.0000	.0006
			black schooling		
β	0.3809***	0.2526***	0.3229***	0.3157***	0.1377***
	(0.0552)	(0.0373)	(0.0561)	(0.0475)	(0.0352)
α	5.5319***	1.4761	7.4403***	3.9455***	10.969***
	(0.8271)	(0.9855)	(0.7992)	(0.8124)	(0.5941)
N	789	240	549	534	304
$\bar{R}^2$	.5332	.2001	.7521	.0506	.9455
p	.0000	.0000	.0000	.0000	.0000

Notes: Table reports results from pooled regressions with errors corrected for panel autocorrelation and Prais-Winsten heteroskedastic error correction. The final row, marked p, is the p-value on the null hypothesis that $\beta = 1$ and $\alpha = 0$.

Table 7: Pooled Regressions of Actual Observations on Model Solutions: State Preferences

	base	pre 1900	post 1890	pre 1960	post 1940
			white fertility		
β	0.9974***	1.0038***	1.0001***	0.9972***	1.0081***
	(0.0008)	(0.0033)	(0.0018)	(0.0009)	(0.0070)
α	0.0001	-0.0465**	-0.0043	0.0001	-0.0230
	(0.0040)	(0.0208)	(0.0062)	(0.0045)	(0.0176)
N	891	342	549	636	304
$\bar{R}^2$	.9967	.9951	.9997	.9959	.9994
p	.0000	.0025	.0000	.0000	.0148
			white schooling		
β	1.0002***	0.9999***	0.9999***	1.0007***	1.0004***
	(0.0001)	(0.0007)	(0.0001)	(0.0006)	(0.0006)
α	-0.0061**	-0.0060	-0.0019	-0.0095**	-0.0110
	(0.0011)	(0.0040)	(0.0014)	(0.0044)	(0.0079)
N	789	240	549	534	304
$\bar{R}^2$	1.0000	1.0000	.9999	.9999	1.0000
p	.0000	.0000	.0000	.0210	.0000
			black fertility		
β	0.9767***	0.9714***	1.0126***	0.9685***	1.0024***
	(0.0064)	(0.0231)	(0.0044)	(0.0117)	(0.0053)
α	-0.0188	-0.1970	-0.0675***	-0.0414	-0.0183
	(0.0281)	(0.1294)	(0.0153)	(0.0552)	(0.0162)
N	843	294	549	588	304
$\bar{R}^2$	.9656	.9309	.9955	.9549	.9971
p	.0000	.1099	.0000	.0000	.0229
			black schooling		
β	1.0010***	1.0048***	0.9998***	1.0016***	0.9996***
	(0.0002)	(0.0009)	(0.0005)	(0.0004)	(0.0011)
α	-0.0191***	-0.0453*	-0.0049	-0.0230***	-0.0027
	(0.0024)	(0.0061)	(0.0052)	(0.0026)	(0.0139)
N	789	240	549	534	304
$\bar{R}^2$	.9998	.9959	1.0000	.9995	1.0000
p	.0000	.0000	.0000	.0000	.0000

Notes: Table reports results from pooled regressions with errors corrected for panel autocorrelation and Prais-Winsten heteroskedastic error correction. The final row, marked p, is the p-value on the null hypothesis that $\beta = 1$ and $\alpha = 0$.

Table 8: Welfare Cost of Discrimination and the Value of Civil Rights: Black Equilibrating Variation, no DC

		λ_κ^b									
Years	preferences	NE	MA	SA	ESC	WSC	Mtn.	Pac.	WNC	ENC	US
all	national	0.1137	0.1972	1.3058	1.4328	0.6010	0.1612	0.0151	0.3657	0.1376	0.8438
all	regional	0.1201	0.1299	1.4097	1.7670	0.6264	0.0953	0.0135	0.3830	0.0768	0.9259
all	state	0.1328	0.1272	1.6906	2.5146	0.8080	0.0992	0.0071	0.4034	0.0845	1.1801
pre 1870	national	1.2686	1.1304	7.0462	9.7058	4.8700	2.7070	0.8419	3.0547	1.9431	7.1090
pre 1870	regional	1.6595	2.4923	6.8580	9.5318	4.6674	4.0522	1.8218	3.5389	2.0371	7.0079
pre 1870	state	1.7200	2.4658	6.9065	9.7855	4.7284	4.2266	1.9112	3.5291	2.4341	7.1084
1870-1890	national	0.2571	0.1348	2.8985	1.3269	2.7425	0.8365	0.3590	0.6770	0.1230	2.1609
1870-1890	regional	0.6542	0.8431	3.3104	2.2774	2.6507	2.2680	1.0735	1.2146	0.8882	2.6693
1870-1890	state	0.8315	0.9853	4.7530	5.7830	3.4336	2.9587	1.5471	1.4475	1.0889	4.4857
1900-1950	national	0.2441	0.7500	0.4675	0.5279	0.4155	1.2872	0.1250	0.6040	0.6135	0.5055
1900-1950	regional	0.1252	0.2356	0.7414	1.0743	0.5266	0.6120	0.1207	0.4353	0.2321	0.6794
1900-1950	state	0.1469	0.2109	1.1556	1.7072	0.8331	0.5800	0.0257	0.4404	0.2397	1.0373
pre 1960	national	0.4372	0.7392	2.4379	2.2519	1.2166	1.2489	0.1365	0.8964	0.6071	1.8994
pre 1960	regional	0.4874	0.5231	2.6315	2.7632	1.2641	0.7611	0.1599	0.9479	0.3472	2.0880
pre 1960	state	0.5387	0.5120	3.1550	3.9486	1.6367	0.7930	0.0833	0.9985	0.3845	2.6663
1960-2000	national	0.0069	0.0251	-0.0096	-0.0134	-0.0051	-0.0021	0.0041	0.0052	0.0163	0.0024
1960-2000	regional	-0.0013	0.0051	-0.0102	0.0079	-0.0015	-0.0046	0.0003	-0.0006	0.0070	-0.0003
1960-2000	state	-0.0014	0.0051	-0.0114	-0.0175	-0.0080	-0.0049	0.0003	-0.0008	0.0070	-0.0044

Notes: Table reports our estimates of the welfare cost of discrimination in the cost of schooling, as well as the value of Civil Rights. All values are weighted by black population.

Table 9: Welfare Cost of Discrimination and the Value of Civil Rights: White Compensating Variation, no DC

		μ_κ^w									
Years	preferences	NE	MA	SA	ESC	WSC	Mtn.	Pac.	WNC	ENC	US
all	national	0.1643	0.5508	4.0842	6.5255	1.0104	0.5985	0.0426	0.7712	0.2324	2.8150
all	regional	0.1309	0.1139	3.2903	5.8578	0.8404	0.1447	0.0273	0.5232	0.0729	2.3162
all	state	0.1314	0.1080	2.9762	4.8373	0.9068	0.1596	0.0101	0.4462	0.0723	2.0383
pre 1870	national	1.8224	2.8480	19.828	33.124	6.3694	6.6423	1.7864	5.8946	3.0297	20.736
pre 1870	regional	1.8593	2.4595	16.619	22.947	5.5471	6.7749	1.2218	4.1992	2.7298	16.180
pre 1870	state	1.8097	2.4358	15.621	22.005	5.6869	4.8879	1.2241	4.3716	2.7417	15.374
1870-1890	national	0.9837	1.4552	14.381	20.180	6.2465	3.8747	1.4998	2.0375	0.7731	13.451
1870-1890	regional	0.8923	0.6955	9.5382	19.178	3.7578	2.7547	1.1714	1.8547	0.8566	10.576
1870-1890	state	0.9216	0.7211	6.6164	12.301	4.1794	2.9227	1.2113	1.5591	0.8802	7.3360
1900-1950	national	0.2577	1.9668	0.5931	0.4863	0.5052	4.7466	0.3534	1.1587	0.9473	0.7113
1900-1950	regional	0.0800	0.1540	0.8959	1.9461	0.7555	1.0885	0.2702	0.6361	0.1728	0.9807
1900-1950	state	0.0907	0.1327	1.2405	2.0273	0.8249	1.1150	0.0733	0.4191	0.1689	1.1318
pre 1960	national	0.6539	2.0173	7.6110	10.235	2.0476	4.6717	0.3969	1.8766	0.9930	6.3304
pre 1960	regional	0.5286	0.4412	6.1379	9.1975	1.7081	1.2407	0.3033	1.2917	0.3129	5.2324
pre 1960	state	0.5307	0.4235	5.5592	7.6120	1.8477	1.2778	0.1147	1.1024	0.3121	4.6131
1960-2000	national	0.0025	0.0852	-0.0145	-0.0238	-0.0109	-0.0131	0.0108	0.0204	0.0358	0.0129
1960-2000	regional	-0.0005	0.0100	-0.0190	-0.0390	-0.0141	-0.0199	0.0025	0.0013	0.0109	-0.0083
1960-2000	state	-0.0006	0.0078	-0.0256	-0.0619	-0.0196	-0.0083	0.0007	0.0005	0.0104	-0.0140

Notes: Table reports our estimates of the welfare cost of discrimination in the cost of schooling, as well as the value of Civil Rights. The values are relative to black wealth. All values are weighted by black population.

Table 10: Welfare Cost of Discrimination and the Value of Civil Rights: White Equilibrating Variation, no DC

		λ_κ^w									
Years	preferences	NE	MA	SA	ESC	WSC	Mtn.	Pac.	WNC	ENC	US
all	national	-0.0378	-0.0494	-0.0239	-0.0521	-0.0143	-0.0440	-0.0077	-0.0541	-0.0385	-0.0363
all	regional	-0.0376	-0.0444	-0.0235	-0.0559	-0.0162	-0.0430	-0.0079	-0.0580	-0.0381	-0.0381
all	state	-0.0373	-0.0437	-0.0226	-0.0539	-0.0146	-0.0415	-0.0078	-0.0555	-0.0386	-0.0386
pre 1870	national	-0.1837	-0.1824	-0.3239	-0.3440	-0.2341	-0.3406	-0.2140	-0.2003	-0.1513	-0.2194
pre 1870	regional	-0.1884	-0.1850	-0.3029	-0.3002	-0.2264	-0.3294	-0.1536	-0.1577	-0.1473	-0.2099
pre 1870	state	-0.1870	-0.1842	-0.2981	-0.2996	-0.2274	-0.3307	-0.1684	-0.1566	-0.1464	-0.2085
1870-1890	national	-0.0768	-0.0722	-0.1103	-0.1047	-0.1410	-0.2327	-0.1418	-0.1256	-0.0582	-0.0908
1870-1890	regional	-0.0778	-0.0759	-0.0870	-0.1062	-0.0996	-0.2077	-0.1405	-0.1252	-0.0704	-0.0900
1870-1890	state	-0.0785	-0.0757	-0.0784	-0.1039	-0.1036	-0.2146	-0.1479	-0.1226	-0.0717	-0.0895
1900-1950	national	-0.0252	-0.0647	-0.0203	-0.0496	-0.0236	-0.1220	-0.0085	-0.0873	-0.0602	-0.0523
1900-1950	regional	-0.0227	-0.0503	-0.0286	-0.0707	-0.0352	-0.1209	-0.0101	-0.0987	-0.0565	-0.0528
1900-1950	state	-0.0225	-0.0488	-0.0281	-0.0654	-0.0298	-0.1156	-0.0105	-0.0938	-0.0576	-0.0511
pre 1960	national	-0.0657	-0.0823	-0.0806	-0.1055	-0.0442	-0.1342	-0.0202	-0.0987	-0.0682	-0.0762
pre 1960	regional	-0.0652	-0.0731	-0.0796	-0.1129	-0.0491	-0.1308	-0.0210	-0.1059	-0.0674	-0.0755
pre 1960	state	-0.0649	-0.0720	-0.0773	-0.1089	-0.0450	-0.1267	-0.0221	-0.1016	-0.0683	-0.0740
1960-2000	national	-0.0032	-0.0082	0.0120	0.0063	0.0054	-0.0049	-0.0030	-0.0010	-0.0081	-0.0011
1960-2000	regional	-0.0032	-0.0083	0.0121	0.0064	0.0055	-0.0050	-0.0031	-0.0008	-0.0081	-0.0011
1960-2000	state	-0.0030	-0.0083	0.0121	0.0063	0.0055	-0.0047	-0.0024	-0.0007	-0.0080	-0.0010

Notes: Table reports our estimates of the welfare cost of discrimination in the cost of schooling, as well as the value of Civil Rights. All values are weighted by white population.

Table 11: Welfare Cost of Discrimination and the Value of Civil Rights: Black Compensating Variation, no DC.

		μ_κ^b									
Years	preferences	NE	MA	SA	ESC	WSC	Mtn.	Pac.	WNC	ENC	US
all	national	-0.1234	-0.1868	-0.1176	-0.2398	-0.0955	-0.0615	-0.0417	-0.1819	-0.1544	-0.1423
all	regional	-0.1245	-0.1822	-0.1303	-0.2892	-0.1158	-0.0878	-0.0366	-0.1934	-0.1579	-0.1506
all	state	-0.1569	-0.1753	-0.1685	-0.3087	-0.1331	-0.1044	-0.0283	-0.1975	-0.1675	-0.1617
pre 1870	national	-0.5267	-0.4977	-0.7758	-0.7881	-0.8189	-0.5006	-0.4750	-0.5447	-0.5684	-0.6016
pre 1870	regional	-0.5737	-0.7043	-0.7669	-0.7739	-0.7846	-0.6654	-0.6116	-0.6684	-0.5930	-0.6793
pre 1870	state	-0.6330	-0.7024	-0.7765	-0.7694	-0.7896	-0.6756	-0.6498	-0.7075	-0.6741	-0.7068
1870-1890	national	-0.1664	-0.1129	-0.4813	-0.5027	-0.6238	-0.4278	-0.2294	-0.2864	-0.1167	-0.2469
1870-1890	regional	-0.3155	-0.4315	-0.4909	-0.4976	-0.5613	-0.6035	-0.4953	-0.4743	-0.4311	-0.4492
1870-1890	state	-0.4563	-0.4574	-0.7273	-0.8066	-0.7055	-0.7549	-0.6014	-0.5896	-0.5100	-0.5665
1900-1950	national	-0.1232	-0.3173	-0.1852	-0.3684	-0.1711	-0.1581	-0.1214	-0.3362	-0.2932	-0.2582
1900-1950	regional	-0.0851	-0.2194	-0.2325	-0.4815	-0.2332	-0.2421	-0.0940	-0.3109	-0.2356	-0.2364
1900-1950	state	-0.1219	-0.1959	-0.3240	-0.5028	-0.2792	-0.2902	-0.0519	-0.2906	-0.2317	-0.2440
pre 1960	national	-0.2113	-0.3092	-0.3206	-0.4578	-0.2445	-0.1861	-0.1329	-0.3341	-0.2864	-0.2929
pre 1960	regional	-0.2220	-0.3211	-0.3536	-0.5301	-0.2893	-0.2793	-0.1284	-0.3550	-0.3039	-0.3175
pre 1960	state	-0.2810	-0.3086	-0.4542	-0.5982	-0.3448	-0.3366	-0.0978	-0.3628	-0.3228	-0.3448
1960-2000	national	-0.0141	-0.0334	0.0110	-0.0013	0.0026	-0.0076	-0.0078	-0.0005	-0.0188	-0.0096
1960-2000	regional	-0.0032	-0.0082	0.0113	-0.0256	-0.0017	-0.0049	-0.0024	-0.0008	-0.0079	-0.0037
1960-2000	state	-0.0026	-0.0082	0.0126	0.0081	0.0062	-0.0039	-0.0024	-0.0005	-0.0079	-0.0006

Notes: Table reports our estimates of the welfare cost of discrimination in the cost of schooling, as well as the value of Civil Rights. All values are weighted by white population.

Table 12: Welfare Cost of Differential Mortality: Black Equilibrating Variation

		λ^b_{death}									
Years	preferences	NE	MA	SA	ESC	WSC	Mtn.	Pac.	WNC	ENC	US
all	national	0.1635	0.2915	1.1826	0.7989	0.5362	0.0788	0.0407	0.5727	0.2430	0.7197
all	regional	0.1040	0.1497	1.3969	1.5256	0.5973	0.0887	0.0206	0.6123	0.1406	0.8991
all	state	0.1227	0.1456	1.7889	2.2576	0.7729	0.0939	0.0238	0.7262	0.1505	1.1930
pre 1870	national	0.6612	1.2121	1.4583	1.1759	1.4064	0.0833	0.8563	2.3716	1.9039	1.3863
pre 1870	regional	0.5017	1.0116	1.4768	1.3228	1.2344	0.0637	1.6860	4.2374	2.1289	1.4454
pre 1870	state	0.5995	1.0389	1.3460	1.4866	0.9608	0.0727	1.9136	4.2591	2.7351	1.3947
1870-1890	national	0.5860	1.3620	6.0514	2.3898	2.5510	0.4258	0.5658	2.7704	2.5494	4.0154
1870-1890	regional	0.8582	1.6747	6.6999	5.0692	2.1436	1.1271	0.9911	3.1306	2.4179	5.0345
1870-1890	state	1.0996	1.8056	9.0009	8.5228	3.0979	1.6753	1.5147	3.8607	2.6443	7.2586
1900-1950	national	0.5679	1.0443	1.2671	0.8467	0.6506	0.4448	0.2341	0.8041	0.9190	0.9804
1900-1950	regional	0.2433	0.3962	1.7493	1.6758	0.9240	0.5270	0.0543	0.5419	0.3820	1.3047
1900-1950	state	0.2744	0.3593	2.3190	2.2818	1.1888	0.5356	0.0767	0.7326	0.3937	1.7150
pre 1960	national	0.5879	1.0882	2.2067	1.2336	1.0608	0.4428	0.2479	1.3887	1.1010	1.5938
pre 1960	regional	0.3797	0.5664	2.6155	2.3445	1.1724	0.5794	0.0926	1.4961	0.6246	1.9996
pre 1960	state	0.4534	0.5501	3.3516	3.4870	1.5172	0.6355	0.1314	0.9985	0.6741	2.6606
1960-2000	national	0.0233	0.0385	0.0273	0.0314	0.0197	0.0241	0.0220	0.0185	0.0213	0.0268
1960-2000	regional	0.0129	0.0173	0.0221	0.0797	0.0311	0.0150	0.0141	0.0119	0.0156	0.0266
1960-2000	state	0.0134	0.0172	0.0259	0.0869	0.0399	0.0125	0.0141	0.0108	0.0151	0.0296

Notes: Table reports our estimates of the welfare cost of differential mortality. All values are weighted by black population.

Table 13: Welfare Cost of Differential Mortality: White Compensating Variation

		μ^w_{death}									
Years	preferences	NE	MA	SA	ESC	WSC	Mtn.	Pac.	WNC	ENC	US
all	national	0.3707	1.0678	6.8634	6.4648	1.1254	0.8961	0.0958	1.5581	0.47247	3.9493
all	regional	0.1985	0.3338	6.1677	6.7749	1.5401	0.2030	0.0464	1.2398	0.2359	3.6821
all	state	0.1990	0.3393	6.0570	7.1562	1.1124	0.1032	0.0378	1.1954	0.2258	3.6407
pre 1870	national	2.9045	10.222	20.946	20.525	5.5930	1.6073	2.2769	12.926	9.9923	18.669
pre 1870	regional	2.4993	8.1181	18.797	22.074	5.4445	1.9390	2.1545	10.443	9.5723	17.648
pre 1870	state	2.2995	8.3153	17.777	21.864	4.8905	2.9280	1.9563	9.9210	9.3168	16.944
1870-1890	national	2.1434	8.5201	33.330	27.190	5.2866	2.5519	2.4058	5.9656	5.7571	24.239
1870-1890	regional	1.1191	2.7046	27.692	22.883	6.7464	2.1409	1.6347	6.5766	5.0047	20.540
1870-1890	state	1.2679	2.9327	27.012	25.010	5.1290	1.6613	1.4705	6.5474	4.7395	20.583
1900-1950	national	0.7731	2.8771	3.2828	1.2703	1.0754	4.9636	0.4602	1.4853	1.4178	2.1476
1900-1950	regional	0.1554	0.2751	3.6534	3.0633	1.8506	0.6612	0.1780	0.6963	0.3036	2.5153
1900-1950	state	0.1750	0.2626	3.9182	3.4043	1.1412	0.4958	0.0792	0.6369	0.2843	2.5574
pre 1960	national	1.3674	4.1154	12.897	10.091	2.2250	4.7480	0.5302	3.7077	2.0793	8.8470
pre 1960	regional	0.7311	1.3005	11.574	10.534	3.0466	0.7927	0.2342	3.0169	1.0196	8.2535
pre 1960	state	0.7283	1.3300	11.372	11.165	2.1850	0.6008	0.1328	2.9115	0.9703	8.1730
1960-2000	national	0.0414	0.1001	0.0565	0.0618	0.0426	0.3178	0.0569	0.0981	0.0601	0.0668
1960-2000	regional	0.0225	0.0269	0.0691	0.1380	0.0568	0.1144	0.0295	0.0328	0.0334	0.0581
1960-2000	state	0.0241	0.0247	0.0615	0.0783	0.0562	0.0284	0.0293	0.0299	0.0335	0.0478

Notes: Table reports our estimates of the welfare cost of differential mortality. The values are relative to black wealth. All values are weighted by black population.

Table 14: Welfare Cost of Differential Mortality: White Equilibrating Variation

		λ^{w}_{death}									
Years	preferences	NE	MA	SA	ESC	WSC	Mtn.	Pac.	WNC	ENC	US
all	national	-0.0760	-0.1133	-0.0748	-0.0872	-0.0460	-0.0455	-0.0351	-0.0837	-0.0858	-0.0789
all	regional	-0.0629	-0.0962	-0.0701	-0.0904	-0.0549	-0.0425	-0.0302	-0.0729	-0.0820	-0.0725
all	state	-0.0616	-0.0951	-0.0646	-0.0865	-0.0492	-0.0324	-0.0289	-0.0714	-0.0818	-0.0700
pre 1870	national	-0.2331	-0.4234	-0.3447	-0.2980	-0.1799	-0.0714	-0.2417	-0.3062	-0.3426	-0.3385
pre 1870	regional	-0.2123	-0.4007	-0.3234	-0.3340	-0.1987	-0.0731	-0.2123	-0.2756	-0.3560	-0.3304
pre 1870	state	-0.2053	-0.3977	-0.3202	-0.3322	-0.1966	-0.0810	-0.2140	-0.2744	-0.3549	-0.3273
1870-1890	national	-0.1844	-0.3138	-0.2424	-0.2100	-0.1552	-0.1369	-0.2020	-0.2378	-0.2859	-0.2547
1870-1890	regional	-0.1447	-0.2525	-0.2529	-0.2468	-0.2263	-0.1292	-0.1821	-0.2201	-0.2776	-0.2390
1870-1890	state	-0.1399	-0.2528	-0.2368	-0.2350	-0.1941	-0.1037	-0.1757	-0.2113	-0.2781	-0.2327
1900-1950	national	-0.0694	-0.1147	-0.0800	-0.0802	-0.0687	-0.0853	-0.0484	-0.0983	-0.0925	-0.0889
1900-1950	regional	-0.0496	-0.0865	-0.0777	-0.0790	-0.0851	-0.0808	-0.0337	-0.0808	-0.0768	-0.0755
1900-1950	state	-0.0494	-0.0845	-0.0634	-0.0724	-0.0745	-0.0574	-0.0316	-0.0803	-0.0758	-0.0710
pre 1960	national	-0.1217	-0.1899	-0.1444	-0.1373	-0.0823	-0.0900	-0.0615	-0.1325	-0.1506	-0.1419
pre 1960	regional	-0.0983	-0.1571	-0.1412	-0.1486	-0.1049	-0.0852	-0.0463	-0.1145	-0.1389	-0.1287
pre 1960	state	-0.0960	-0.1553	-0.1283	-0.1418	-0.0922	-0.0619	-0.0439	-0.1123	-0.1382	-0.1241
1960-2000	national	-0.0193	-0.0174	-0.0297	-0.0324	-0.0221	-0.0263	-0.0253	-0.0256	-0.0192	-0.0233
1960-2000	regional	-0.0190	-0.0200	-0.0240	-0.0268	-0.0220	-0.0240	-0.0242	-0.0233	-0.0236	-0.0229
1960-2000	state	-0.0189	-0.0197	-0.0234	-0.0259	-0.0208	-0.0197	-0.0233	-0.0226	-0.0240	-0.0223

Notes: Table reports our estimates of the welfare cost of differential mortality. All values are weighted by white population.

Table 15: Welfare Cost of Differential Mortality: Black Compensating Variation

		μ^b_{death}									
Years	preferences	NE	MA	SA	ESC	WSC	Mtn.	Pac.	WNC	ENC	US
all	national	-0.1759	-0.3002	-0.1822	-0.2609	-0.1431	-0.1016	-0.0832	-0.2235	-0.2454	-0.2111
all	regional	-0.1230	-0.2220	-0.1977	-0.3287	-0.1874	-0.0810	-0.0446	-0.2077	-0.2072	-0.1882
all	state	-0.1601	-0.2067	-0.2233	-0.3161	-0.1855	-0.0928	-0.0505	-0.2236	-0.2133	-0.1942
pre 1870	national	-0.2770	-0.4959	-0.3248	-0.3256	-0.3065	-0.0499	-0.4066	-0.4901	-0.5215	-0.4128
pre 1870	regional	-0.2405	-0.4524	-0.3308	-0.3326	-0.2954	-0.0358	-0.5120	-0.6339	-0.5506	-0.4066
pre 1870	state	-0.3029	-0.4436	-0.3210	-0.3364	-0.2776	-0.0395	-0.5517	-0.6483	-0.6136	-0.4253
1870-1890	national	-0.3218	-0.5656	-0.7444	-0.6783	-0.6715	-0.2509	-0.3335	-0.5158	-0.6345	-0.5766
1870-1890	regional	-0.3708	-0.6342	-0.7520	-0.7827	-0.6453	-0.3259	-0.4688	-0.5915	-0.6680	-0.6290
1870-1890	state	-0.5157	-0.6279	-0.8611	-0.8734	-0.7467	-0.4484	-0.5834	-0.6787	-0.7123	-0.6929
1900-1950	national	-0.2965	-0.4918	-0.3747	-0.4491	-0.2920	-0.2864	-0.2356	-0.3579	-0.4148	-0.3872
1900-1950	regional	-0.1597	-0.3143	-0.4382	-0.5692	-0.4097	-0.2269	-0.0964	-0.3015	-0.3081	-0.3204
1900-1950	state	-0.2080	-0.2783	-0.5147	-0.5449	-0.4064	-0.2633	-0.1126	-0.3198	-0.3061	-0.3263
pre 1960	national	-0.2969	-0.5043	-0.4224	-0.4703	-0.3349	-0.2810	-0.2445	-0.3929	-0.4645	-0.4202
pre 1960	regional	-0.2117	-0.3854	-0.4688	-0.5698	-0.4320	-0.2343	-0.1276	-0.3689	-0.3957	-0.3788
pre 1960	state	-0.2792	-0.3580	-0.5371	-0.5702	-0.4399	-0.2784	-0.1512	-0.4003	-0.4081	-0.3954
1960-2000	national	-0.0254	-0.0443	-0.0267	-0.0318	-0.0169	-0.0239	-0.0231	-0.0216	-0.0203	-0.0266
1960-2000	regional	-0.0129	-0.0172	-0.0222	-0.0649	-0.0264	-0.0146	-0.0137	-0.0154	-0.0135	-0.0200
1960-2000	state	-0.0120	-0.0170	-0.0201	-0.0380	-0.0180	-0.0125	-0.0130	-0.0130	-0.0132	-0.0167

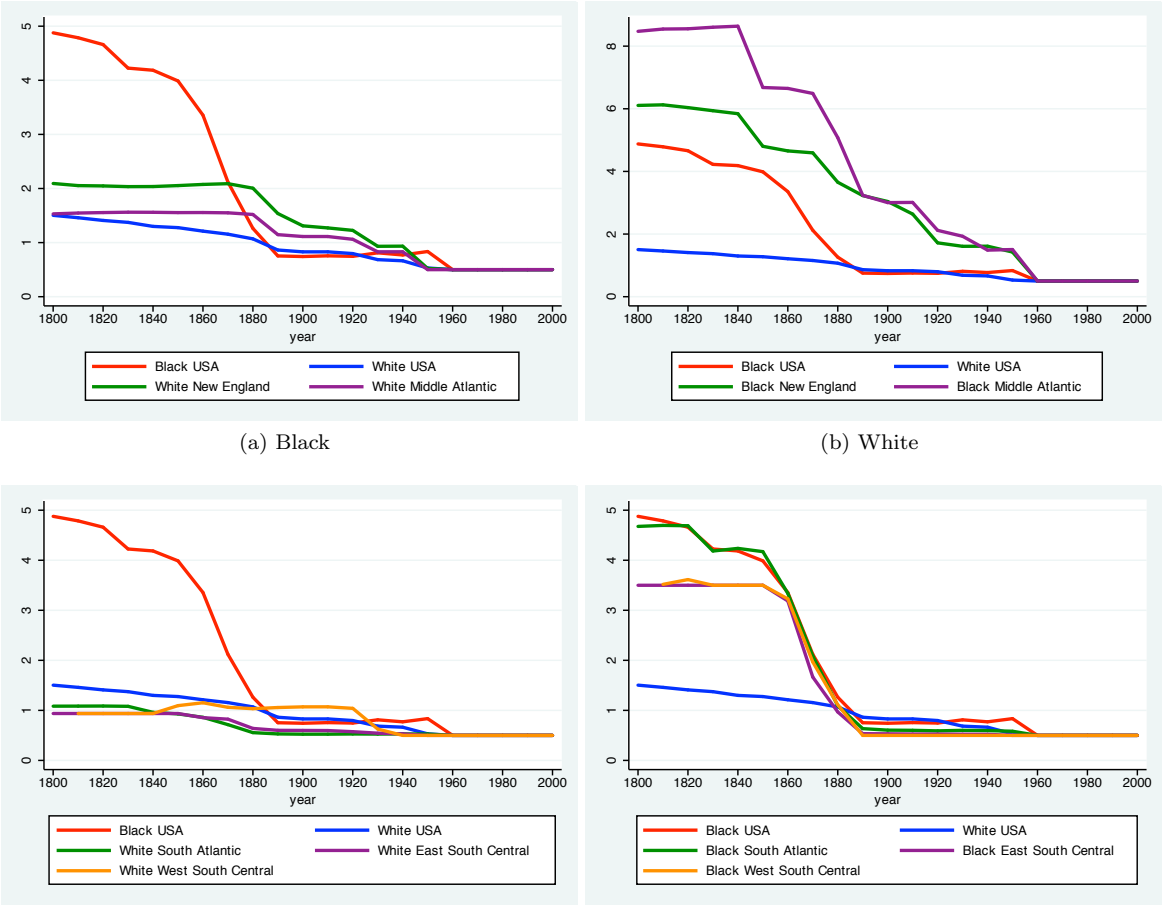
Notes: Table reports our estimates of the welfare cost of differential mortality. All values are weighted by white population.

Table 16: Relative Black Human Capital

Years	NE	MA	SA	ESC	WSC	Mtn.	Pac.	WNC	ENC	US
1800	0.2159	0.1192	0.0821	0.0940	-	-	-	-	0.1316	0.0877
1820	0.1880	0.1062	0.0461	0.0578	-	-	-	-	0.0947	0.0533
1840	0.1547	0.0938	0.0253	0.0326	0.0480	-	-	0.0538	0.0694	0.0330
1860	0.1194	0.0734	0.0167	0.0167	0.0383	-	-	0.0371	0.0513	0.0223
1880	0.1691	0.1002	0.0139	0.0124	0.0382	0.0640	0.1665	0.0454	0.0774	0.0223
1900	0.2397	0.1616	0.0233	0.0177	0.0408	0.0818	0.2133	0.1104	0.1262	0.0357
1920	0.3668	0.2655	0.0458	0.0362	0.0749	0.1442	0.2892	0.19802	0.2225	0.0687
1930	0.5105	0.3999	0.0713	0.0599	0.1226	0.2713	0.4062	0.3010	0.3161	0.1101
1940	0.5559	0.4319	0.0977	0.0837	0.1541	0.2774	0.5157	0.3771	0.3994	0.1528
1950	0.6872	0.5852	0.1530	0.1253	0.2204	0.4038	0.6660	0.4877	0.5300	0.2456
1960	0.7415	0.6318	0.2127	0.1755	0.2883	0.4571	0.7410	0.5680	0.5956	0.3121
1970	0.8234	0.7590	0.3433	0.2921	0.4106	0.5982	0.8153	0.6756	0.7206	0.4729
1980	0.8518	0.7878	0.4586	0.4022	0.5205	0.6614	0.8493	0.7418	0.7632	0.5895
1990	0.8996	0.8638	0.5859	0.5399	0.6346	0.7835	0.8932	0.8118	0.8427	0.7145
2000	0.9197	0.8797	0.6667	0.6312	0.7211	0.8083	0.9175	0.8529	0.8651	0.7697
2010	0.9455	0.9231	0.7528	0.7293	0.7971	0.8790	0.9385	0.8974	0.9113	0.8352
2020	0.9552	0.9342	0.8092	0.7916	0.8482	0.8913	0.9521	0.9202	0.9269	0.8686

Notes: Table reports our estimates of black parental human capital compared with white parental human capital

6 Appendix



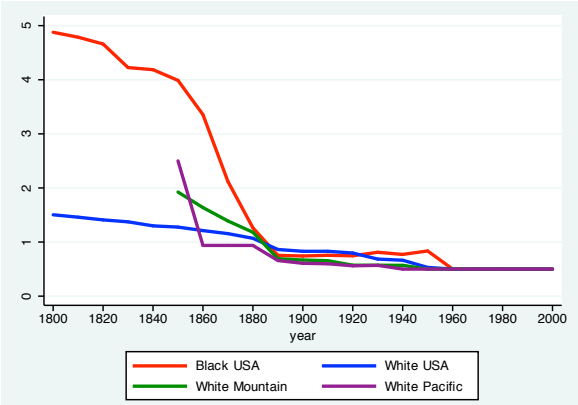
(a) Black

(b) White

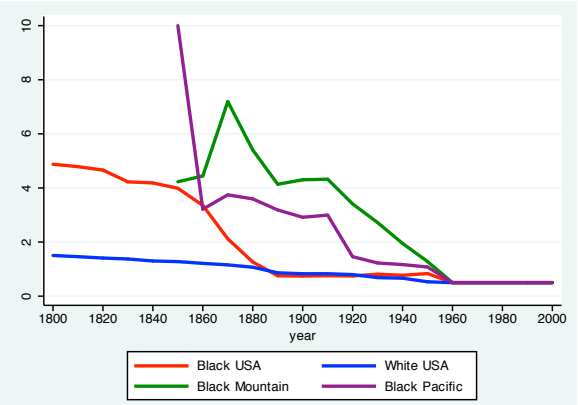
(c) Black

(d) White

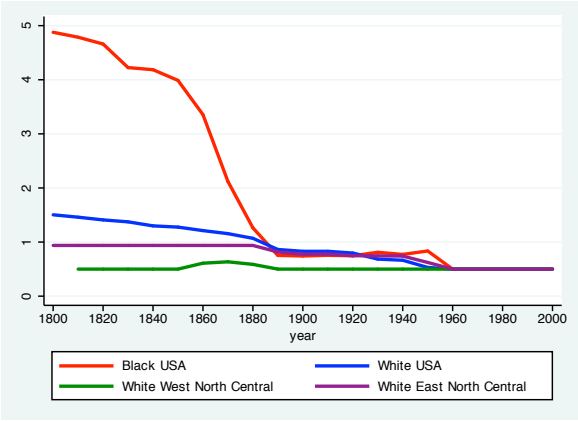
Figure 29: Black and White ν



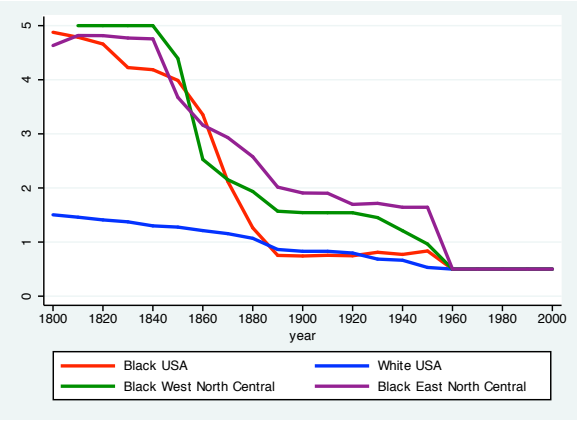
(a) Black



(b) White

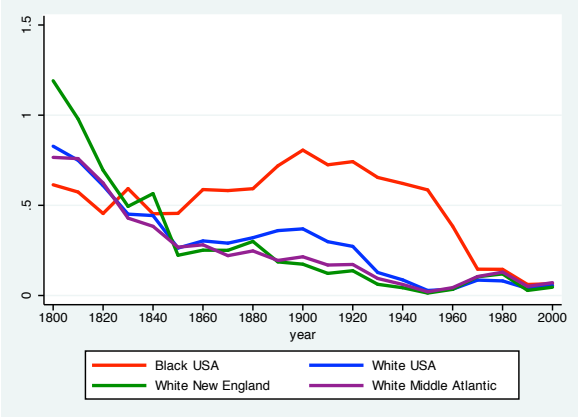


(c) Black

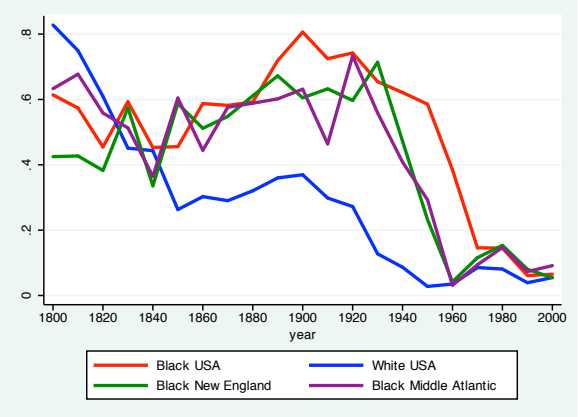


(d) White

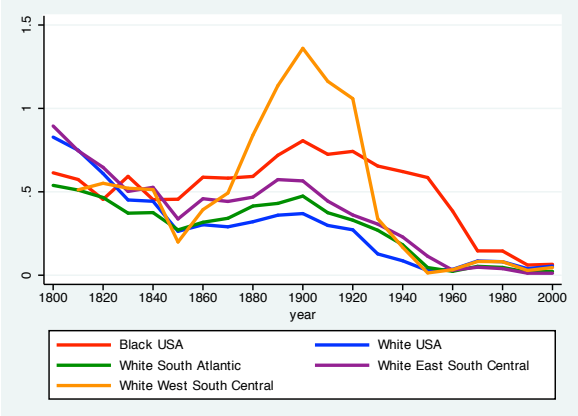
Figure 30: Cohort Black and White ν



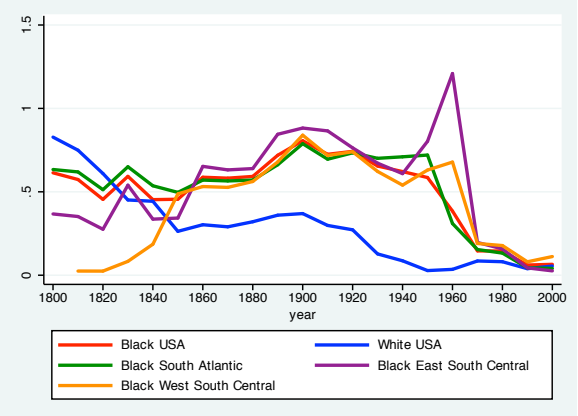
(a) Black



(b) White

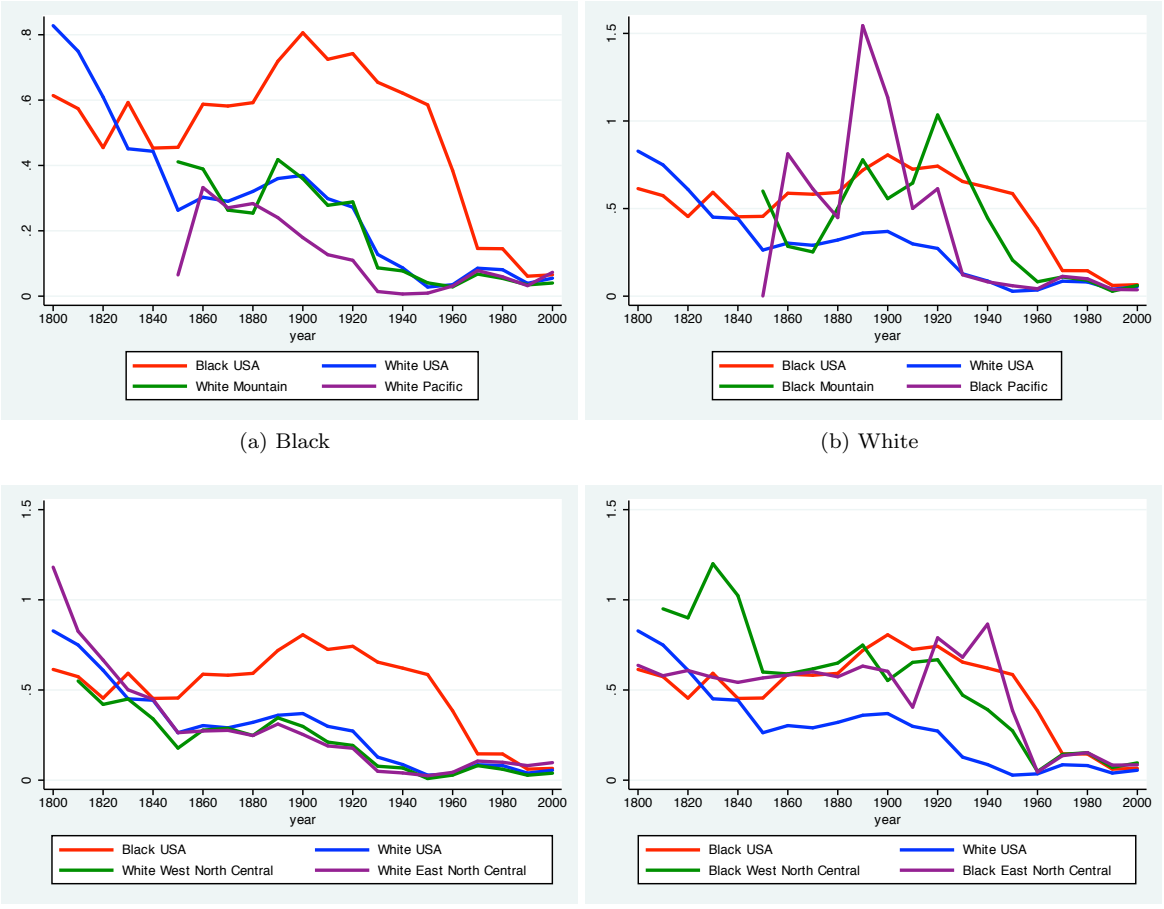


(c) Black



(d) White

Figure 31: Black and White β



(a) Black

(b) White

(c) Black

(d) White

Figure 32: Cohort Black and White β

Table 17: Pooled Regressions of Actual Density on Model Price of Space

	white	black
β	0.9991***	1.0000***
	(0.0005)	(0.0003)
α	-0.0132	-0.0158**
	(0.0124)	(0.0073)
N	947	947
$\bar{R}^2$	.9989	.9994
p	.0112	.0002

Notes: Table reports results from pooled regressions with errors corrected for panel autocorrelation and Prais-Winsten heteroskedastic error correction. The final row, marked p, is the p-value on the null hypothesis that $\beta = 1$ and $\alpha = 0$.