What do "Model" Minorities Teach Us About Overcoming Disadvantage? The Case of Asian-Americans*

[PRELIMINARY AND INCOMPLETE]

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The "Model Minority Hypothesis" (MMH) asserts that some minorities have overcome discrimination more rapidly than others due to preferences for education, labor and saving. Asian-Americans originally inspired the MMH in the 1960s due to their long history as targets of discrimination. I assess the MMH for Asian-Americans in historical data. I first examine long-term trends in earnings and occupation and conclude that native-born Asian-Americans have always been richer than blacks and Native Americans, rather than more upwardly-mobile. I then test for parental preference variation by estimating children's final education conditional on parental income. After adjusting for independent children, permanent income and geography I find that Asian-American parents display a stronger propensity to invest in children's education than both black and white parents. A simple decomposition of adult male earnings suggests that if black parents had adopted the extraordinary educational investment behavior of Asian-American parents they could have closed about half the black-white earnings gap since 1950. I conclude the MMH offers a poor description of the historical facts.

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"At a time when it is being proposed that hundreds of billions be spent to uplift Negroes and other minorities, the nation's 300,000 Chinese-Americans are moving ahead on their own–with no help from anyone else."

U.S. News and World Report, December 26, 1966

"By any criterion of good citizenship that we choose, the Japanese Americans are better than any other group in our society, including native-born whites. They have established this remarkable record, moreover, by their almost totally unaided effort."

New York Times, January 9, 1966

"...it seems to me, with all the influence that all you gentlemen have in the Negro community, that we could emphasize... which I think the Jewish community has done, on educating their children, on making them study, making them stay in school and all the rest."

President John F. Kennedy meeting with civil rights leaders after the March on Washington, August 28th, 1963

1 Introduction

Racial and ethnic groups exhibit different socioeconomic outcomes in the United States. For example, blacks, Native Americans, and Hispanics exhibit worse academic and labor market outcomes than whites, Asians and Jews. Where do these racial outcome gaps come from? The economic literature distinguishes several broad and inter-related explanations: endowments, prices, and preferences and beliefs. Growing empirical literatures document the causal role of parental wealth endowments in children's human capital accumulation (Dahl and Lochner 2012, Hoynes, Schanzenbach and Almond 2014), and the importance of discrimination in altering prices of education (Margo 1990) and labor supply (Bertrand and Mullainaithan 2004). A third empirical literature has revived interest among economists in the importance of preferences and beliefs under the headings of "culture" (e.g., Ichino and Maggi 2000, Fernandez, Fogli and Olivetti 2004, Guiso, Sapienza and Zingales 2006), bringing economics more into line with modern traditions in other social sciences (Akerlof and Kranton 2000).

A major incarnation of the idea that culture explains group outcome differences is often referred to as the "Model Minority Hypothesis" (MMH). The MMH can be broken down into three sub-hypotheses:

1. Some "model minorities" faced similar levels of poverty and discrimination as "problem minorities"

2. Model minorities achieved rapid upward mobility without any special assistance from government

3. Stronger preferences for children's schooling, labor, and/or saving account for this rapid upward mobility

The MMH is a powerful idea: it suggests that minority groups can overcome even harsh discrimination fully and rapidly without government intervention. It suggests the key to upward mobility is for groups to embrace certain behaviors voluntarily, not for the government to transfer wealth or punish discrimination. This implication accords with a prominent strain of American political thought that emphasizes the personal responsibility of individuals rather than social constraints on opportunity.

Unfortunately, it has proven difficult to assess even the basic historical plausibility of the MMH. The fact that blacks and Native Americans joined the U.S. involuntarily and underwent centuries of extreme discrimination makes many social scientists reluctant to view voluntary immigrants such as Asians and Jews as relevant comparison groups. Model minorities may have begun life in the US with different levels of skill and wealth due to selective migration. This selection may have increased over time as individuals unable to succeed in the US returned to their home countries. Model minorities may also have faced different kinds and degrees of discrimination, and different institutional environments based on geographical patterns of settlement. These complex issues, moreover, must be addressed with the limited available data that goes back far enough in time, with sufficiently large and representative samples, to track long-term historical patterns of small groups. The primary data set that meets these criteria is the decennial census, but the census is a repeated cross-section that is ill-suited to address these underlying problems in conventional ways.

In this paper, I shed new empirical light on all three components of the MMH. While I am unable to evaluate the MMH in a causal sense, I am able to provide descriptive evidence on its basic plausibility in historical data. The main empirical contribution is to develop a test for group variation in parental preferences for children's schooling and thereby address part (3) of the MMH. The test has substantial power to reject large variation in parental preferences, thought it has much less power to establish the existence of parental preference variation. Specifically, I develop a method to estimate the relationship between family income and children's schooling by race back to 1940 on repeated cross-sectional data. These relationships are loosely tied to the concept of Engel

curves in traditional demand estimation. The method exploits smooth cohort trends and a "parallel curves" educational attainment property that I verify in the Panel Study of Income Dynamics (PSID) in order to overcome the well-known problem that children often finish schooling after leaving the parental household (Cameron and Heckman 1993). I then develop a simple decomposition of racial outcome gaps into these "Engel curves" and two other terms that are simple to estimate. This decomposition permits me to assess the quantitative importance of group differences in Engel curves for children's schooling, and thereby assess the hypothesis that group parental preference differences explain a large share of group outcome differences. I also examine actual spending on education by parental income in the Consumer Expenditure Survey over 1980-2010 to compare with census patterns on educational outcomes.

I also shed light on parts (1) and (2) of the MMH. First, using racial earnings ratios, I show that there is no evidence that native-born Asian-Americans experienced faster long-term upward mobility than blacks and Native Americans. Rather, native-born Asian-Americans have always been richer and higher-skilled than these other minorities, and all three groups have caught up to white income levels at similar rates. The long-term similarity of black and Native American earnings relative to Asians suggests that joining the US involuntarily and undergoing centuries of extreme subjugation has had long-lasting adverse effects on these groups, and that Asian Americans are a problematic "control" group despite the apparent similarity of "Jim Crow" regimes imposed on blacks and Asians during the late 19th and early 20th centuries.

Second, I present evidence on the extent of discrimination faced by Asians. I follow Margo (1990) and Card and Krueger (1992) in highlighting the important role of disenfranchised minority population share in educational discrimination. Virtually all Asian Americans have always constituted under 10% of state and county populations. Blacks living in states and counties with less than 10% black population share have typically faced much smaller black-white educational expenditure gaps for clear economic reasons. I provide anecdotal evidence on early 20th century Asian educational experience consistent with this theory. Therefore native-born Asians did not face similar levels of poverty, likely faced structurally weaker levels of discrimination than most blacks, and did not experience more rapid upward mobility than blacks.

I focus the empirical work on simple comparisons of Asians, blacks, and whites, though I also incorporate other minorities at various points. Asians are uniquely important to the MMH for several reasons. First, Asians are the only "model minority" with at least a superficially plausible claim to have faced a level of institutionalized, pervasive discrimination on par with blacks and Native Americans during the late 19th and early

20th centuries. Second, Asians have been identified in the census without reference to foreign-born status for 150 years. In contrast, Jews can only be partly identified in three censuses that collected data on "mother tongue," and other successful minority groups such as African and Indian immigrants only arrived in the US in significant numbers in recent decades after the Jim Crow era had ended. Third, Asians were the original inspiration for the (white) journalists who popularized the MMH during the 1960s Civil Rights Movement.

Much of the prior economic literature on the MMH has focused on addressing the problem of selective migration. Boustan, Abramitzky, and Eriksson (2013) attempt to address the question of whether early 20th century European immigrants achieved faster earnings growth than native-born Americans. To address selection problems, they link a subsample of individual European migrants across the 1900, 1910, and 1920 censuses to estimate income growth on a balanced panel. They conclude that these immigrant groups did not experience unusually rapid upward income growth during this period. Unfortunately, the authors obtain very low match rates across censuses (16% of native-born and 12% of foreign-born men), and their results depend somewhat on the exact matching algorithm.[1] Moreover, the authors only examine earnings growth over the working life of one adult generation, rather than intergenerational mobility or parental behaviors toward children.

Suzuki (2002, 1995) documents the importance of selection into migration and return migration for average income growth among Japanese immigrants between 1920 and 1930, but does not incorporate his findings into a general framework permitting assessment of the MMH. Chiswick (1988) compares immigrant group outcomes and argues that group schooling investments positively correlate with group (Mincerian) returns to schooling, thereby suggesting that group demand for schooling rather than access to schooling explains group schooling variation. However, Chiswick's estimates of the returns to schooling are not consistent with more recent research (Neal 2006) for reasons that are not clear.[2] Moreover, he concludes that racial outcome gaps stem from unspecified variation in the prices of child quality and quantity facing different races. **Borjas** (1992) documents a correlation between the average socioeconomic status of immigrant parental groups and children apart from the parent-child correlation and interprets this as evidence

[1] Unusual and well-spelled names play an important role in this matching procedure, leading to concerns about representativeness of the matched sample that the authors attempt to address. Other subtle problems the authors discuss but cannot completely resolve are false matches and how best to select match candidates.

[2] Chiswick relies on one year of census data, and presents one specification for his Mincerian earnings equation, which includes weekly hours as a regressor without any adjustment for measurement error.

that "ethnic capital" contributes to schooling outcome gaps. He is unable to examine Asians due to his reliance on small panel data sets (NLSY). Ethnic capital would be one interpretation of the parental behavior differences I document here, though parental preferences and other factors offer other interpretations.

This paper adds to the literature by highlighting the role of parental Engel curves in the MMH, developing a new method to estimate these Engel curves in repeated cross-sectional data, and providing a way to interpret the economic importance of group Engel curve variation using a simple and estimable decomposition of group outcome gaps. This paper also makes use of the 100% sample of the 1940 census and other expansions in IPUMS data availability that have taken place since many of these earlier papers were written. No prior research has had the statistical power to examine Asian-Americans in the detail that is possible using these newer data. Finally, I focus on non-parametric, reduced-form graphical evidence rather than regression tables, allowing for visual comparison of key patterns across races and years.

The paper proceeds as follows. Section XX...

2 Historical Context: the Other Jim Crow

A basic premise of the MMH is that Asians experienced historical discrimination to a degree that is at least relevant to the experience of blacks and Native Americans. The most obvious and radical difference for blacks is slavery: black Americans were brought to the US involuntary and enslaved for centuries. Likewise, the most obvious and radical difference for Native Americans is that the US was "brought to" the Native Americans involuntarily, accompanied by centuries of plague, warfare, slavery, and forced relocation (Page 2004). In contrast, Asian Americans typically came to the US voluntarily in search of economic opportunity as laborers or skilled professionals. While some 19th century Chinese immigrants entered the U.S. as slaves or indentured servants, and many may have been coerced or misled into migrating, many more have come voluntarily to seek economic opportunity.

However, after the Civil War, Asian Americans did face a broad range of legal and social obstacles that shared much in common with the Jim Crow regime imposed on blacks in the South, and intense discrimination lasted well into the 20th century for both groups. I here review some key historical elements of discrimination against Asian Americans in order to convey the rough intuitive appeal of the MMH. This brief discussion draws heavily on Chang (2004).

Foreign-born Asians were legally barred from citizenship and hence voting by the

Naturalization Act of 1790, much as blacks were (re-)disenfranchised after reconstruction ended by a combination of intimidation and discriminatory red tape. Asian Americans experienced mob violence throughout the late 19th century (e.g., Los Angeles, CA in 1871, Chico, CA in 1877, Seattle and Tacoma, WA and Rock Springs, WY in 1885, Snake River, OR in 1887), and hostility from anti-Asian clubs much like the KKK (Asiatic Exclusion League, Chinese Exclusion League, Workingmen's Party of California). Laws barred Asians from testifying against a white witness in court (*People v. Hall* in 1853), effectively legalizing many kinds of white aggression toward Asians.

The Chinese Exclusion Act of 1882 and the "Gentlemen's Agreement" in 1907 formalized racial hostility toward Asians by ending immigration of laborers from China and Japan. Chinese Americans were subject to arbitrary deportation and effective nullification of citizenship due to restrictions on habeas corpus petitions (Scott Act 1882, *United States v. Ju Toy* 1905). The Geary Act of 1892 required all Chinese Americans to register with the federal government and display residency certificates upon penalty of deportation. In 1898 the US Supreme Court considered withdrawing the right of *native-born* Asian Americans to citizenship, but declined to do so in a 6-2 decision with the Chief Justice in the dissenting minority (*Wong Kim Ark v. U.S.*).

Many cities and states levied numerous discriminatory taxes and fees on Asians (1852 Foreign Miner's Tax, 1852 Commutation Tax, 1860 Fishing License, 1862 Police Tax, 1870 "queue" ordinance, 1870 sidewalk ordinance, and many others). Asian workers faced pervasive wage and employment discrimination; California prohibited all corporations and municipalities from employing Asians in 1879. Many companies declined to hire Asians well into the 20th century, and many companies that did hire Asians–such as the Central Pacific Railroad Company in the 1870s–paid them less than white laborers and barred Asians from positions of authority. From 1913-23, virtually all western states passed Alien Land Acts that prohibited Asians from owning land or leasing land for extended periods, curtailing the growth of Asian agricultural entrepreneurship.

Asians faced laws against marriage to whites (1905 amendment to Section 60 of the California Civil Code) and laws obstructing marriage to U.S. citizens (Expatriation Act 1907, Cable Act 1922). From 1871-1885 in California, Asian children were denied public schooling completely despite taxes levied on their parents to finance schools. After 1885, some California districts segregated Asian children into separate "Oriental schools" (from 1885 until gradual integration in early-to-mid 20th century).

Over 100,000 Chinese American immigrants experienced weeks, months or even years of prison-like detention on Angel Island during immigration proceedings from 1910-1940. Prisoners were not eligible for medical care and could not communicate with relatives

during these detentions. And of course, during WWII the US forcibly relocated over 100,000 Japanese Americans to detention camps for several years.

Despite these many signs of intense legal and social discrimination, other signs suggest that Asians never faced quite the monolithic segregation experienced by southern blacks after reconstruction. Many Asians attended white schools in California from the late 19th century onwards (Hendrick 1975). In the early 20th century, many white teachers and key administrators defended integration of Asian students and openly praised their academic achievements, including the superintendant of the large Los Angeles School District and the president of Stanford University (Hendrick 1975). Chinese American soldiers, unlike black American soldiers, were not segregated into separate military units during WWII. Moreover, Japan and China both exerted political and economic pressure on the US to curb the most egregious racial abuse, with occasional success as in the case of Japanese school segregation in 1905 and the Chinese boycott of American goods after the *Ju Toy* decision also in 1905.

While Asians likely experienced less severe discrimination than southern blacks during the Jim Crow era, it is nonetheless clear that Asians experienced very significant discrimination during much of their history in the US.

3 Data

The decennial census is the only data set large enough and extending back far enough in time to examine non-black, non-Hispanic minorities in US history.[3]I rely on census data from 1940-2000, when income and education are both available. I make full use of the new 100% digitized sample of the 1940 census, which makes some of my key comparisons across minorities possible before the 1965 Immigration Law for the first time. I rely on census data from 1850-2000–spanning 150 years–in order to examine trends in relative economic status across minorities, and shed light on the premise of the MMH that model minorities have experienced more rapid upward mobility than other minorities. While there are many subtle consistency issues in comparing variables across years, these issues are less critical for comparisons across racial and income groups within a given year.

I also incorporate data from the PSID to support some of the methods I employ in census data. The PSID has three features of interest: it links independent children to parents, it links individual outcomes over many years, and it collects much richer income

[3]The Consumer Population Survey is another large, long-standing survey. For this paper, census data are preferable to CPS data because the March CPS begins in 1962, only introduces "Asian/Pacific Islander" to its racial classification in 1988, and excludes military and incarcerated individuals from its sample.

data.[4] Clearly the PSID provides limited insight into education and earnings by race in 1940, before the landmark civil rights gains of the 1960s. I use these advantages of the PSID to assess the proportionality assumption in dependent and independent college attainment by parental income, and to adjust annual income by race in the census to reflect permanent income in various ways.

Finally, I make limited use of the Consumer Expenditure Surveys from 1980-2010. The CES added "Asian" to its racial classification in 1980. I use the CES to examine racial differences in Engel curves for education expenditures, partly following Charles, Hurst and Roussanov (2009).

There are a few data issues that should be discussed. I define "Asians" broadly as Chinese, Japanese, and "Other Asian or Pacific Islander." I do this mainly to maximize power, but it turns out not to have a large effect on the results. Asians have been identified in the census race variable through enumerator "observation" (1850-1950) and self-reporting (1960-2000) in every year back to 1850.

I choose to focus on Asians rather than Jews–another alleged "model" minority and the subject of the JFK quote in the introduction–for three reasons. First, Asians have unambiguously faced much harsher and more institutionalized discrimination in the US than Jews, making Asians a better test case for the MMH. Second, native-born Jews can only be identified using "mother tongue" and only in the 1940 and 1970 censuses (Chiswick 1983). Third, in the two years in which native-born Jews can be observed,they have dramatically higher average earnings than native-born whites, immediately casting doubt on the idea that Jews overcame low human capital as well as discrimination.

It is not obvious how properly to count young adults in "group living" situations such as college dormitories, prisons, and military barracks (National Research Council 2006). These children may be counted by enumerators both in their group living facility and in their parental home. For example, a college student who lives in a dormitory during the school year and lives with her parents during the summers may be counted in both surveys. This is important here because I rely on cohort trends in the number of children living with parents and independently for my estimation strategy. I take two approaches that should bound the problem and obtain similar results in either case. In my main analysis sample, I include all children reporting "group living" as independent children. In an alternative sample, I only count children reporting status as "household head" as independent children. The first approach errs on the side of counting some children twice, once as dependent and once as independent. The second approach only counts children

[4] I chose to use the PSID rather than the NLSY largely because the PSID begins earlier. Neither data set contains significant numbers of Asians.

once, but may miss some independent children.

Another issue is how to count zero in reported income and earnings in census data. I choose to include zeros from all my baseline analysis because they likely represent a combination of genuine zeros and measurement error, and the exact mix may well vary over race and time.

4 Group Outcomes Over Time

A basic premise of the MMH is that model minorities were poor at one time, and then achieved more rapid income growth over time than other groups. Surprisingly, I have been unable to find a clear examination of this question for Asians.

I first present group averages in male earnings. Earnings are first available in census data in 1940. I include ages 25-65 and reweight groups to match the Asian age distribution. I exclude Hawaii and Alaska from all calculations because they are not included in the census in 1940, 1950, and 1850-1880. Asians may have experienced less discrimination in Hawaii that they did on the mainland in the early 20th century (Takaki 1989), making them a less appealing test case for the MMH.[5]

Figure 1.a plots male earnings ratios with respect to Asians from 1940-2000 for the full US population for whites, blacks, and Native Americans. For most of this paper I will focus on whites, Asians and blacks for simplicity. However, I include Native Americans in this section because they have important characteristics in common with blacks, and in contrast with Asians and other immigrants: they did not join the U.S. voluntarily, they have faced intense discrimination for several centuries (Page 2004), and they were denied access to most local public schools during much of the 19th and 20th centuries (Adams 1995).

The figure shows that all three minorities have reduced the earnings gap with whites since 1940. Earnings of Asians have increased more than other minorities in absolute terms but only slightly more in proportional terms: the black-Asian earnings ratio has fallen from 0.8 in 1940 to 0.7 in 2000. The similarity between black and Native American earnings is striking. The trends presented here are consistent with prior work on Asian-Americans (e.g. Darity, Dietrich and Guilkey 1997). Note these trends combine *intra*generational mobility as incomes grow over the lifecycle with *inter*generational mo-

[5] Hawaii did effectively develop a two-tiered educational system that favored whites starting in 1924 with the advent of "English Standard Schools." However, apparently the sole entry criteria for these schools were English language examinations, the schools appear to have been heavily racially integrated at least at the time of a 1948 report, and the Department of Public Instruction claimed that per-student expenditures were strictly equal across types of schools (Hughes 1993).

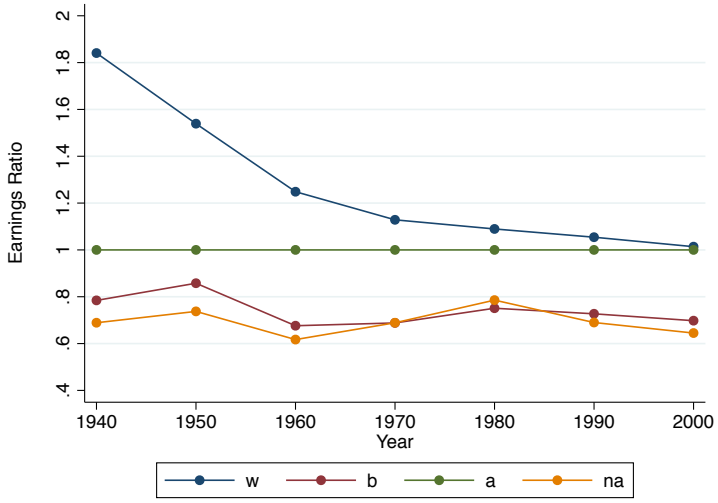
bility from parental investments in children.

However, changes in average outcomes over repeated cross-sections are hard to interpret for well-known reasons. First, changes in averages over time may reflect entry of new immigrants rather than differential growth of incomes for incumbent immigrants. Second, changes in averages may reflect exit of immigrants who decide not to remain in the US. Both of these forces are practical concerns for Asian Americans. Restrictions on immigration altered the numbers and skill types of Asian immigrants eligible for US entry over time. And some estimates suggest that half of all Asian immigrants returned to their home countries (XX sources: Joyce Chen, Suzuki, Iris Chang).

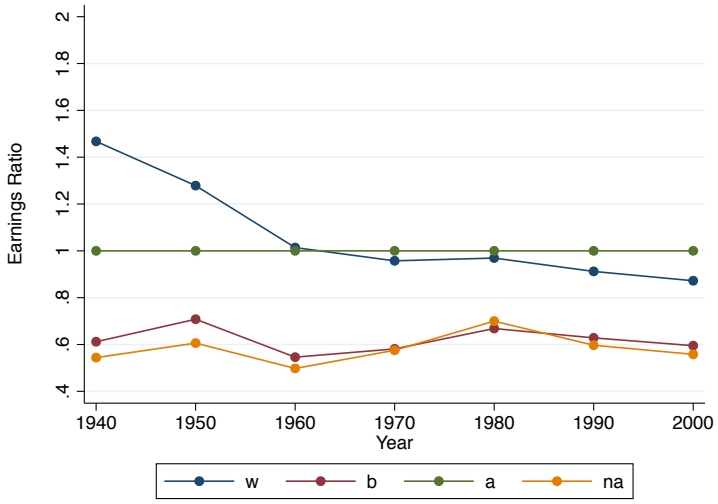
A simple restriction that partially addresses both of these problems–and has another advantage–is to restrict to native-born Asians. This restriction partly eliminates the contemporaneous impact of immigrants entering the US between ages 25 and 65. These new immigrants still affect average incomes when restricting to native-born Asians, but only 25 years in the future through the incomes of their children, and only if immigrants decide to start and raise a family in the US. This restriction therefore attenuates the effect of new immigrants on the group average by exploiting inter-generational mean-reversion. The restriction also attenuates return migration, because parents of native-born US children and native-born adults living in the US after age 25 are much less likely to leave the US than the average immigrant.

Restricting to native-born Asians also has the advantage of eliminating group income gains due to transitory aspects of assimilation. Many writers have pointed out that skilled immigrants may suffer income penalties for one generation due to language barriers and other adjustment frictions (Suzuki 2002, Darity XX). In addition to eliminating income gains due to these short-term intragenerational adjustments, the restriction eliminates any differential parenting behavior that is not sustained among native-born Asian parents. For example, immigrant parents whose skills are underemployed in the U.S. may place higher emphasis on the achievement levels of their children (XX cite). Eliminating both of these sources of group income growth puts Asians on a more equal footing for comparison with native US minorities.

Figure 1.b therefore replicates Figure 1.a but restricting to native-born. Now there is absolutely no evidence of more rapid upward mobility for Asians relative to blacks and Native-Americans: Asian men have earned about 60% more than these groups for the last 60 years. Native-born Asian men achieved earnings parity with whites by 1960. The affluence of Asian-Americans relative to other native-born minorities reflects a long-



(a) All



(b) Native-Born

Figure 1: Male Earnings Ratios Relative to Asians, 1940-2000

Notes: Figure plots average male earnings age 25-65 for each race divided by analogous average for Asians over time. Hawaii and Alaska excluded. Races reweighted on age to match age distribution of Asians.

standing skill advantage, not rapid upward mobility. This first premise of the MMH therefore appears to contradict basic historical data.

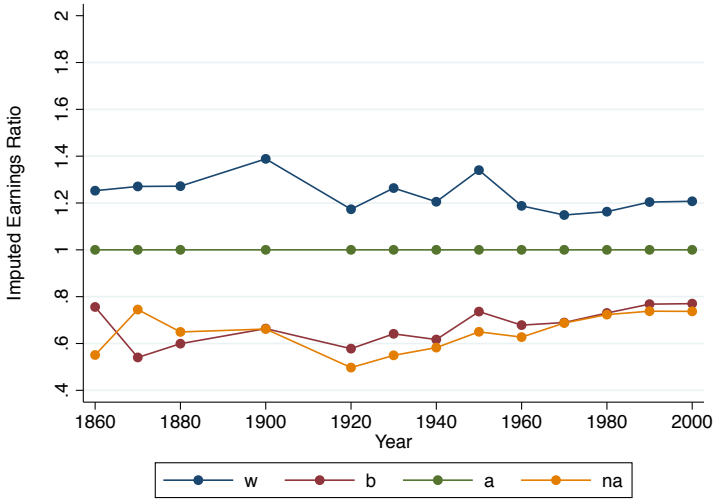
However, perhaps Asians achieved more rapid upward mobility before 1940. To examine this question, I impute earnings in earlier periods based on occupation, which is available back to 1850. I follow Smith (1984) and Margo (1990) in imputing earnings in earlier periods based on earnings in occupations in 1970. I impute income by race, sex, native-born status, and occupation. To harmonize occupations across years I rely on the IPUMS variable OCC1950. Figure 2 displays the imputed earnings ratios with respect to Asians from 1860-2000, both for all Asians and for native-born Asians. The figures provide no evidence of particularly rapid upward mobility of Asians relative to other minorities before 1940. Asians have held different and higher-paying (as of 1970) occupations than blacks and Native Americans since Asians first arrived in the U.S.

What occupations are driving these imputed earnings differences? Table 1 presents the most common occupation for each race by year. It is clear that Asians have had very different occupational histories than blacks and Native Americans, consistent with having higher skills upon arrival in the US. The most common occupation for blacks and Native Americans has almost always been laborers, farmers[6], and missing. In contrast, Asians transitioned from mining (for gold in California), to small business owners in the laundry and dry-cleaning industry, and then into white collar occupations, which is also the top occupation category for whites.

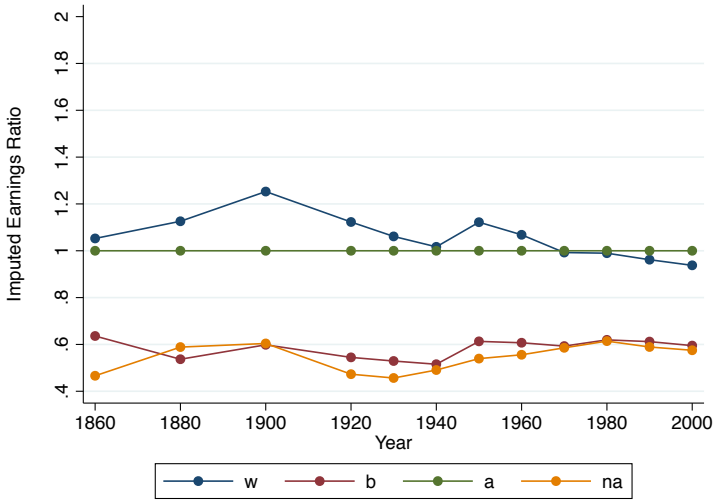
The census also collected data on literacy up until 1930. Figure 3 plots literacy rates defined as reported ability to read and write in any language, for available years by race. The figure is entirely consistent with Asian immigrants having skills much higher to the level of whites upon arrival in the US. Overall, these patterns are much more consistent with Asians arriving in the US with skills in the ballpark of whites, imparting these skills to their children, and gradually improving their economic achievement across generations at a rate quite similar to other native-born groups minorities.

These patterns provide little support for the key MMH idea that Asians faced the same barriers to achievement as native-born minorities in the US, but overcame them through unusually rapid upward mobility. However, they do not conclusively reject that story for

[6]Farming contains both owners and laborers, and is therefore not very informative about socioeconomic status in itself.



(a) All



(b) Native-Born

Figure 2: Imputed Male Earnings Ratios Relative to Asians, 1860-2000

Notes: Figure plots average imputed male earnings age 25-65 for each race divided by analogous average for Asians over time. Hawaii and Alaska excluded. Races reweighted on age to match age distribution of Asians. The imputation is based on earnings in 1970 averaged by cells defined by OCC1950, sex, race and native-born status.

Year	White		Asian	
	Occupation	Share	Occupation	Share
1860	Farmers (owners & workers)	0.43224	Mine operatives & laborers	0.637503
1870	Farmers (owners & workers)	0.390162	Mine operatives & laborers	0.448011
1880	Farmers (owners & workers)	0.388331	Mine operatives & laborers	0.267256
1900	Farmers (owners & workers)	0.318088	Laundry & dry cleaners	0.374668
1910	Farmers (owners & workers)	0.276686	Managers, officials & proprietors	0.265617
1920	Farmers (owners & workers)	0.238569	Farmers (owners & workers)	0.220401
1930	Farmers (owners & workers)	0.179336	Managers, officials & proprietors	0.233954
1940	Farmers (owners & workers)	0.129755	Managers, officials & proprietors	0.195088
1950	Managers, officials & proprietors	0.103311	Managers, officials & proprietors	0.154739
1960	Managers, officials & proprietors	0.101721	Managers, officials & proprietors	0.115624
1970	Managers, officials & proprietors	0.089114	Managers, officials & proprietors	0.08
1980	Managers, officials & proprietors	0.113561	Managers, officials & proprietors	0.113106
1990	Managers, officials & proprietors	0.134029	Managers, officials & proprietors	0.134097
2000	Managers, officials & proprietors	0.149501	Managers, officials & proprietors	0.141637

Year	Black		Native American	
	Occupation	Share	Occupation	Share
1860	Laborers	0.257355	Other non-occupation	0.517062
1870	Farm laborers, wage	0.430936	Farmers (owners & workers)	0.328661
1880	Farmers (owners & workers)	0.324259	Laborers	0.27716
1900	Farmers (owners & workers)	0.403048	Farmers (owners & workers)	0.458426
1910	Farmers (owners & workers)	0.387031	Farmers (owners & workers)	0.381442
1920	Farmers (owners & workers)	0.365641	Farmers (owners & workers)	0.419919
1930	Farmers (owners & workers)	0.284765	Farmers (owners & workers)	0.405271
1940	Farmers (owners & workers)	0.199262	Farmers (owners & workers)	0.291586
1950	N/A (blank)	0.149883	Farmers (owners & workers)	0.241278
1960	Laborers	0.140327	Laborers	0.15777
1970	Operative & kindred workers	0.13027	N/A (blank)	0.104133
1980	N/A (blank)	0.146493	N/A (blank)	0.118678
1990	N/A (blank)	0.134589	N/A (blank)	0.121228
2000	N/A (blank)	0.129203	N/A (blank)	0.13059

Table 1: Most Common Occupation by Race: Label and Share, 1860-2000

Notes: Occupation shares calculated for household heads age 25-65, excluding Alaska and Hawaii.

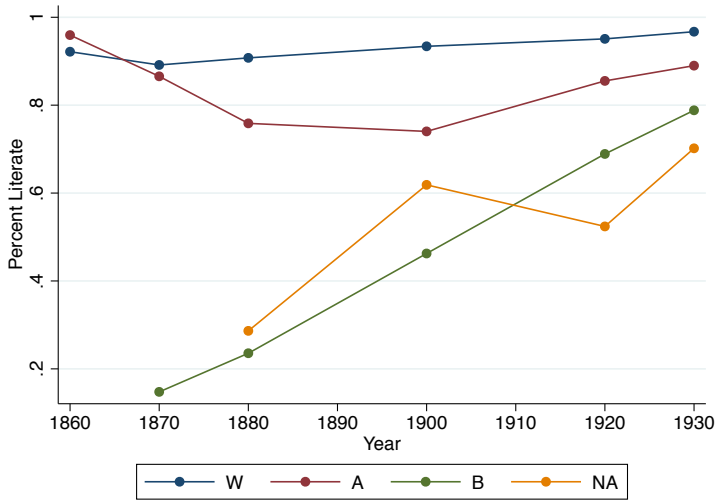


Figure 3: Percent Literate (Reads + Writes) by Race, 1850-1930

Notes: Figure plots average literacy rate, defined as ability to read and write in any language, by race for household heads of ages 25-65, excluding Alaska and Hawaii.

two reasons. First, Imputing income in earlier years ignores income changes within race by occupation cells. Clearly, the narrowing of racial pay gaps within occupations may be an important part of the Asian experience, perhaps differentially from other minorities. Second, as discussed, restricting to native-born Asians attenuates but does not eliminate changes in the composition of Asians underlying the average outcomes over time. If the quality of Asian immigrants declined significantly over the last 150 years, this could mask the higher rate of upward mobility claimed by proponents of the MMH. In fact, there are many factors that could have generated this trend such as changing immigration restrictions, and changes in the economic positions of Asian countries relative to the US.

Therefore, it would be valuable to examine parental behaviors of different immigrant groups directly. I now turn to this task.

5 Estimating Parental "Engel Curves" in Child Outcomes

The MMH asserts that model minority parents have demonstrated greater demand for schooling than other minorities, and that this greater demand for schooling has increased their rate of upward income mobility. I examine this hypothesis by estimating whether the relationship between parental income and children's schooling varies across races. I refer to this relationship as a parental "Engel curve," even though it relates income to

children's outcomes rather than child input expenditures and is therefore technically not an Engel curve. Readers interested in the results rather than the various adjustments required to facilitate comparisons across races and economic interpretation can skip to section 6.

I focus on child outcomes rather than input expenditures for several reasons. First, the census contains no information on child input expenditures apart from housing, whereas it contains education data back to 1940. Second, child input expenditures are only one channel by which family income may affect child outcomes differentially across groups, and therefore an overly narrow interpretation of the MMH. Other channels include group parental attitudes toward schooling (which may be amplified by income, as in Weinberg 2001), and access to group institutions such as local schools, banks, and social networks. I therefore interpret income not strictly as the ability to increase expenditures, but a rough index of parental ability to achieve desired outcomes for children.

Parental income likely correlates with many kinds of skills that affect both work and parenting. If this correlation differs across racial groups–perhaps due to skill-selective migration and return-migration–it represents an alternative explanation for differences in group Engel curves. This explanation is sharply at odds with the MHS (Suzuki 2002, 1995) because it implies the investment behavior of Asians reflects parental endowments rather than parental preferences, undermining the argument that such investment behavior could be adopted voluntarily by parents in other racial groups. I provide supplementary estimates of actual Engel curves in educational expenditures by group back to 1980 in the CES to test whether actual spending underlies the final schooling outcomes in the census, rather than inheritance of parental skill unrelated to parental expenditures or preferences.

It can be argued that total parental earnings ignores the parental trade-off between higher incomes and more time spent with children. I prefer total family income as a measure of the childhood resource environment for several reasons. First, the empirical evidence on how maternal labor supply affects children at different ages in different institutional environments is small and mixed (Baker, Gruber and Milligan 2008, Havnes and Mogstad 2011, 2014, Barker and Milligan 2010, Ruhm 2008). In this study I measure parental income during children's teenage years, making it less likely that labor supply reduces parent-infant bonding, breastfeeding, vaccinations, or other mechanisms explored in the literature. Second, total family income incorporates the earnings and human capital of both parents, rather than just one parent. In cross-sectional data, child outcomes positively correlate with the earnings and human capital of both parents, suggesting that the time shifted out of caring for children when parents work more is not a

first-order phenomenon compared to the benefits of having more affluent parents. Third, total family income incorporates differences in rates of single parenthood across groups and time. In cross-sectional data, again, child outcomes negatively correlate with single parenthood. Despite all these reasons to prefer total family income, I confirm that all the main results are robust to using father's income by itself XX.

I now turn to estimating cross-sectional parental Engel curves in children's final schooling. Estimating these descriptive parameters poses two serious challenges.

5.1 Interpreting Group Engel Curves

In order to quantify the importance of differences in Engel curves between groups, I present a simple, mechanical decomposition of group outcomes into Engel curves, parental income distributions, and group earnings by schooling level.

Let g index racial group, and let y^0 indicate parental income during childhood. Let y_g^1 indicate average adult group earnings, and h_g^1 indicate average adult schooling. Let $f_g\left(y^0\right)$ indicate the probability density function for parental income in group g. Adult group earnings depend on final education, $y_g^1 = y_g^1\left(h_g^1\right)$, and final education depends on parental income in childhood $h_g^1 = h_g^1\left(y_g^0\right)$, where both of these relations may vary by race. We can now combine these into a simple decomposition of average group adult income:

$$\mathbb{E}\left[y_g^1\right] = \int_{y^0} y_g^1\left(h_g^1\left(y^0\right)\right) f_g\left(y^0\right) dy^0. \tag{1}$$

This decomposition breaks group average earnings at a point in time into three terms. The term $y_g^1\left(h_g^1\right)$ captures earnings conditional on schooling, and can differ across races due to factors such as discrimination, within-schooling human capital variation. This term is easy to estimate by averaging group earnings within schooling. It turns out that all races experienced the striking convexification of the returns to schooling documented in Lemieux (2006) and Heckman, Lochner and Todd (2006), though as we will see returns have changed differentially across races. The term $f_g\left(y^0\right)$ captures the parental income distribution experienced by the current generation during childhood, and is also easy to estimate for native-born individuals. The term $h_g\left(y^0\right)$ is the key term of interest, and captures the parental "Engel curve" in children's final schooling. For reasons outlined above, this term is the key term of interest for the MMH, as well as the hardest term to estimate, and therefore the focus of the empirical work in this paper.

This decomposition allows me to state how group outcome gaps would be mechanically affected by replacing each of these three components for one group with the corresponding

components of another group. For example, it allows me estimate the share of the black-white earnings gap that would be closed if blacks adopted the Asian Engel curve for schooling $h^1_{asian}\left(y^0\right)$, or the white parental income distribution $f_{white}\left(y^0\right)$.

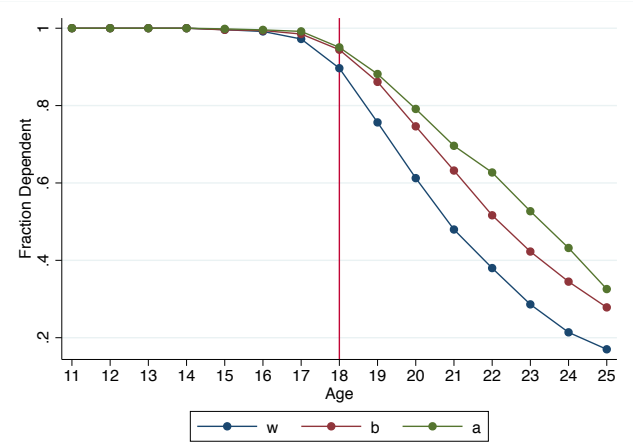
Note that I ignore effects beyond one generation for simplicity in the empirical work. This means that when I replace black Engel curves with the Asian Engel curves for parents in generation T, I examine the direct effect on schooling and earnings in generation $T+1$, and I ignore the indirect effect of these new Engel curves on parental income distribution of children in generation $T+2$. This may lead me to underestimate the long-term importance of Engel curve variation across groups. As it turns out, Engel curves are fairly flat, and therefore these indirect parental income effects are small. Appendix 1 clarifies this point mathematically.

5.2 Independent Children

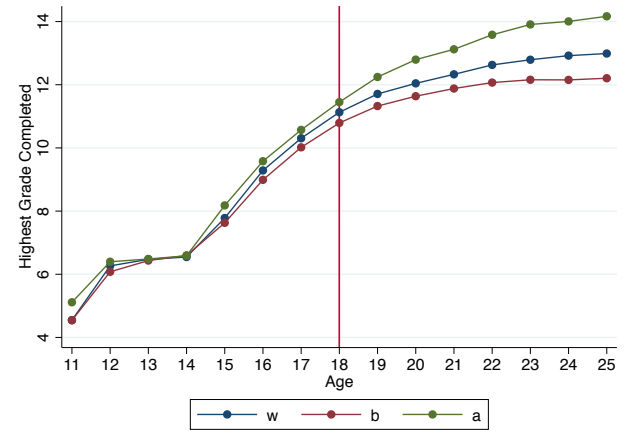
A long-standing empirical problem is that many children form independent households before they complete schooling, breaking the cross-sectional link between children's final schooling and parental income (Cameron and Heckman 1993). Figure 4a displays this phenomenon for several races in 1980 by plotting the fraction of children still living with their parents by age. The figure shows that children virtually all live with their parents up through age 16, and then begin to move out rapidly at rates that vary by race. Figure 4b shows that highest grade attained rises diffentially across races long after many children have left the parental household. By the ages at which schooling has been mostly completed, under 50% of children can be linked to parental income directly in census data.

Prior research has addressed this problem by turning to panel data (e.g. Cameron and Heckman 1993). Unfortunately, there is no panel data set in the US with a large sample of non-black, non-Hispanic minorities. I therefore address the dependency problem by developing a new method for imputing children's young-adult outcomes at the group level in cross-sectional data. The approach exploits (1) smooth group cohort size trends and (2) a proportionality assumption that I test and fail to reject in the PSID. I ignore race in the notation for simplicity; I implement the method separately for each race.

Slightly adjusting the above notation, let h_y represent average years of completed schooling for children of age a (age index omitted) with parental income y. Let d_y indicate the share of children in this parental income group claimed by parents as dependents in



(a) Fraction Dependent by Age



(b) Highest Grade of Schooling Attained by Age

Figure 4: The Dependency Problem in 1980

Notes: Panel (a) plots fraction of native-born children living with parents by age and race in 1980. Panel (b) plots average schooling of native-born children by age and race in 1980. Both plots exclude Alaska and Hawaii.

the census. Then write

$$h_y = d_y h_y^D + (1 - d_y)\, h_y^I \tag{2}$$

where superscript D indicates dependent status and superscript I indicates independent status. In one-year cross-sections of census data, we observe sample analogues of schooling for children by parental income for dependent children h_y^D, age-specific dependency rates d, and age-specific schooling for both dependents and independents, h^D and h^I respectively. We do not directly observe $y-$specific dependency rates d_y^I or schooling h_y^I for independent children. We would like to estimate these unobserved terms in order to impute overall schooling by income groups.

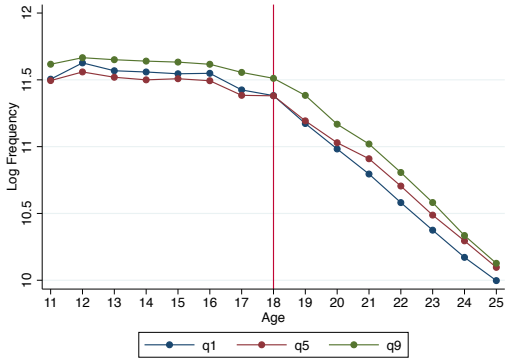
I estimate y-specific dependency rates using a ***smooth group cohort trends*** **assumption**. Write the total number of children at each age in cross-sectional data as N_y, and note that total children is the sum of dependent and independent children, $N_y = N_y^D + N_y^I$. As shown for 1980 in Figure 4a and is true for other years, children do not leave home until after age 16 for all races. This implies that $N_y^I \approx 0$ for all $a < 17$. We can therefore estimate group cohort size trends by regressing N_y^D on a polynomial in age a for $a < 17$ separately for each y group. I experiment with multiple orders of this polynomial; in practice simply imputing group size from age 17 works as well as richer specifications. The assumption here is that cohort size within groups evolves smoothly and slowly over time.

This assumption can be examined empirically. Figure 5 plots the log of the log of the number of children living with parents in different income deciles by age, with a different panel for each race. I use the new 100% sample of 1940 data for these figures because the size of the data permit the most powerful visual assessment of the assumption. In other years, the data reveal similar but noisier patterns. The figure conveys the appeal of the smooth cohort trend assumption.

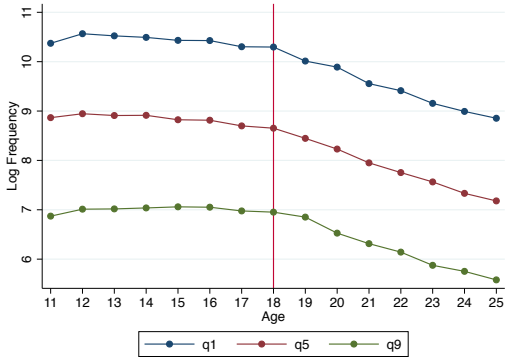
I estimate y-specific schooling for independents at a fixed age by making a stronger ***parallel curves*** **assumption**:

$$\rho = h_y^D - h_y^I \text{ for all } y. \tag{3}$$

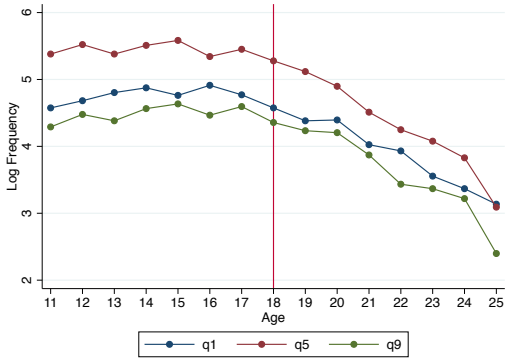
This assumption places no restriction on the shape of the Engel curves; it simply requires this shape to be equal up to a constant across dependent and independent children. The assumption is almost surely false in a literal sense, and will be violated in almost any economic model of dependency status. However, it captures the plausible notion that



(a) White



(b) Black



(c) Asian

Figure 5: Log Frequency Dependent by Age for Income Deciles 1, 5 and 9, 1940 100% Sample

Notes: Figures plot log frequencies for native-born children living with parents by age and race in 1940 100% IPUMS data sample, excluding Alaska and Hawaii.

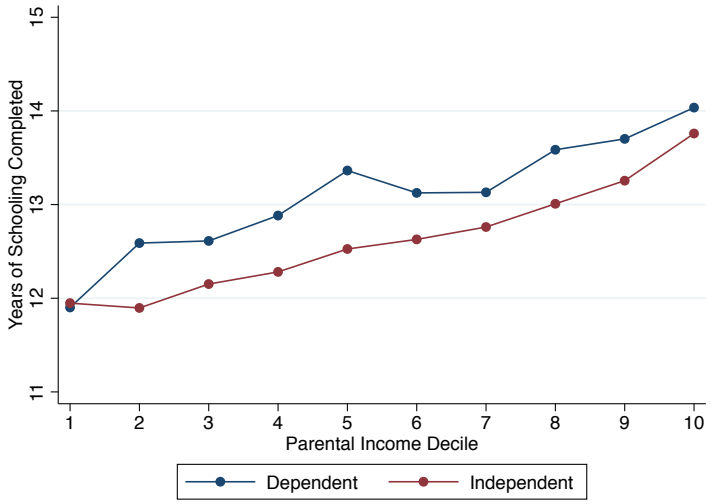


Figure 6: Years of Schooling Completed by Age 23 by Parental Income Decile at age 17

Notes: Figure based on data from PSID, pooling children from entire sample years 1968-2011, with average year around 1986. Figure plots average years of schooling completed by age 17 by total parental income when children are age 17. Schooling at 23 is set to missing when lower than six years. Probability weights applied in all calculations. Children with zero parental income at age 17 excluded.

parental income correlates with child outcomes in ways that do not strongly depend on annual dependency status in young adulthood.

Figure 6 examines this parallel curves assumption in the PSID by plotting years of schooling completed at age 23 by total parental income decile, where parental income is measured when children are age 17. The assumption appears to be a reasonable approximation of reality. A similar pattern emerges when using total parental earnings, rather than full income, and when examining other ages in the 22-25 range; regressions on the collapsed data consistently yield statistically and economically significant differences in intercepts but not for slopes across dependent and independent Engel curves.

Under proportionality, it is straightforward to solve for final schooling of independent children by age and income group. Dropping age subscripts for simplicity, let $\pi_y^I = \frac{N_y^I}{N^I}$, or income group shares for independent children. Then using the identity $h^I = \sum_{j=1}^{K} \pi_j^I h_j^I$, where K is the total number of income groups (*e.g.* deciles), we can substitute in for the h_y^I terms using the parallel curves assumption and solve for ρ:

$$\rho = \sum_{j=1}^{K} \pi_j^I h_j^D - h^I \tag{4}$$

We can then solve for the h_j^I terms using $h_j^D - \rho$, separately for each age. I implement this approach separately at each age from 22 to 25, and then average imputed final schooling across all of these ages in order to increase power.

5.3 Transitory Income

Another empirical problem is that we only observe one year of parental income per family in census data, potentially leading to biased estimates of parental Engel curves in permanent income due to measurement error. This is a larger problem here because measurement error in permanent income may vary systematically across racial groups, leading to differential mismeasurement of μ_g and θ_g and therefore underestimating the importance of income in explaining group schooling differentials. Recent research, for example, has shown that income may explain a much larger share of black-white test score gaps than previously thought (Rothstein and Wozny 2012).

To clarify the problem, let annual income of individual i in group g in year t equal permanent income plus noise

$$y_{igt} = y_{ig} + e_{igt}. \tag{5}$$

Let h_{ig} indicate final schooling for child i in group g. For simplicity I restrict the Engel curves to be linear. In an ideal regression, we would estimate the slope and intercept of the Engel curve with respect to permanent income, separately for each group g:

$$h_{ig} = \theta_g + \beta_g y_{ig} + \varepsilon_{ig} \tag{6}$$

Instead, we are forced to estimate Engel curves using annual income or annual earnings:

$$h_{ig} = \theta_g^* + \beta_g^* y_{igt} + \varepsilon_{ig}^* \tag{7}$$

The relationships between the coefficients in the feasible and the ideal regressions are

$$\begin{aligned} \beta_g^* &= (\alpha_g \lambda_g) \cdot \beta_g \\ \theta_g^* &= \theta_g + \left(1 - \alpha_g^2 \lambda_g\right) \mu_g \beta_g \end{aligned} \tag{8}$$

where α_g is the coefficient in a regression of transitory income on permanent income in group g, λ_g is the ratio of permanent to transitory income for group g, and μ_g is average permanent income in group g. The measurement error arises from pure measurement error such as recall mistakes, but also from transitory shocks to earnings, non-labor income, and lifecycle effects.

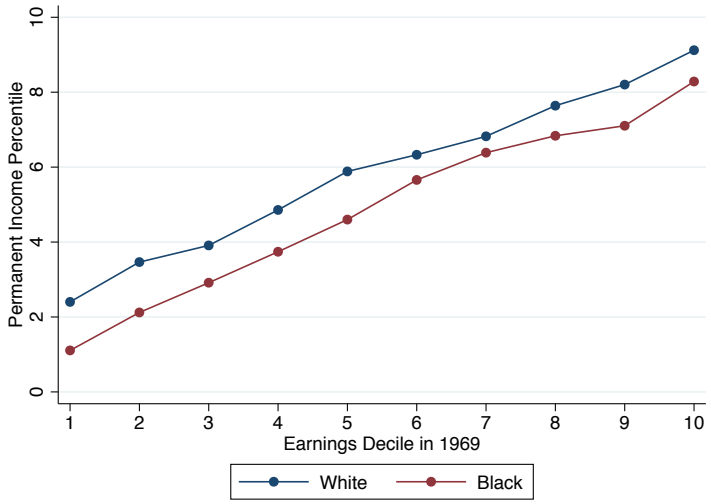


Figure 7: Average Permanent Income Percentile by Annual Earnings Percentile in 1969

Notes: Sample includes household heads, ages 25-65. Income includes labor, business, transfer, interest, dividents, and other sources of total family income. Permanent income calculated by averaging annual income in all available years for each individual household head, then taking the log of this average. Annual earnings deciles constructed using 1970 survey sample weights. Zeros excluded from annual earnings deciles. Zeros included in construction of permanent income.

Equation (8) shows that the use of annual rather than permanent income creates two problems. First, if groups differ in permanent income levels μ_g, then lower-income group Engel curves will be shifted down relative to higher-income group Engel curves, due to differential mean-reversion. Intuitively, if a black family and a white family are equally poor in a given year, the white family likely has higher income before and after this year than the black family, and therefore higher permanent income and child schooling. Figure 7 vividly confirms this problem in the PSID by plotting average percentile in permanent income by annual earnings deciles for black and white families separately in 1969. At all levels of annual earnings, black families have significantly lower permanent income, with a gap ranging from 5-15 percentiles. This gap arises from both differential non-labor income and differential mean-reversion of transitory shocks.

Second, if groups differ in the variance share of transitory income λ_g, then Engel curves in annual income will have slopes differentially attenuated by measurement error. For example, if black workers are more likely to be laid off, this will flatten the black Engel curve relative to the white Engel curve as estimated in cross-sectional data.

I address these problems directly by estimating the terms in equation (8).[7] A first step is to focus on estimating Engel curves with respect to income percentiles, rather than income levels or logs. This choice mechanically sets $\lambda_g \equiv 1$ if no individuals have identical incomes and incomes are not censored, and in practice this is a good approximation in this application. Note that λ_g is less stable over time for income in levels or logs, because income volatility increases over this period as other researchers have documented (*e.g.*, Shin and Solon 2011). I estimate μ_g in census data for each race in each year as the average percentile of annual parental income, which will equal the average percentile of permanent parental income if transitory and lifetime shocks cancel out within racial groups. The term α_g can be estimated directly in the PSID, but not in the census. If this moment is stable in the PSID, then it suggests extrapolation to earlier census years and to Asians has some credibility. To calculate α_g in the PSID, I regress total family earnings percentile in each year on permanent income percentile, restricting to families with at least 10 years of income in the PSID. Figure 8 displays α_g for whites and blacks separately in the PSID by year. The moment appears highly stable over time, and roughly similar across races. I therefore estimate this parameter at around 0.8.[8]

5.4 Geography

Historically, Asian Americans have lived primarily in two states: Hawaii and California. Hawaii is not a good test case for the model minority hypothesis because it was not included in the census in 1940-50, almost no blacks or Native Americans have ever lived there, and Asians in Hawaii did not experience the same kinds of legal discrimination as mainland Asians. (Tanaki XX, Hughes 1993). I therefore restrict the analysis to California. In 1940, California had ten times more native-born Asians than any other state, and still had four times more native-born Asians than any other state in 1980. California is the only state with sufficient numbers of Asians to estimate Engel curves precisely.

Fortunately, California has also contained a significant black minority over the 1940-2000 period. Moreover, blacks in California arrived as voluntary migrants in search of better economic opportunities, much like Asians, potentially controlling for some degree of selection. Figure 9 supports this by comparing income distributions for blacks, Asians

[7] I experimented with using home values and rents as measures of permanent income. These measures are appealing because they exist in census data for all races. However, home values and rents do not predict permanent income percentile as well as annual income or earnings percentiles in PSID data. In practice none of these choices affect the main results of the paper.

[8] XX [Different, clarify] Haider and Solon (2006) show this parameter in individual earnings regressions will not generally equal 1 under realistic lifecycle earnings processes.

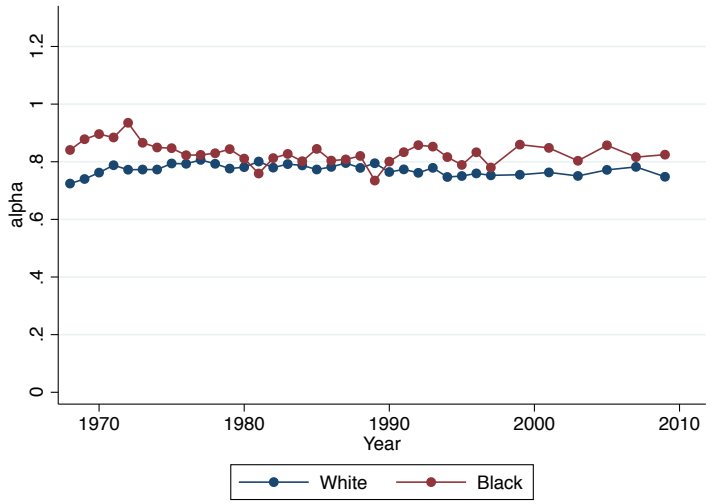


Figure 8: Estimated α_g by Year

Notes: The term α_g represents the coefficient from a regression of annual total family earnings percentile on permanent total family income percentile, run separately on each year in the PSID using each year's PSID probability weights. Sample includes families with heads between ages 25-65. Income includes labor, business, transfer, interest, dividents, and other sources of total family income. Permanent income calculated by averaging annual income in all available years for each individual household head, then taking the log of this average. Annual earnings deciles constructed using each year's sample weights. Zeros excluded from annual earnings percentiles. Zeros included in construction of permanent income from annual incomes, and in construction of permanent income percentiles.

and whites (a) nationally and (b) just for California. It is clear that blacks and Asians in California appear much more similar than they do at the national level.

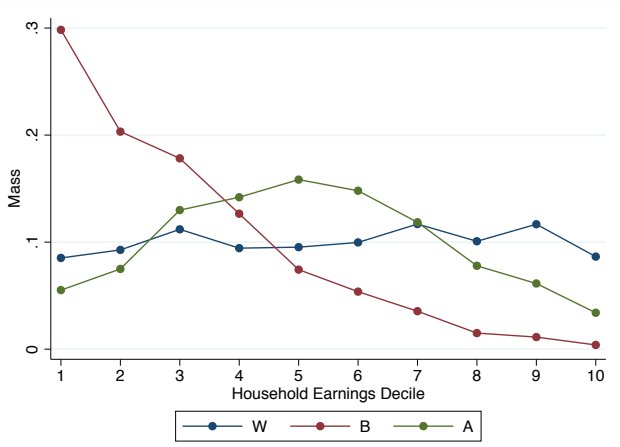
In addition to selecting on voluntary migration, restricting to California may align the institutional environment facing different minorities. Recent research has established that intergenerational mobility varies substantially across places in the US (Chetty *et al* 2014), and that much of this variation stems causally from the places themselves rather than selection of different individuals across places (Chetty and Hendren 2014). California had an excellent public school system in the early 20th century, ranking high compared to other states in teacher pay, total expenditures, class size, and other common metrics of school quality (Ayres 1920), and in many respects valuing efficiency and equity more than preferences of racist parents (Hendricks 1975). One might expect these institutional factors to affect demand for schooling and therefore parental Engel curves.

A consequence of the scarcity of Asians in the US overall is that Asians have been relatively scarce in every state and in every county at all points in US history. If we rank all mainland Asian individuals by the share of their county composed of Asians for each year since 1870, the median and 90th percentile Asian have lived in counties with 5.3% and 19.5% of all children Asian, respectively. The analogous figures for blacks are 24.1% and 58.7%, reflecting their much greater share of total US population.[9]

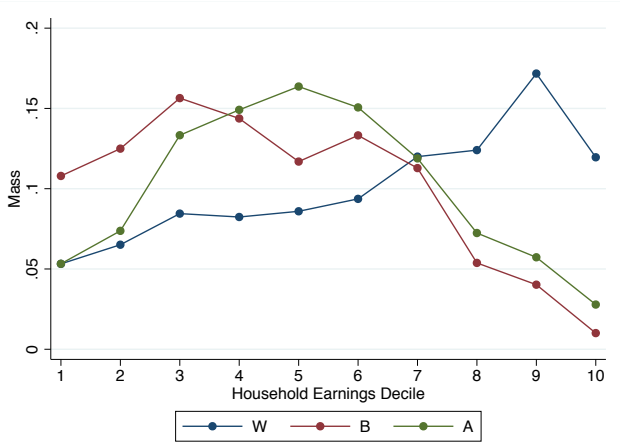
These differences have potentially important implications for the quality of public schooling available to Asians. Margo (1990) and Card and Krueger (1992) document that black-white school resource gaps increase dramatically with the share of blacks in the state and the county. For example, in 1920 class sizes at white and black schools were nearly identical in states with black population shares under 10%, while class sizes were twice as large in black schools in states with black population shares over 50% (Card and Krueger 1992, Figure II). In 1920 California was 3.4% Asian, and the two counties in California with the largest population of Asians (Los Angeles and San Francisco) were only about 4% Asian.

The mechanism for this relationship is described in Margo (1990). In the early 20th century demand for schooling rose dramatically. Whites could finance greater school expenditures by raising local school taxes, or by redistributing revenue from black schools to white schools, which had become feasible after the successful disenfranchisement of blacks in the late 19th century. The relative appeal of redistribution increased in the share of black property in the local tax base, which depended largely on the black population

[9] A similar pattern emerges at the state level, and if we restrict to any subset of years in this period.



(a) United States



(b) California

Figure 9: Parental Income Distribution for Native-Born by Race, 1940

Notes: Figures plot the probability mass functions for total parental earnings deciles of native-born children under age 18 in 1940. Deciles calculated over full US population, and therefore held fixed across races and locations.

share. For example, if blacks were 75% of the county population, then a $1 reduction in black per-pupil expenditures could finance a $3 increase in white per-pupil expenditure.

A large share of Asians in California were disenfranchised by legal exclusion from naturalization, much as many Southern blacks were disenfranchised by other Jim Crow laws and practices. However, small Asian population shares made it infeasible for most districts to finance any significant increase in white school expenditures through redistribution from Asian to white schools. In many cases, Asians were so scarce that the fixed costs of providing segregated schools would have amounted to a drain on white school budgets. Thus in many parts of California *de facto* integration was widespread relatively early in the 20th century.

XX It would be useful to replicate Margo's analysis of black-white school spending ratios in Louisiana counties on Asian-white school spending ratios in California counties. However this exercise may be underpowered due to the smaller variation in Asian population shares across counties (Asian county share in California never exceeds 20% in any year), and would require a list of segregated Asian schools that I have not been able to find in California state superintendant reports, city annual school board reports, and city annual budgetary reports for many of the cities with the largest Asian populations in CA in the 1900-1940 period. I do find many references to Asian integration and high achievement (e.g. Bell 1928, Hendrick 1975). The number of "Asian" schools in California appears to be quite small. In San Francisco, the highest-share county in California, the "Oriental School," later renamed Commodore Perry School, can be compared to other schools in per-pupil spending for the years 1924-29, and indeed ranks in the bottom few schools in San Francisco during these years.

6 Results

I first present the basic Engel curves for child schooling in the 1940 census that only adjust for independent children using the smooth group cohort trends and parallel curves assumptions as in section 5.2. I construct the curves separately for children at each age 22-25 and then take unweighted averages of these imputed schooling values within race and parental income group.

It turns out that the Engel curves are approximately linear in parental income percentile, and sometimes quite nonlinear in parental income levels and logs. I therefore focus on the decile specification because linearity has two advantages: (1) it allows me to summarize many Engel curves at once by displaying intercept and slope estimates, and (2) it facilitates adjustment for permanent income differences across races. Note that

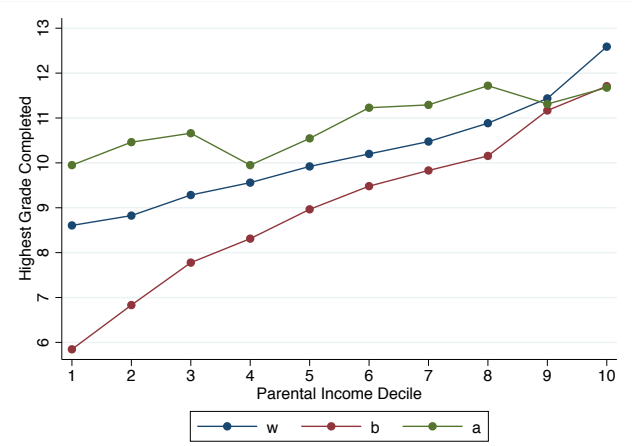
this decision does not drive any of the the main findings of the paper.

Figure 10 presents the results at the national level in two years: 1940 and 1980. I choose these years because 1940 is the first year with sufficient sample size to obtain precise Engel curves, and the pattern in 1980 is representative of the the later years; below I show the transition across all years in a more parsimonious way. The Engel curves are very different across all three races in 1940. Asians have significantly higher schooling than both whites and blacks, and blacks have a lower intercept and higher slope, leading to especially large differences in schooling at the lowest income levels. By 1980, whites and blacks look nearly identical, while Asians have a much higher intercept than both groups. Note that the Engel curves for whites and blacks displayed for 1980 match up well with Engel curves in the PSID as displayed in Figure 6 for average year 1986.

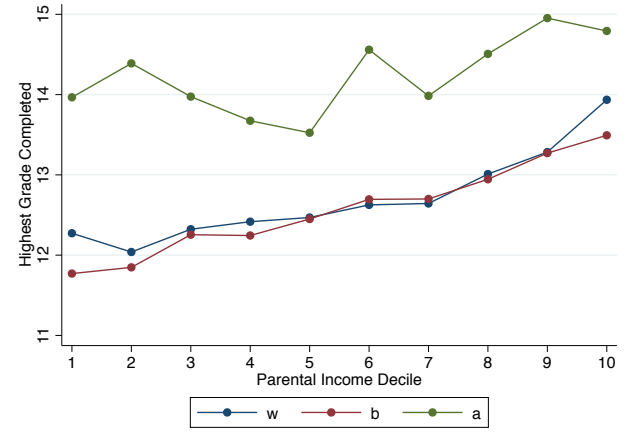
Figure 11 replicates Figure 10 restricting to just California. As discussed above, California is a more appealing place for comparing Asian and black group behaviors than the entire US for several reasons: California is the only state with significant populations of both races, it partly controls for school quality and access, its black residents are more similar to Asians on observables, its black residents are voluntary long-distance migrants and therefore may be more similar to Asians on unobservables. The large national differences in 1940 at the national level are virtually non-existent in California: all groups have high schooling consistent with California's states excellent educational system at that time. In 1940, the "model minority" status of Asians appears to be a confound for their residence in a state that generated high education levels much more broadly.

By 1980, the story is different. The slope of all Engel curves has fallen dramatically–parental income is much less associated with higher child schooling that it was in 1940. In addition, the stark difference between California and the US has disappeared. For both the full US population and the California sample, Asians display a much higher Engel curve than both blacks and whites, while blacks and whites display very similar Engel curves.

A useful way to summarize the information in these figures is to fit lines to the Engel curves and report slopes and intercepts by race and year. Figures 12 and 13 implement



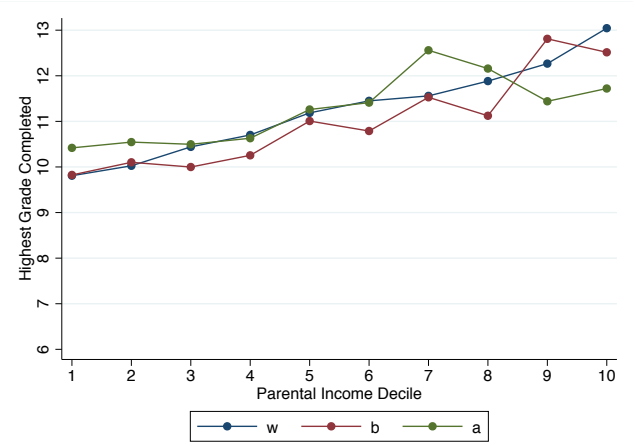
(a) 1940



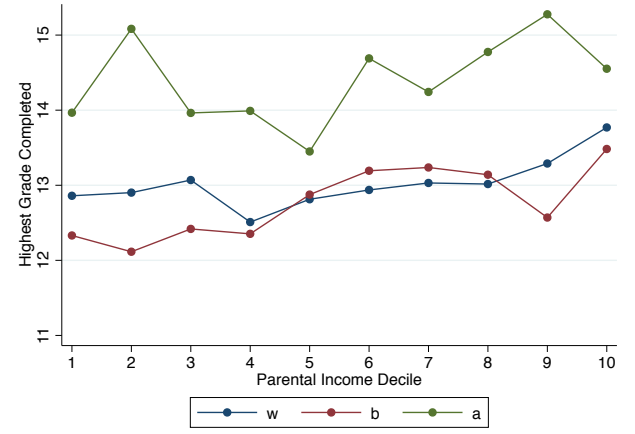
(b) 1980

Figure 10: Years of Schooling by Parental Income Decile: National U.S.

Notes: Hawaii and Alaska excluded. Figure adjusts for independent children and pools ages 22-25 as described in section 5.2 of paper. Parental income deciles calculated as sum of head and spouse earnings over full population age 25-65.



(a) 1940



(b) 1980

Figure 11: Years of Schooling by Parental Income Decile: California

Notes: Hawaii and Alaska excluded. Figure adjusts for independent children and pools ages 22-25 as described in section 5.2 of paper. Parental income deciles calculated as sum of head and spouse earnings over full population age 25-65.

this approach for the national and the California samples, respectively.[10] The patterns discerned in the prior figures emerge more clearly when comparing more years. Asians have higher schooling than both whites and blacks conditional on parental income. These higher Engel curves stem from higher intercepts rather than higher slopes. Blacks and whites have remarkably similar Engel curves, especially in California and relative to Asians. Engel curves across all groups converged dramatically from 1940 to 1970, then converged more slowly at the national level and stopped converging in California. Coinciding with this convergence has been an increase in Engel curve intercepts and a decline in Engel curve slopes. In other words, the poorest children caught up to the richest children rapidly up through 1970 and much more slowly or not at all after that.

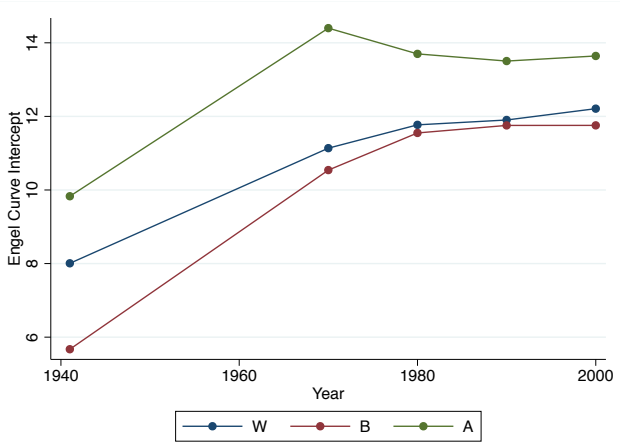
As discussed in section (5.3) and shown in Figure 7, blacks and whites with equal annual incomes do not have equal permanant incomes, and this may bias the estimated intercept and slopes displayed above. I now implement the correction for these permanent income differences using Equation (8). To give a concrete example, the adjustment in 1940 uses the values $\alpha_g = 0.8$ for all races based on Figure 8, $\lambda_g = 1$ for all races based on properties of distributions of percentiles, and $\mu_{white} = 6.6$, $\mu_{black} = 4.3$, $\mu_{asian} = 5.2$ based on average decile of annual total parental earnings in the census. The only thing changing over the years are these average parental earnings deciles.

This adjustment turns out to make virtually no difference to the results, and I therefore omit them. The results are similar when I estimate Engel curves using parental home mortgage and rent expenditures rather than family income, and when I reduce black annual earnings by plausible amounts to reflect permanent income gaps prior to constructing income deciles. It thus appears that unobserved permanent income differences are unlikely to drive the main patterns documented above.

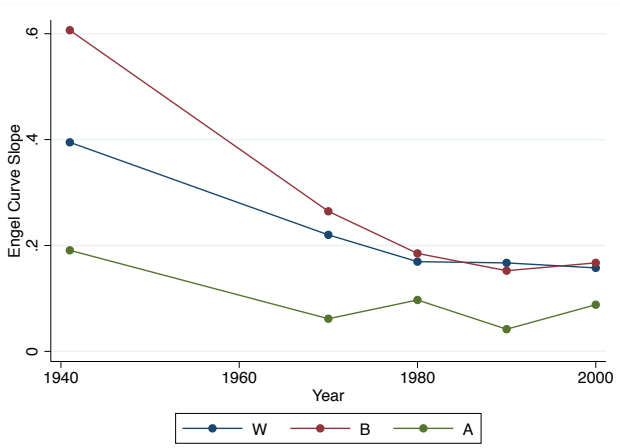
6.1 Education Expenditure Engel Curves

These results raise the question of how Asian families achieve such high education levels of their children. One simple explanation would be that they spend a greater share of

[10] Engel curves cannot be constructed for the 1950 census because only one individual per family received the census long form with questions about income and education, making it impossible to relate parental income to child outcomes. Engel curves can be constructed in 1960 but they are too noisy to be useful due to the 1% sample in the period before the 1965 Immigration Reform expanded the Asian-American population.



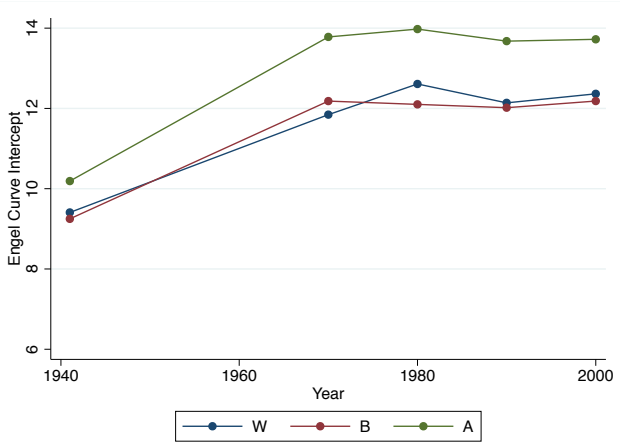
(a) Engel Curve Intercepts



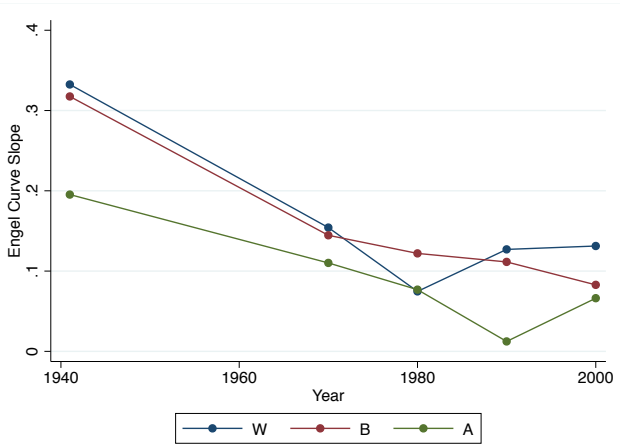
(b) Engel Curve Slopes

Figure 12: Linear Engel Curve Parameters by Race and Year: National US

Notes: Presents estimated intercepts and slopes from linear regressions of children's highest grade attained on parental income decile, using data grouped at the year by race by parental income decile level. Probability weights are used to construct cell means, but no weights are used in the regressions.



(a) Engel Curve Intercepts



(b) Engel Curve Slopes

Figure 13: Linear Engel Curve Parameters by Race and Year: California

Notes: Presents estimated intercepts and slopes from linear regressions of children's highest grade attained on parental income decile, using data grouped at the year by race by parental income decile level. Probability weights are used to construct cell means, but no weights are used in the regressions.

income on educational goods such as tutoring, books, tuition, summer camps, etc. To explore this explanation we construct actual Engel curves in the Consumer Expenditure Survey (CES), which added "Asian" to its racial classifications in 1980. Following Charles, Hurst and Roussanov (2009, henceforth CHR) I estimate Engel curves for two categories of goods: education expenditures and "visible" expenditures, where visible expenditures include clothing, jewelry, and cars. CHR compare whites, blacks and Hispanics; here I focus on whites, blacks and Asians.

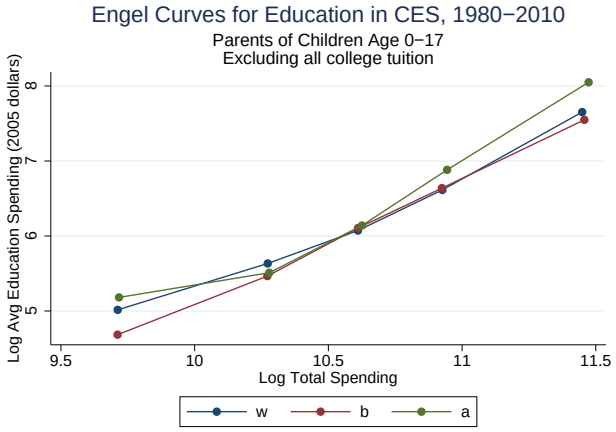
Figure 14 displays these Engel curves by total expenditure quintiles for whites, blacks and Asians separately, pooling all annual curves from 1980-2010 to increase statistical power for the relatively small Asian sample.[11] The figures are consistent with CHR in that blacks spend more on visible spending and less on education than whites. However, as with final schooling, the difference between blacks and whites is fairly small relative to the difference between Asians and both groups. Asians spend much less on visible spending and much more on education than other groups. This finding suggests one mechanism underlying the results in census data: Asians spend more on educational goods throughout their children's early lives.

7 Racial Pay Gaps

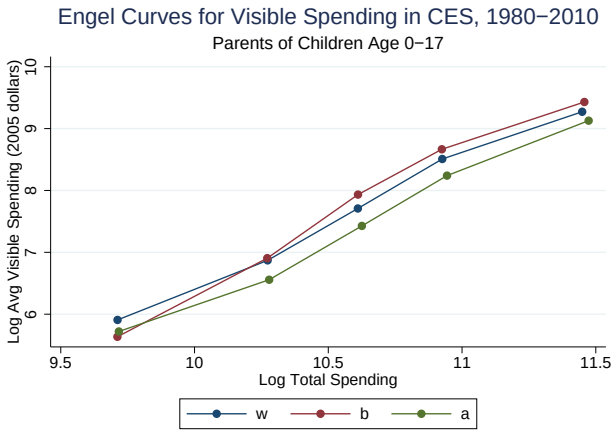
Equation (1) decomposes group outcomes into three factors: group parental Engel curves, group parental income distributions, and group pay conditional on schooling. Above I estimate group parental Engel curves. Group parental income distributions can be estimated directly in census data. The final component of the decomposition is pay conditional on schooling. This can also be estimated directly in census data, and turns out to play an important role in group earnings variation. Figure 15 displays log earnings for men by years of schooling in 1940 and 1980 in California. In 1940, Asians and blacks both received about 0.4 log points lower pay than whites at every level of schooling. By 1980, Asians were paid like whites, while blacks still faced a large pay penalty at all levels of schooling that falls in level of schooling.

As with Engel curves, these pay curves can be summarized parsimoniously by plotting intercepts and slopes over time by race. Figure 16 presents these estimates to highlight

[11] Figures restricting to California were too noisy to be useful; but note the difference between national and California Engel curves is quite small by 1980 in census data.



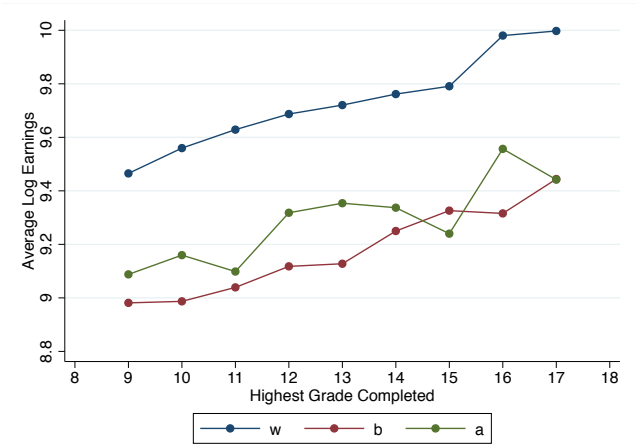
(a) Education Spending



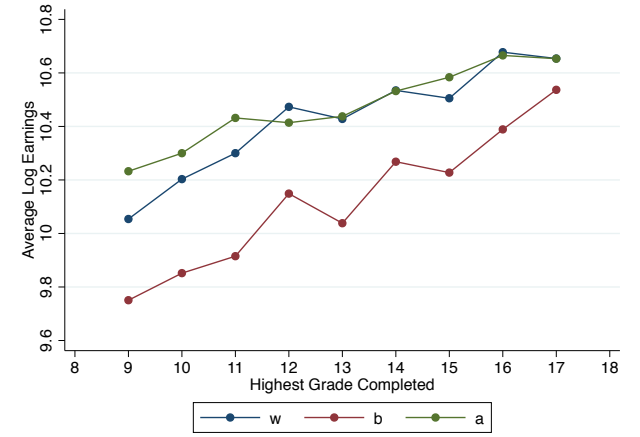
(b) Visible Spending

Figure 14: Engel Curves in CES by race, 1980-2010

Notes: Figures based on data from CES and constructed as follows. For each calendar year 1980-2010, calculate total spending quintiles excluding zeros, and construct group averages of log educational expenditures by these quintiles. Exclude spending on college tuition on own child or any of child's siblings from education category. Use CES sample weights both to construct quintiles and annual group averages. Next, average these yearly means into decadal means without using sample weights. Education expenditure contains: School books and supplies for all kinds of schools and day care, tuition for elementary and high school, tuition for vocational or technical school, tuition for other schools, rentals of books and equipment, and other school-related Test preparation, tutoring services. Visible spending includes all clothing, apparel products and services, personal care, transportation, cars and trucks, other vehicles, reduction in principal on vehicle loan, and auto parts.



(a) 1940



(b) 1980

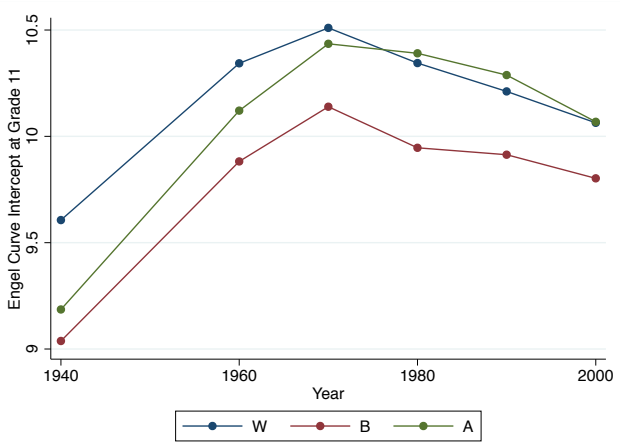
Figure 15: Log Earnings for Men by Highest Grade Attained

Notes: Restricts to native-born men ages 25-65. Reweights all groups to age distribution of Asians. Earnings deflated using CPI-Urban to 2011 dollars.

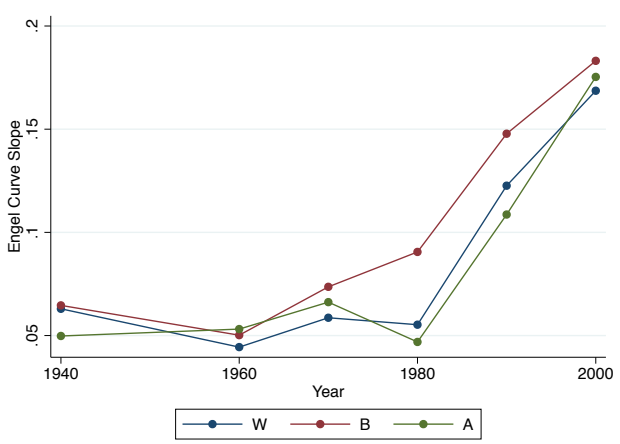
the evolution of pay levels and slopes over time. Asians caught up to white pay *levels* by 1970. The slopes of these lines, i.e. the Mincerian "return" to schooling, rise rapidly after 1980 for all groups, but especially for blacks. There is no evidence that blacks face weaker incentives to invest in schooling than other groups. Black men simply face lower pay levels than other groups.

Do these pay gaps within schooling categories stem from within- or between-occupation pay gaps? To examine this I first examine how black-Asian pay gaps vary with inclusion of dummies for occupation. I restrict the sample to native-born blacks and Asians in California and regress log earnings on a dummy for blacks, then include dummies for highest grade attained, and then include dummies for occupation. Figure 17 displays the resulting black-Asian pay gaps by year. Note that occupation has not yet been harmonized in the 100% 1940 sample, so the 1940 and 1950 IPUMS samples both contain too few native-born Asians with positive earnings living in California to include in this exercise. In California, as in the US more generally, Asians have always earned more than blacks. Education accounts for about 25-50% of this gap. Occupation as measured by the census variable OCC1950 accounts for an additional 20-25% of the remaining earnings gap. This leaves about 40-50% of the gap unexplained by either education or occupation in most years.

I also inspecte occupational differences manually by race and education group. For this exercise I define unskilled workers as those with highest grade attained ≤ 12, and skilled workers as those with highest grade attained ≥ 16. While there is substantial overlap in occupational groups across races within skill categories, there are some interesting differences. Unskilled Asians have entered seemingly more skill-intensive occupations than blacks since 1940. For example, higher shares of unskilled Asians have held occupations that are more white-collar (manager, clerical, bookkeeper), more technical (mechanic, machinist) and involving self-employment (farmer, gardener). In contrast, higher shares of unskilled blacks have held occupations that are more blue-collar (laborer, military), less technical (truck driver, porter, janitor), and involving wage employment (laborer, household worker). Among the high-skilled, Asians have been somewhat more likely to enter occupations requiring knowledge of science and math (e.g., accountant, engineer, physician).



(a) Regression Intercepts (Grade 11)



(b) Regression Slopes

Figure 16: Log Earnings Regressions on Highest Grade Attained by Year and Race

Notes: Slopes and intercepts from regressions of log earnings on highest grade of schooling attained using average log average in cells defined by year, race, and highest grade attained. Restricts to native-born men ages 25-65. All races reweighted to age distribution of Asians prior to construction of cell averages. Earnings deflated using CPI-Urban to 2011 dollars.

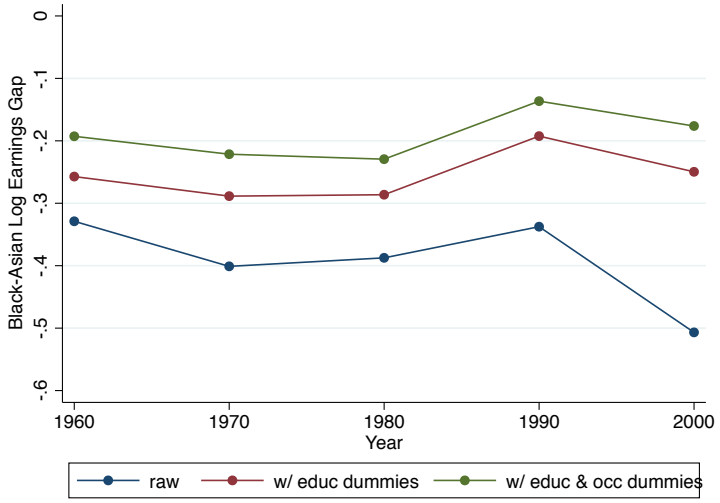


Figure 17: Black-Asian Log Earnings Gaps in California by Year

Notes: Sample includes native-born men ages 25-65 living in California. Points represent estimated coefficient on black dummy in regression of log earnings using data collapsed at the year*race*education*occupation level. All regressions use freqency weights from collapse, which in turn incorporate sampling weights from census. Years 1940 and 1950 excluded due to small samples; note variable OCC1950 not yet available in 1940 100% sample.

8 Estimating the Full Decomposition: the Importance of Group Engel Curve Variation

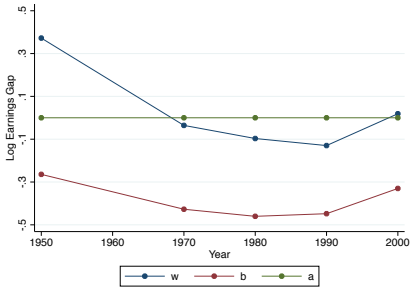
The results above suggest that Asian parents do indeed achieve higher schooling for their children than other families with similar resources. But are these differences in group Engel curves economically large? To answer this question I incorporate the findings above into the decomposition of group male earnings differences from Section (5.1). We now have all three terms from the decomposition in equation (1), and we can examine their relative contributions to group outcome gaps such as those presented in Figure 1.

For this exercise I focus on differences in average log earnings from Asians for men ages 30-35 as the group outcome gaps of interest. I restrict to native-born and to California for reasons discussed above. I focus on ages 30-35 because these young men likely experience parental behavior similar to what I estimate for 22-25 year olds in the prior census (ten years earlier), but they are older and therefore have earnings more representative of their lifetime earnings (see Chetty, et al 2014, Figure XX).

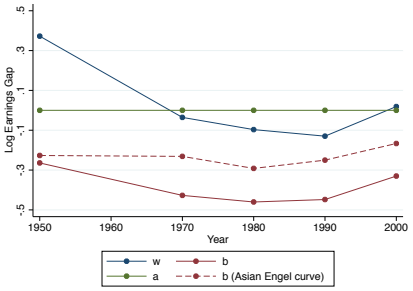
I perform three counterfactual exercises, imputing each term for Asians to blacks in each year and seeing how this alters earnings gaps from Asians. I here ignore the multi-generational dynamic effects of changing these terms for simplicity. The counterfactuals therefore mechanically address the question, "What would have happened if each generation of black children had received the parental income, Engel curve, or pay function that Asians received in that generation?" I display the results graphically in Figure 18, and present the numbers underlying the figures in Table 2.

In Figure 18.a, I present actual log earnings gaps from 1950-2000. This figure is similar to Figure 1. In year T, each point comes from combining all three estimated terms of the decomposition: the parental Engel curve at T-10, total parental earnings distribution at T-10, and male earnings conditional on schooling at T. Panel (a) shows that white earnings fall over time relative to Asians and blacks, while the black-Asian earnings gap does not change substantially over time.

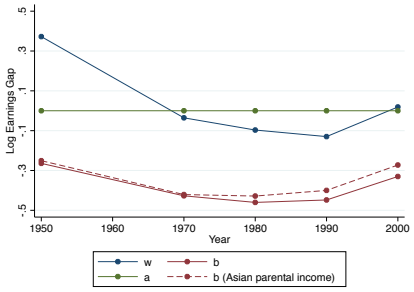
Panel (b) replaces the black Engel curve with the Asian Engel curve from the same year. This asks what would happen if blacks somehow took President Kennedy's "advice" and invested in their children's schooling at the same rate as a "model" minority. It also reflects a plausible upper bound on the impact of "stay in school" cultural exhortations. As expected based on the results above, Asian Engel curves significantly shift up black education and hence black earnings at every level of parental income in every year other



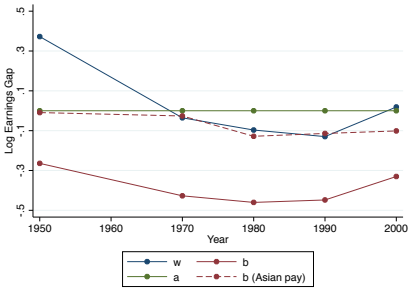
(a) Actual



(b) Blacks w/ Asian Engel Curve



(c) Blacks w/ Asian Parental Earnings



(d) Blacks w/ Asian Pay

Figure 18: Log Earnings Gaps from Asians by Race and Year in California

Notes: Figures present differences in average log earnings as calculated from three estimated terms in decomposition. The earnings function in 1950 imputed from 1940 earnings function for all races due to power limitations. Engel curves in 1960 and 1970 imputed from 1980 Engel curve for all races due to power limitations. Parental income calculated in T-10 for families with children age 13-18. Engel curves calculated as in Figure XX. Missing points in Engel curves imputed with linear interpolation; no race-by-year cell is missing more than four points. Average log earnings by education calculated on men ages 30-35. Calculations for all terms restrict to households residing in California.

Log Earnings Levels

Year	White Actual	Asian Actual	Black Actual	Black w/ Asian Pay Function	Black w/ Asian Parental Engel	Black w/ Asian Parental Income
1950	9.69	9.32	9.05	9.31	9.09	9.07
1970	10.57	10.61	10.18	10.58	10.38	10.19
1980	10.37	10.46	10.00	10.34	10.17	10.04
1990	10.47	10.60	10.15	10.49	10.35	10.20
2000	10.51	10.49	10.16	10.39	10.32	10.22

Black-Asian Log Earnings Gap

Year	Actual	Black w/ Asian Pay Function	Black w/ Asian Parental Engel	Black w/ Asian Parental Income
1950	-0.26	-0.01	-0.23	-0.25
1970	-0.43	-0.03	-0.23	-0.42
1980	-0.46	-0.13	-0.29	-0.43
1990	-0.45	-0.11	-0.25	-0.40
2000	-0.33	-0.10	-0.17	-0.27

Black-White Log Earnings Gap

Year	Actual	Black w/ Asian Pay Function	Black w/ Asian Parental Engel	Black w/ Asian Parental Income
1950	-0.64	-0.38	-0.60	-0.62
1970	-0.39	0.01	-0.20	-0.39
1980	-0.36	-0.03	-0.19	-0.33
1990	-0.32	0.02	-0.12	-0.27
2000	-0.35	-0.12	-0.19	-0.29

Table 2: Estimated Male Log Earnings Levels and Gaps by Year, California

Notes: See notes to Figure 18.

than 1940. These counterfactual investments would have closed about 40% of the black-Asian earnings gap in every year.

Panel (c) replaces the black parental income distribution with the significantly higher Asian parental income distribution. If the main advantage of being Asian is being rich, then we might expect more aggressive redistribution to improve racial earnings gaps. However, the results suggest that this higher income distribution has little impact on black earnings. This finding reflects the fact that parental Engel curves are not very steep after 1940. This finding also holds if we give black children the parental income distribution of white parents.

Panel (d) replaces the black pay function – pay conditional on education – with the pay function of Asians. The pay function turns out to be the most important advantage of Asians relative to blacks by far. Black earnings become similar to white earnings just from changing pay, without any change in parental income distributions of Engel curves. These large differences in pay presumably reflect either labor market discrimination or unobserved human capital differences, which may in turn depend on variation in home and school characteristics with complex social origins.

9 Conclusion

The importance of culture in explaining large and persistent group outcomes remains controversial within economics. In this paper I have examined a particularly influential version of this idea, the Model Minority Hypothesis as it applies to Asian-Americans. I first show that native-born Asian earnings have greatly exceeded black and Native American earnings at least back to 1940 and likely back into the 19th century. The basic evidence is therefore more consistent with viewing Asian Americans as a high-skilled immigrant group rather than an upwardly-mobile group. The long-term similarity of black and Native American earnings relative to Asians suggests that joining the US involuntarily and undergoing centuries of extreme subjugation has had long-lasting adverse effects on these groups. These historical differences suggest that Asian Americans are a problematic "control" group despite the apparent similarity of "Jim Crow" regimes imposed on blacks and Asians during the late 19th and early 20th centuries.

I then estimate parental "Engel curves" in children's final schooling for each race and year separately. Relying on both the census and the PSID, I develop three key empirical adjustments: (1) a method for incorporating independent children into group means by parental income, (2) a method for adjusting linear Engel curves to account for unobserved group differences in permanent parental income, and (3) an observation that California

is the only feasible place for comparing historical Engel curves of black and native-born Asian Americans. By focusing on California, I also control partly for unobserved determinants of costly immigration in pursuit of economic opportunity, and for effects of local minority population share on educational spending gaps as documented by Margo (1990) and Card and Krueger (1992).

The resulting Engel curves reveal several patterns of interest. Asian Americans have exhibited significantly higher parental Engel curves in children's schooling out of parental income than both whites and blacks. In contrast, black and white Engel curves in California have been strikingly similar as far back in time as can be measured. Using the CES, I show that high expenditures on educational goods and services may play a significant role in the high educational achievement of Asian children.

I then assess the economic magnitude of these Engel curve differences across races using a simple decomposition of racial earnings gaps. I show that while Asian Engel curves have provided a significant advantage over other groups, a much more important factor has been high Asian pay within education groups. Asians and blacks were both paid much less than whites within all educational groups in 1940, but Asians caught up to whites by 1980 while blacks made little progress. I show that occupational categories explain only about 25% of these within-education black-Asian earnings differences.

Therefore the MMH as applied to Asian Americans appears misleading at best and entirely false at worst. Asian Americans have likely always earned much more than blacks and Native Americans. While Asians may have displayed a significantly higher propensity to invest in children's schooling, this difference by itself has only accounted for a part of the Asian earnings advantage. A more important factor has been high Asian earnings within education groups relative to blacks. College major cannot account for these pay gaps; neither can occupational categories. Therefore Asian Americans either face less discrimination than blacks in the labor market, or Asian Americans accumulate more unobserved human capital than blacks during childhood. Existing research on early childhood achievement gaps (Fryer and Levitt 2013, XX more cites) and labor market discrimination (Neal and Johnson 1996, Fryer 2010) suggests a larger role for unobserved human capital. This explanation would be consistent with high-skilled Asian parents doing much more for their children than increasing their quantity of formal schooling. This conclusion, if correct, suggests that asking disadvantage parents to "keep their kids in school" will only partly address racial outcome gaps.

For Online Publication

Appendix 1: Dynamic Effects of Parental Engel Curve Variation

This appendix explores the effects of ignoring dynamics of equation (1) in Section 5.1 on my counterfactuals in Section 8. In order to study dynamics I have to make a number of strong simplifying assumptions. Ignoring group subscripts, I first linearize parental Engel curves as $h_1(y_0) = \theta + \gamma y_0$ and linearize adult earnings functions as $y^1\left(h^1\right) = \alpha + \beta h^1$. I can then rewrite equation (1) as

$$\mathbb{E}[y_1] = \int_{y_0} f(y_0) \{\alpha + \beta(\theta + \gamma y_0)\} dy_0. \tag{9}$$

I thereby assume that each group has a constant parental Engel curve and adult earnings function. I also assume that each parent has one child and each child has one parent. I thereby abstract from the marriage market, fertility choices, and different earnings functions for men and women.

This recursive relation leads to the following formula for average group earnings in generation T:

$$\mathbb{E}[y_T] = \int_{y_0} f(y_0) \left\{ (\alpha + \beta\theta) \sum_{j}^{T} (\beta\gamma)^{j-1} + (\beta\gamma)^T y_0 \right\} dy_0 \tag{10}$$

The key question is how black earnings would evolve over multiple generations under a larger Engel curve intercept such as that displayed by Asians, with and without accounting for dyamics. Ignoring dynamics amounts to esimating

$$\begin{aligned} \frac{\partial \mathbb{E}[y_T]}{\partial \theta} &= \frac{\partial}{\partial \theta} \int_{y_{T-1}} f(y_{T-1}) \{\alpha + \beta(\theta + \gamma y_{T-1})\} dy_{T-1} \\ &= \beta \end{aligned}$$

where the second step follows by ignoring the dependence of y_{T-1} on other parameters, which would be difficult to incorporate analytically. Intuitively, however, this effect simply shifts up the counterfactual black parental earnings distribution as the Asian Engel curve gradually raises black income over time. Therefore, a conservative shortcut that likely overstates the importance of dynamic considerations is to use the Asian parental income distribution for blacks in each year. As Figure 18.c makes clear, however, parental income distributions have little impact on average earnings due to the relative flatness of parental Engel curves; I therefore ignore this consideration.

Incorporating dynamics amounts to estimating

$$\frac{\partial \mathbb{E}[y_T]}{\partial \theta} = \frac{\partial}{\partial \theta} \int_{y_{T-1}} f(y_0) \left\{ (\alpha + \beta\theta) \sum_{j}^{T} (\beta\gamma)^{j-1} + (\beta\gamma)^T y_0 \right\} dy_{T-1}$$

$$
\begin{aligned}
&= \beta \cdot \left\{ \sum_{j=1}^{T} (\beta\gamma)^{j-1} \right\} \\
&\equiv \beta \cdot \Gamma_T
\end{aligned}
$$

Note that this derivaiton does not require ignoring dependence of y_{T-1} on other parameters, because the initial parental income distribution fully determines average group earnings in all future generations. Therefore, the potential error arising from the use of a static rather than dynamic model can be assessed by calculating the term Γ_T.

Denominating y_T in log real dollars, θ in years of schooling, β in log of real dollars divided by years of schooling, and γ in years of schooling divided by log of real dollars, I approximate these values for blacks as follows based on the 1970 values from Figure 16 and a version of Figure 13 replacing parental income deciles with log parental income: $\beta \approx 0.08$ and $\gamma \approx 0.5$. This leads to values of $\Gamma_T \approx 1.04$ for any $T > 1$, indicating a small bias from the use of static rather than dynamic counterfactuals.

Why is this bias small? When θ increases, this raises the amount of schooling achieved at every parental income level. This has a significant direct effect on earnings captured by β, the return to schooling. The dynamic effect arises from the upward shift in the parental income distribution for the next generation, which shifts the group's schooling along this higher parental Engel curve. The slope of this Engel curve, γ, is therefore the main determinant of the dynamic effect, and these Engel curve slopes are relatively small. When parental log earnings in the next generation raise by 0.08 due to the direct effect, an Engel curve slope of $\gamma = 0.5$ indicates an indirect effect on their children's schooling of 0.04 additional years, which raises earnings by only $0.08 * 0.04 = 0.0024$.

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