

ABSTRACT

Title of Thesis: THE EFFECT OF AGE STRUCTURE ON US
INCOME INEQUALITY, 1976 TO 2007

Scott Albrecht, Master of Arts, 2008

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This paper examines the relationship between age structure and income inequality. As a cohort ages, incomes become more unequally distributed within it. Consequently, as the age structure of a population evolves, it may have real effects on the aggregate distribution of incomes in that population. Using March CPS data from 1976 to 2007, I decompose inequality change by age and education. Changes in the age structure have had a net negative impact on inequality since 1976. The aging of the large baby boom cohort has been offset by the aging of the relatively small birth dearth cohort and by trends in mean income by age. I also find some evidence that inequality patterns by education are influenced by the age structure of education groups.

THE EFFECT OF AGE STRUCTURE ON US INCOME INEQUALITY,
1976 TO 2007

By

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INTRODUCTION

Researchers have identified a host of causes and catalysts that have powered trends in US income inequality over the last three decades (Kuznets 1965; Chevan and Stokes 2000; Morris and Western 1999; Schulz 1992; Morrill 2000). I propose here that it is also important to account for the evolution of the age structure of a population when discussing patterns in income inequality, because patterns and trends of income inequality vary by age. As the age structure of a population evolves, these differences in inequality by age may have real effects on the aggregate level of inequality in a population. I also offer a test of whether trends in inequality by education have been measurably influenced by changes in the age structure of the US population.

From a life course approach, this interrelationship between inequality and age (both in the biological sense and as a measure of time) exists because many of the factors that cause groups to be differentiated by income are cumulative (Dannefer 1987; O’Rand and Henretta 1999). For example, poor health early in life limits one’s access to better employment and, consequently, to better medical care. If a significant minority of a cohort is plagued by bad health, this cumulative disadvantage leads to increased heterogeneity within the cohort as the cohort ages (Deaton and Paxson 1998). Mechanisms of cumulative advantage or disadvantage include educational attainment, health, family formation (marriage, partner selection, divorce, and fertility tempo and quantum), and the statistical variance produced by a series of random events.

Members of a cohort are initially differentiated by discriminating social structures, choices (educational attainment, career and marriage decisions), and chance (“luck”) (O’Rand and Henretta 1999; Oaxaca and Ransom 1994). Structure, choice and

chance initially disadvantage some members of a cohort relative to others. This initial disadvantage is then exacerbated by the mechanisms of cumulative disadvantage. Lack of access to opportunities, poor choices and bad luck influence one's educational attainment, health, and family formation, which then ease or constrain an individual's ability to find work or be physically able to work, to be productive, gain experience and status in the labor market, and to take risks in search of higher wages.

Cumulative disadvantage within cohorts may have an impact on aggregate levels of inequality if the age structure of a population is evolving or if cohorts are differentially affected by the period effects of change. Because inequality within cohorts is generally greater than the inequality between cohorts (O'Rand and Henretta 1999; Easterlin, Macunovich and Crimmins 1993), if inequality varies systematically by age across cohorts, a younger population, *ceteris paribus*, will have a different aggregate income distribution than an older population. Therefore, although age does not uniquely create inequality, age structure can interact with those factors that produce higher (or lower) levels of inequality and produce real effects in the aggregate distribution of income.

The income distribution schedules between and within subgroups, such as the more and less educated, can also vary by age. Therefore, if members of younger cohorts tend to have higher levels of education than older cohorts (as was the case in the US when the baby boom entered the labor force), this can condition both the level of inequality within and between subgroups with different levels of education and the contribution of the educational income gap on aggregate income inequality. Using data from the Current Population Survey from 1976 to 2007, I decompose inequality change

between and within groups to analyze how trends in inequality have been conditioned by population aging and increased educational attainment.

LITERATURE REVIEW

Although cohorts are often treated popularly as monolithic entities, they are quite diverse and, in fact, the mechanisms of intracohort differentiation are defining features of any cohort (Elder 1975) and are conditioned by social structure and time (Maddux 1987). The study of intracohort differentiation has produced three hypotheses: 1) status maintenance; 2) cumulative advantage; and 3) status redistribution (O’Rand and Henretta 1999). I focus on the implications of these hypotheses on the income distribution within a cohort.

The *status maintenance* hypothesis states that status survives across life transitions and episodes in the life course (Pampel and Hardy 1994). Researchers have focused on the continuing importance of status markers during the transition from work to retirement and the stability of the income hierarchy as a cohort passes that threshold (Pampel and Hardy 1994; Henretta and Campbell 1976).

The hypothesis of *cumulative advantage* predicts increasing inequality with time based on an initial advantage or disadvantage (Crystal and Shea 1990; Dannefer 1987). Typically, studies supporting this hypothesis point to strong trends in inequality by age in cross-sectional data (O’Rand and Henretta 1999; see Crystal and Shea 1990). For example, Gottschalk and Smeeding (1997) find that inequality among the baby boomers is relatively pervasive and appears to have increased during the 1990’s. Cross-sectionally,

income inequality increases with age through the working years, as demonstrated by Figure 1.



Finally, the *status redistribution* hypothesis points to the effect of government programs and policies, particularly at retirement, in reducing income gaps. This hypothesis predicts both a decline in inequality after retirement and lower levels of inequality in less conservative welfare states (O’Rand and Henretta 1999). The effect of redistribution after retirement is notable in Figure 1 as within-group inequality falls as cohorts approach retirement.

Together, these hypotheses suggest an income distribution that is stable but increasingly unequal until retirement. Increasing heterogeneity with age is a dominant generalization in gerontology, and substantial evidence has been found for a “fanning

out” over a range of characteristics (Walker 1983; Maddox 1987; Massex and Douglas 1974; Danneger 1987). The patterns of income inequality within a cohort are driven by the status markers (e.g. education) and other factors (e.g. health) that allow some workers to outpace members of their cohort.

Mechansims of Intracohort Differentiation

The process of intracohort differentiation begins when some individuals are able to gain an initial advantage through structures, choice and chance. Recently, researchers have noted the effects of *trigger events*, including childbirth, divorce, and job loss, on social stratification through the life course (DiPrete 2002; Budig and England 2001; DiPrete and McManus 2000; Gangl 2006). In many cases, these triggers have a cumulative effect on income over time. The next section discusses a few mechanisms through which initial advantages or disadvantages may accumulate with age and time and, thus, produce higher levels of within-cohort differentiation in older cohorts.

An individual’s achieved level of education may be influenced by their access to education, their choices in terms of educational achievement, or other random circumstances (Oaxaca and Ransom 1994). Individuals are also differentiated by the type of education and not just the level of education—certain skill sets are better rewarded and this rate of reward changes over time (Gerhart 1990). Those with higher levels of education and skill sets that are better rewarded generally receive higher incomes while they are working, are less likely to become unemployed and more likely to find a new job in the case of job loss, and often experience a higher rate of income growth (Ashenfelter and Ham 1979; Levy 1998). Consequently, the relative advantage of education in terms of income grows with age.

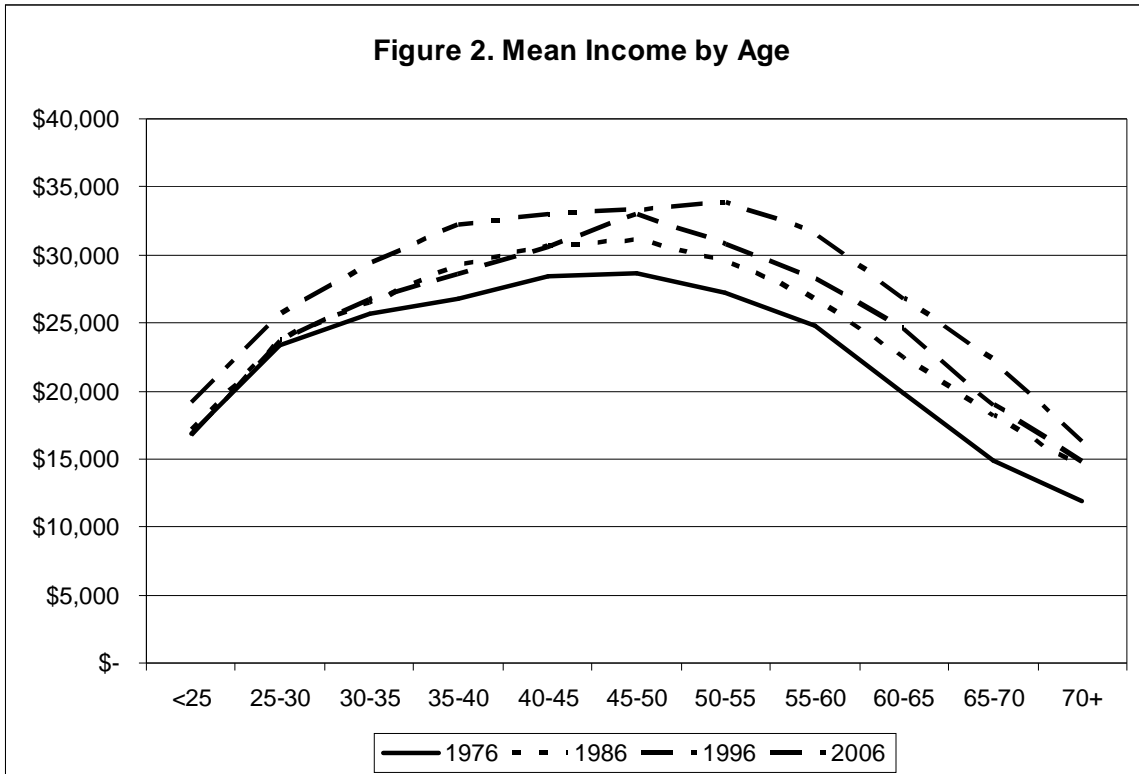
Childhood experiences, work environments and occupational stress, certain risky behaviors, and bad luck can also have strong health implications (Land and Young 2006). Deaton and Paxson (1998) have demonstrated how health, treated as a nonstationary random variable, can lead to increased disparity in health and income (see also Preston and Elo 1995; Adler et al 1994). Stress models of health over the life course emphasize that the effects of poor health are compounded (Ryff and Singer 1997), and thus its negative influence on income is also compounded.

Marriage, childbearing, and divorce, both their probability of occurring and the time at which they occur, have important consequences on household income. Studies have found an inequality between married and unmarried individuals that is maintained, if not exaggerated, through age (Oppenheimer 1994; Blau, F. 1998; Blossfield 1995). Married couples have an additional, pseudo-cumulative advantage in that more married women enter the labor force and take on more hours after children leave the house (Blau, D. 1998). These advantages, though, may be offset by childbearing and divorce (Budig and England 2001; DiPrete and McManus 2000). Another line of research points to the role of assortative mating in further differentiating households by education and occupational status (Oppenheimer 1994).

Through these mechanisms—education, health, and family formation—differences between members of a cohort can grow with time. Crystal and Shea (1990) found that, of the lowest quintile by income for those 64 and over, 51 percent were widowed, 53 percent had only an elementary education, and 34 percent suffered from poor health. By pushing individuals down divergent pathways, these mechanisms of cumulative disadvantage help to produce unequal outcomes later in life.

Intercohort Differentiation

Aggregate inequality can also be affected by relative differences in mean incomes across cohorts. Because the mean income of a cohort tends to follow a predictable path through the life course—increasing through the prime working years and then declining through retirement (see Figure 2)—changes in the distribution of the population by age can affect the distribution of incomes in the population (Easterlin, Macunovich and Crimmins 1993).



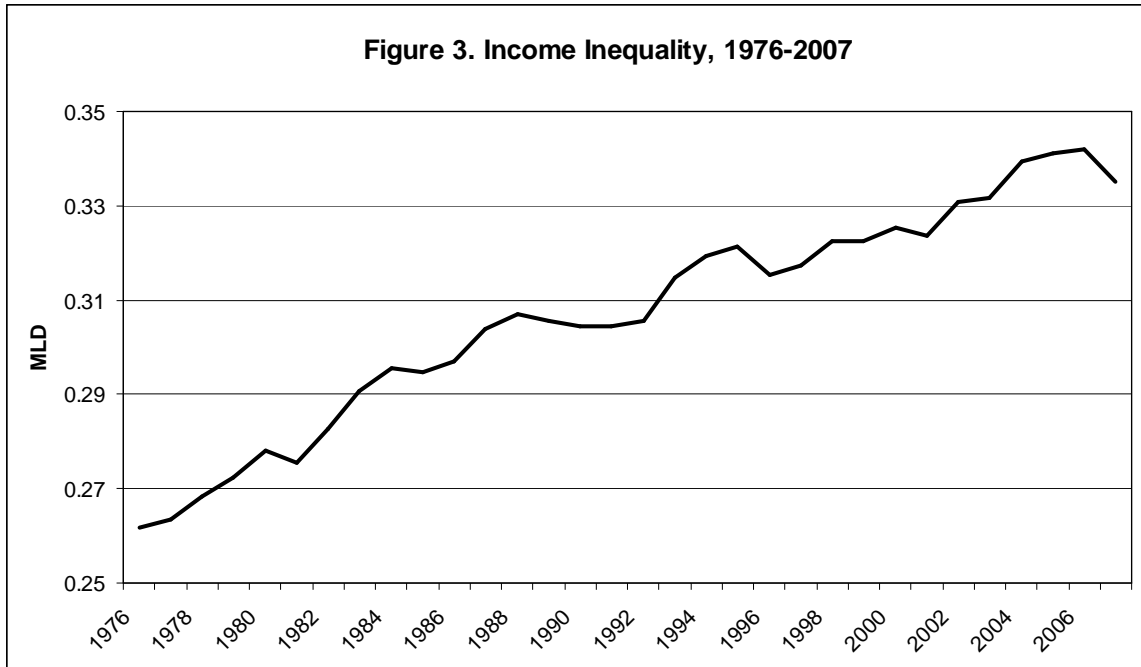
Cohorts can also be differentiated by period effects. Researchers have pointed to the unique impact of deindustrialization on men by age, race and metro status (Odland and Ellis 2002; Katz and Murphy 1992; Wilson 1996). Researchers have also looked at

the impact of demographic events. The Easterlin effect attempts to predict a number of cohort dynamics based on the size of the cohort (Easterlin 1967; 1981). Larger cohorts face greater competition, influencing the opportunities and expectations of members of those cohorts. This proposition is especially significant when we consider the impact of the baby boom on US inequality.

Recent Trends in US Inequality

Processes of intra- and intercohort differentiation within a specific age structure can work to exaggerate or hide the period effects of economic and historical events and trends on aggregate inequality. The result is a complex arrangement of embedded patterns and interactions that can be difficult to disentangle, but the effort to understand recent trends in US income inequality have produced some robust and widely accepted results.

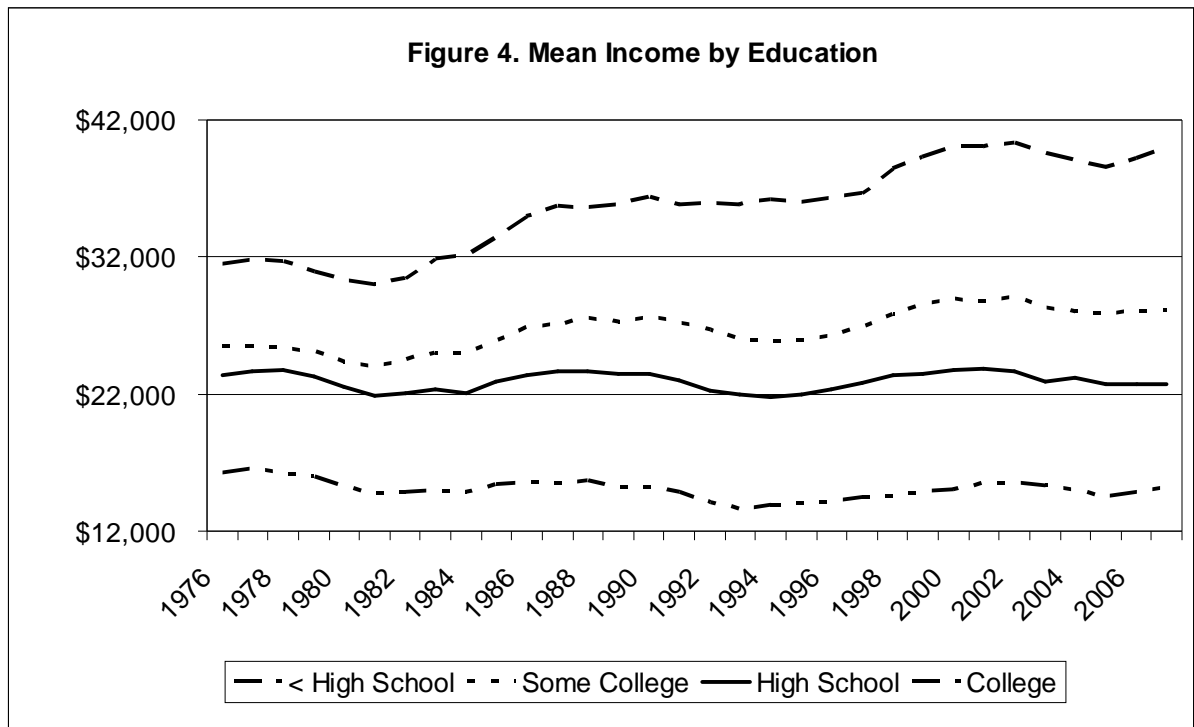
The first area of consensus is that inequality has been increasing (Lemieux 2008). The benefits of rapid economic growth in the 1950's and 1960's were widely distributed, but the economy stagnated in the 1970's and the earnings of workers began to diverge (Odland and Ellis 2001; Ryscavage 1999). Levy and Murnane (1992) identify three specific episodes in income inequality. From the end of World War II until 1973 real wages were growing rapidly across the board and the slope of income inequality was negative. Between 1973 and 1979 the economy stagnated and real wages stagnated as well, and then in 1979 income inequality began to rise rapidly (see Figure 3).



Since 1979, skill-biased technological change, in the context of the human capital theory of income, has been used to explain increased levels of aggregate inequality (Katz and Murphy 1992; Bound and Johnson 1992). The computer revolution (Krueger 1993) and the decline of the manufacturing sector led to a new economic environment that rewarded the performance of abstract tasks (that require high levels of education to perform) above the performance of routine tasks (Autor, Katz, and Kearney 2006).

Through the 1980's, the growth in income inequality appeared to be ubiquitous—it affected the level of inequality between and within all education groups. Since the early 1990s, though, inequality has grown primarily within the college educated, with little change within the less educated groups, such that the majority of inequality growth has occurred among those with incomes above the median (Lemieux 2006, 2008; Piketty and Saez 2006; Autor, Katz, and Kearney 2006). In other words, aggregate inequality in the US has grown over the last decade because the incomes of some, but not all, of the

college educated have grown disproportionately, increasing the gap between the college educated and others and also widening gaps with the college educated group. This trend is demonstrated in Figure 4.



AGE STRUCTURE, EDUCATION, AND INEQUALITY

The interaction of education and age structure, and the consequent impact on inequality, has already been well-documented for one historical period. During Levy's second period of inequality, from 1973 to 1979, the demand for skill was on the rise, but the demand was outstripped by the supply of new educated workers as the baby boomers entered the labor force (Freeman 1976). It was, therefore, during the 1980's, when the relative supply of college educated workers began to decelerate, that the highly skilled

were able to make real gains in earnings while the earnings of those with less education stagnated (Autor, Katz and Kearney 2005).

Since then, though, researchers have generally ignored the potential effects of an aging baby boom (and the evolution of the age structure generally) on inequality. Gottschalk and Smeeding (1997) noted that the baby boom has become more differentiated over time. But the literature lacks a systematic analysis of the effect of this increased differentiation on inequality between and within education groups and on aggregate inequality. Researchers have identified a number of factors that are associated with trends in income inequality (educational income gap, increased employment in service industries, skill-biased technological change), but these research efforts assume that the distribution of wages is independent of age. The contribution of this paper is that it considers the effect of age structure on income distribution for the entire population and within and between education groups.

I first propose that some degree of change in the aggregate level of inequality in the United States over the last three decades can be linked to changes in the population's age structure. A cohort can contribute to the aggregate level of inequality both through the mean income of the group (between-group inequality) and the level of variance within that group (within-group inequality). Because both the mean income and within-cohort differentiation vary systematically with age, changes in the age structure of the population, which change the relative weights and contributions of the different age groups, can impact aggregate inequality.

Second, it is proposed that the trend of increasing within-group inequality among the college educated is in part a product of the changing age structure of that group. The

baby boom generation is both large and better educated than any preceding generation. Consequently, the changes in the age structure of specific education groups are even more dramatic than changes in the age structure of the whole population. The group most affected by these trends is the college educated, whose median age fell in the 70s when the baby boomers hit the labor market and is now rising. As discussed earlier, this trend can produce greater inequality within the college educated and increase the gap between the college educated and the less educated—such that demographic trends may be responsible for patterns of inequality that appear structural in nature.

METHODOLOGY

I will use a multi-level decomposition of inequality by age and education. This decomposition allows for a consistent comparison of the sources of aggregate inequality: inequality within age and education groups, between age and education groups, and the weight of these groups as determined by the age and educational distribution of the population.

This analysis uses the Mean Log Deviation measure of inequality because it is additively decomposable—the result is the same regardless of how we divide the population or if we divide the population at all (Theil 1967; Shorrocks 1980; 1984). Though the interpretation of the measure is not as straightforward as some more common inequality measures (i.e. Gini), this study focuses on the relative values of the component parts, which have developed fairly standard interpretations (see Mookherjee and Shorrocks 1982; Akita 2003).

The MLD is expressed as:

$$I_0 = \sum_i n_i \ln\left(\frac{\mu}{y_i}\right)$$

where n_i is the share of the population represented by i (be it a group or individual), y_i is the income of i , and μ is the mean income of the population.

If we group i into j groups, the measure transforms to:

$$I_0 = \sum_j n_j I_{0j} + \sum_j n_j \ln\left(\frac{\mu}{\mu_j}\right) \quad \text{where} \quad I_{0j} = \sum_{ij} \frac{n_i}{n_j} \ln\left(\frac{\mu_j}{y_i}\right)$$

such that the first term is the “within-group” inequality term and the second represents “between-group” inequality. This second expression of I_0 is always equal to the first if all i belong to one and only one j .

This cross sectional measure can then be converted to a measure of change over time.

$$\Delta I_0 = \sum_j n_{j(t+1)} I_{0j(t+1)} - \sum_j n_{j(t)} I_{0j(t)} + \sum_j n_{j(t+1)} \ln\left(\frac{\mu_{(t+1)}}{\mu_{j(t+1)}}\right) - \sum_j n_{j(t)} \ln\left(\frac{\mu_{(t)}}{\mu_{j(t)}}\right)$$

$$\begin{aligned} \Delta I_0 = & \sum_j n_{j(t+1)} I_{0j(t+1)} + \left(n_{j(t)} I_{0j(t+1)} - n_{j(t)} I_{0j(t+1)} \right) - n_{j(t)} I_{0j(t)} + \\ & \sum_j n_{j(t+1)} \ln\left(\frac{\mu_{(t+1)}}{\mu_{j(t+1)}}\right) + \left(n_{j(t)} \ln\left(\frac{\mu_{(t+1)}}{\mu_{j(t+1)}}\right) - n_{j(t)} \ln\left(\frac{\mu_{(t+1)}}{\mu_{j(t+1)}}\right) \right) - n_{j(t)} \ln\left(\frac{\mu_{(t)}}{\mu_{j(t)}}\right) \end{aligned}$$

$$\Delta I_0 = \sum_j \Delta I_{0j} n_{j(t)} + \sum_j \Delta n_j I_{0j(t+1)} + \sum_j \Delta \ln\left(\frac{\mu}{\mu_j}\right) n_{j(t)} + \sum_j \Delta n_j \ln\left(\frac{\mu_{(t+1)}}{\mu_{j(t+1)}}\right)$$

The first term of the final equation estimates the change in aggregate inequality due to a change in inequality within groups, the second and fourth terms account for

changes in the relative size of groups, and the third term measures the effect of changes in the relative income levels of different groups (Shorrocks 1982; Akita 2003).

This analysis uses decompositions by age (11 age groups-under 25, 25 to 29, 30 to 34, 35 to 39, 40 to 44, 45 to 49, 50 to 54, 55 to 59, 60 to 64, 65 to 69, and 70+) and by education (less than high school, high school, some college, college graduate). The final decomposition uses a total of 44 nested categories-eleven age categories within each of four education categories.

Using the decomposition method above, change in inequality can be decomposed to a change in the distribution of the population by age and by education, a change in the level of inequality within groups (by age and education) and a change in the level of inequality between groups. If age structure is an important framework for understanding inequality dynamics, we would expect the first component measure, a change in the distribution in population by age, to be consistent with changes in the age structure of the population and to be substantially large for the period in question.

I have used data from the March Current Population Survey from 1976 to 2007. The primary variable is household income, adjusted to the consumer price index. Demographic characteristics of the household (age and education) are adopted from the householder.

RESULTS

Cross-Sectional Inequality by Age and Education

Table 1 charts inequality within age groups over time. In all time periods, within-group inequality increased over the prime working years and then steadied after

retirement (see also Figure 1). Table 1 also shows that inequality increased for all age groups between 1976 and 2007, but that within-group inequality increased the most, both in terms of real increase and increase as a percent of the original inequality mark, for younger age groups, with inequality increasing by about 65% for the youngest two age groups.

Year	Under 25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70+
1976	0.221	0.167	0.177	0.173	0.187	0.205	0.233	0.264	0.290	0.271	0.279
1977	0.222	0.175	0.167	0.184	0.191	0.200	0.233	0.265	0.287	0.270	0.277
1978	0.243	0.183	0.173	0.183	0.187	0.202	0.237	0.254	0.296	0.271	0.277
1979	0.229	0.191	0.188	0.185	0.196	0.211	0.238	0.267	0.298	0.278	0.280
1980	0.240	0.192	0.189	0.194	0.205	0.219	0.250	0.270	0.310	0.287	0.282
1981	0.235	0.202	0.205	0.196	0.208	0.208	0.258	0.268	0.292	0.273	0.277
1982	0.263	0.219	0.205	0.216	0.217	0.231	0.249	0.270	0.303	0.276	0.287
1983	0.273	0.235	0.213	0.241	0.231	0.252	0.270	0.276	0.289	0.277	0.304
1984	0.292	0.243	0.224	0.222	0.237	0.252	0.263	0.301	0.306	0.273	0.299
1985	0.293	0.244	0.225	0.221	0.240	0.259	0.274	0.305	0.301	0.270	0.296
1986	0.298	0.246	0.221	0.224	0.230	0.238	0.283	0.305	0.312	0.282	0.306
1987	0.311	0.240	0.239	0.236	0.227	0.256	0.270	0.309	0.325	0.283	0.305
1988	0.318	0.244	0.246	0.237	0.232	0.250	0.277	0.307	0.325	0.283	0.316
1989	0.312	0.245	0.239	0.233	0.228	0.259	0.295	0.307	0.317	0.286	0.310
1990	0.295	0.244	0.241	0.231	0.232	0.254	0.278	0.314	0.298	0.298	0.312
1991	0.319	0.259	0.243	0.230	0.225	0.249	0.278	0.297	0.311	0.287	0.315
1992	0.306	0.258	0.257	0.235	0.225	0.256	0.280	0.291	0.309	0.309	0.295
1993	0.337	0.258	0.260	0.249	0.243	0.255	0.279	0.311	0.315	0.295	0.304
1994	0.347	0.270	0.277	0.261	0.252	0.266	0.281	0.302	0.299	0.290	0.301
1995	0.317	0.272	0.266	0.260	0.257	0.254	0.271	0.327	0.355	0.307	0.300
1996	0.328	0.252	0.269	0.250	0.260	0.258	0.305	0.329	0.320	0.280	0.298
1997	0.312	0.266	0.264	0.251	0.247	0.257	0.313	0.330	0.330	0.318	0.307
1998	0.347	0.264	0.275	0.260	0.251	0.261	0.293	0.348	0.338	0.324	0.308
1999	0.333	0.277	0.253	0.264	0.261	0.263	0.283	0.341	0.339	0.324	0.323
2000	0.353	0.268	0.261	0.249	0.268	0.266	0.293	0.353	0.340	0.322	0.318
2001	0.315	0.270	0.259	0.253	0.260	0.274	0.289	0.328	0.347	0.315	0.333
2002	0.339	0.270	0.268	0.269	0.268	0.278	0.292	0.365	0.340	0.327	0.318
2003	0.345	0.283	0.266	0.268	0.282	0.277	0.290	0.335	0.335	0.327	0.316
2004	0.362	0.291	0.285	0.271	0.271	0.289	0.293	0.333	0.337	0.335	0.336
2005	0.356	0.276	0.284	0.282	0.276	0.297	0.320	0.335	0.344	0.341	0.326
2006	0.366	0.284	0.278	0.280	0.292	0.301	0.299	0.329	0.345	0.337	0.335
2007	0.365	0.277	0.275	0.276	0.274	0.287	0.302	0.319	0.351	0.322	0.336
Change	0.144	0.110	0.098	0.104	0.087	0.082	0.069	0.055	0.060	0.051	0.058
%Change	65.3%	65.8%	55.3%	60.2%	46.5%	40.2%	29.6%	20.8%	20.7%	18.9%	20.7%

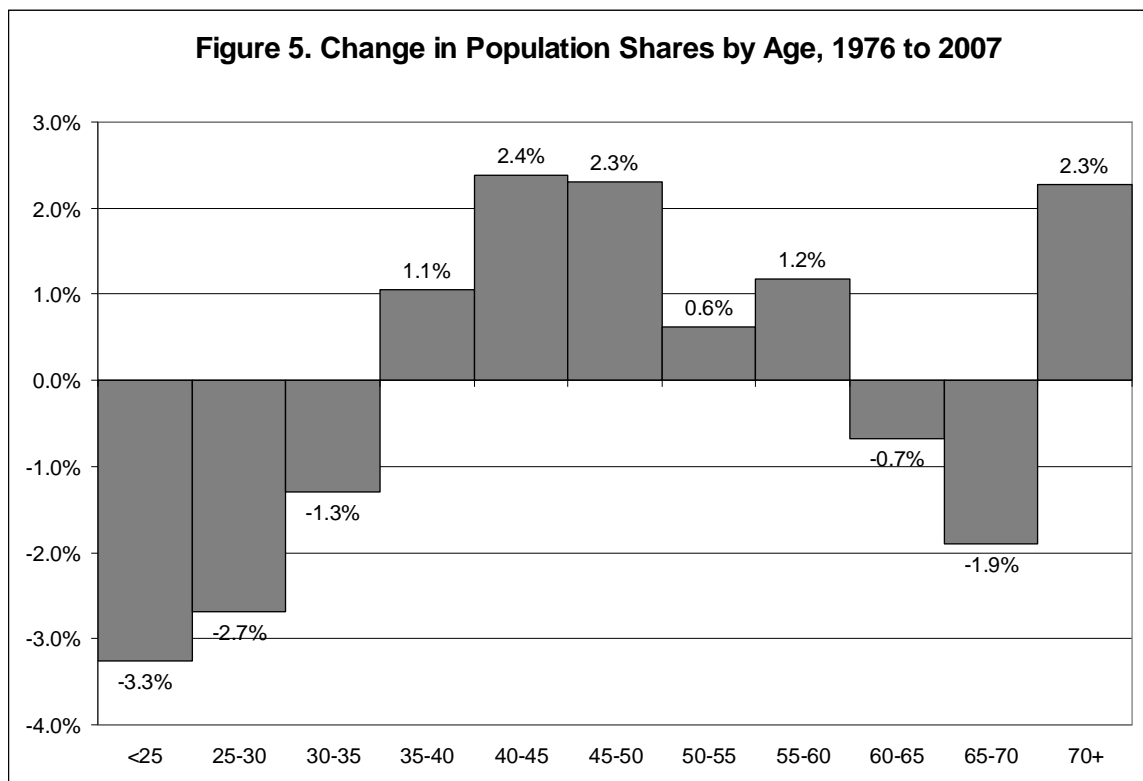
When we divide the population by education level we see that these groups also had unique experiences from 1976 to 2007 in terms of mean income and within-group inequality (see Table 2). Again, within-group income increased for all groups, but more

so for those groups with at least a high school education. Notably, real incomes declined for those with a high school education or less over the period while increasing 10% and almost 27% for those with some college and a college degree, respectively.

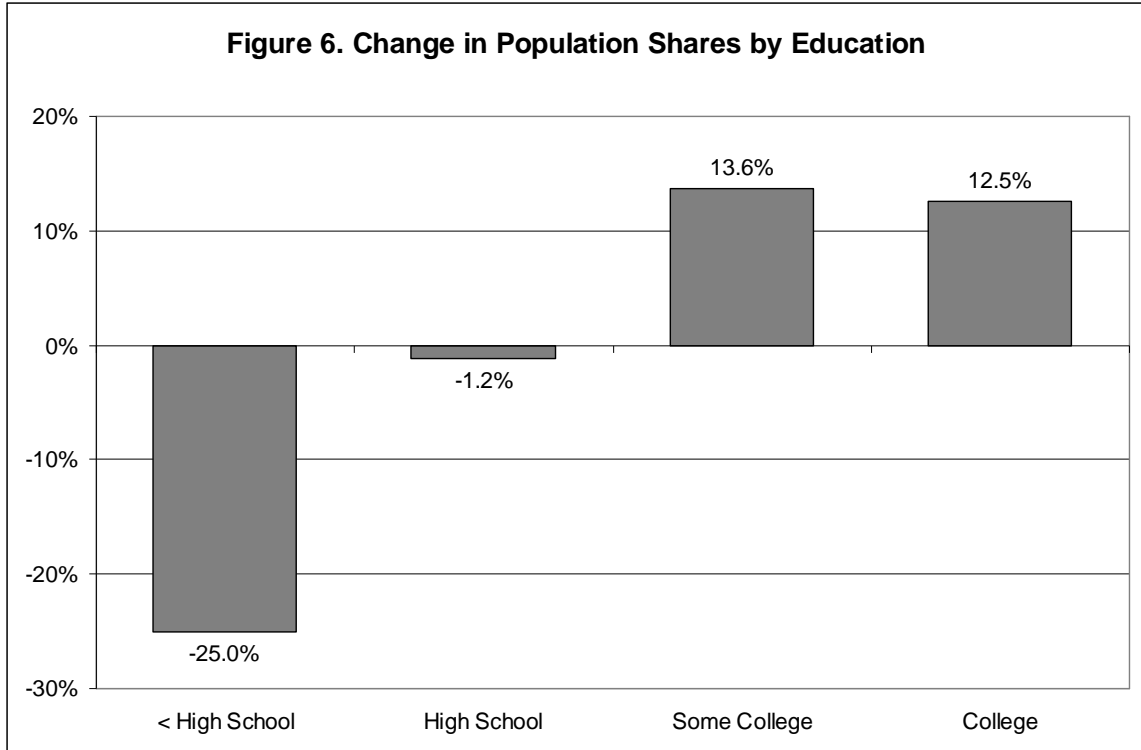
Year	MLD				Income			
	< HS	High School	Some College	College	< HS	High School	Some College	College
1976	0.299	0.207	0.196	0.164	16,265	23,396	25,428	31,479
1977	0.300	0.211	0.207	0.165	16,553	23,680	25,446	31,727
1978	0.304	0.218	0.211	0.170	16,243	23,773	25,333	31,611
1979	0.312	0.225	0.212	0.175	15,910	23,277	25,047	30,927
1980	0.325	0.224	0.215	0.175	15,220	22,562	24,300	30,381
1981	0.318	0.223	0.219	0.169	14,709	21,833	23,921	29,920
1982	0.319	0.237	0.227	0.179	14,854	22,066	24,471	30,418
1983	0.325	0.250	0.222	0.179	14,914	22,342	24,949	31,842
1984	0.335	0.249	0.236	0.182	14,816	22,063	24,948	32,169
1985	0.331	0.251	0.242	0.183	15,385	22,944	25,786	33,406
1986	0.334	0.259	0.233	0.174	15,599	23,342	26,849	34,958
1987	0.343	0.262	0.241	0.178	15,493	23,631	27,070	35,671
1988	0.352	0.266	0.245	0.181	15,703	23,633	27,508	35,630
1989	0.345	0.269	0.232	0.181	15,221	23,472	27,192	35,820
1990	0.348	0.262	0.231	0.185	15,176	23,446	27,617	36,387
1991	0.341	0.269	0.236	0.181	14,850	22,997	27,205	35,829
1992	0.339	0.270	0.241	0.181	14,032	22,256	26,626	35,867
1993	0.339	0.282	0.251	0.188	13,561	21,955	25,995	35,803
1994	0.333	0.287	0.263	0.205	13,903	21,741	25,804	36,191
1995	0.345	0.296	0.258	0.208	13,936	21,981	25,902	36,022
1996	0.328	0.286	0.261	0.212	14,075	22,335	26,258	36,250
1997	0.334	0.293	0.267	0.210	14,442	22,774	26,879	36,646
1998	0.341	0.294	0.274	0.207	14,533	23,345	27,779	38,443
1999	0.341	0.301	0.268	0.210	14,860	23,496	28,536	39,234
2000	0.348	0.301	0.267	0.219	15,039	23,764	28,898	40,054
2001	0.346	0.304	0.263	0.226	15,466	23,841	28,718	40,048
2002	0.344	0.301	0.282	0.235	15,508	23,642	29,157	40,285
2003	0.351	0.307	0.283	0.229	15,248	22,945	28,297	39,518
2004	0.346	0.319	0.289	0.247	14,978	23,191	28,014	39,131
2005	0.347	0.321	0.287	0.246	14,431	22,727	27,876	38,504
2006	0.345	0.319	0.299	0.245	14,837	22,698	27,999	39,155
2007	0.342	0.307	0.292	0.245	15,235	22,731	28,068	39,931
Change	0.043	0.100	0.096	0.080	-1,029	-665	2,640	8,452
%Change	14.4%	48.4%	48.8%	49.0%	-6.3%	-2.8%	10.4%	26.9%

Along with the level of inequality within groups, it is also important to consider the relative size of groups. Figures 5 and 6 chart changes in the percent of the population represented by the specific age and education groups. The younger half of the age distribution tells a simple story of population aging. The story is then complicated,

though, by shrinking population shares for the 60 to 64 and 65 to 69 age groups, signaling the arrival of the relatively small depression-era birth-death cohort. Ironically, although the population is getting older, and older cohorts tend to have higher levels of inequality, those age groups-the very young and the 60 to 70 years-that have the highest levels of inequality are also those age groups that have become relatively smaller.

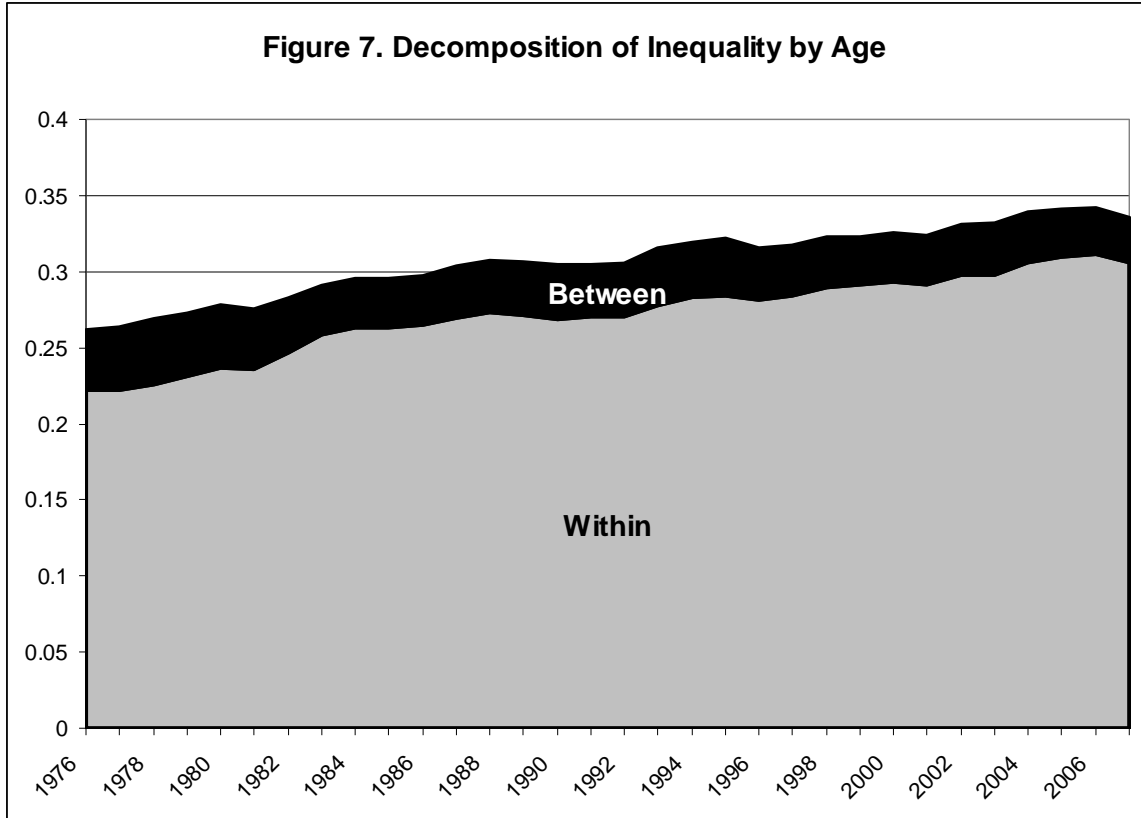


Changes in the relative size of education groups fits with our expectations of higher educational achievement for the population since 1976. In 1976, about 29% of the population had been to at least some college-this number increased to about 55% in 2007. The percent of householders that had not finished high school fell 25 percentage points.



Decomposition of Inequality Change

As discussed earlier, we can decompose inequality to contributions from differences within groups (intracohort differentiation) and between groups (intercohort differentiation). Decomposing US income inequality using the age categories described above, within-group inequality is the primary contributor to aggregate inequality (see Figure 7). In 2007, 91.3% of the total inequality resulted from income disparities within groups while the remaining 8.7% was a product of differences in mean incomes between different groups.



Using the change formula, Table 3 presents the results for the decomposition by age of change in US inequality from 1976 to 2007. This method of decomposition identifies four potential contributors: a change in the level of inequality within groups (Within), a change in the size of groups with respect to level of within-group inequality (Weight, Within), a change in the size of groups with respect to their mean income level relative to other groups (Weight, Between), and a change in the mean income level of different groups (Between). It is explaining the inequality growth from .263 to .335.

Table 3. Decomposition of Inequality Change, 1976 to 2007					
	Within	Weight		Between	Total
		Within	Between		
<25	0.015	-0.012	-0.012	0.010	0.001
25-30	0.013	-0.007	-0.002	0.014	0.017
30-35	0.010	-0.004	0.001	0.008	0.015
35-40	0.009	0.003	-0.002	0.003	0.013
40-45	0.007	0.007	-0.004	0.007	0.016
45-50	0.007	0.007	-0.004	0.005	0.014
50-55	0.006	0.002	-0.001	0.000	0.007
55-60	0.004	0.004	-0.002	-0.003	0.004
60-65	0.005	-0.002	0.000	-0.007	-0.005
65-70	0.004	-0.006	-0.004	-0.014	-0.020
70+	0.007	0.008	0.012	-0.014	0.012
Total	0.085	-0.002	-0.019	0.008	0.073

The largest contributor to the growth in aggregate inequality was expanding inequalities within groups, experienced universally though not equally—inequality within younger groups grew faster than it did within older groups.

Changes in the relative size of groups actually had a negative impact on inequality over the period in question. Interpreting the effects of weight changes within groups is relatively easy—groups that got relatively larger contribute more to the aggregate inequality and vice-versa. For example, middle-age workers make up a greater share of the population and also made a positive contribution to inequality change between 1976 and 2007. Interpreting the effects of weight changes between groups is a little more complex. A group made a positive contribution to inequality change if it had a low income and grew or had a relatively large income and shrunk. Generally, the wealthier cohorts in the prime working years grew and the poorer cohorts shrunk, pushing aggregate inequality down.

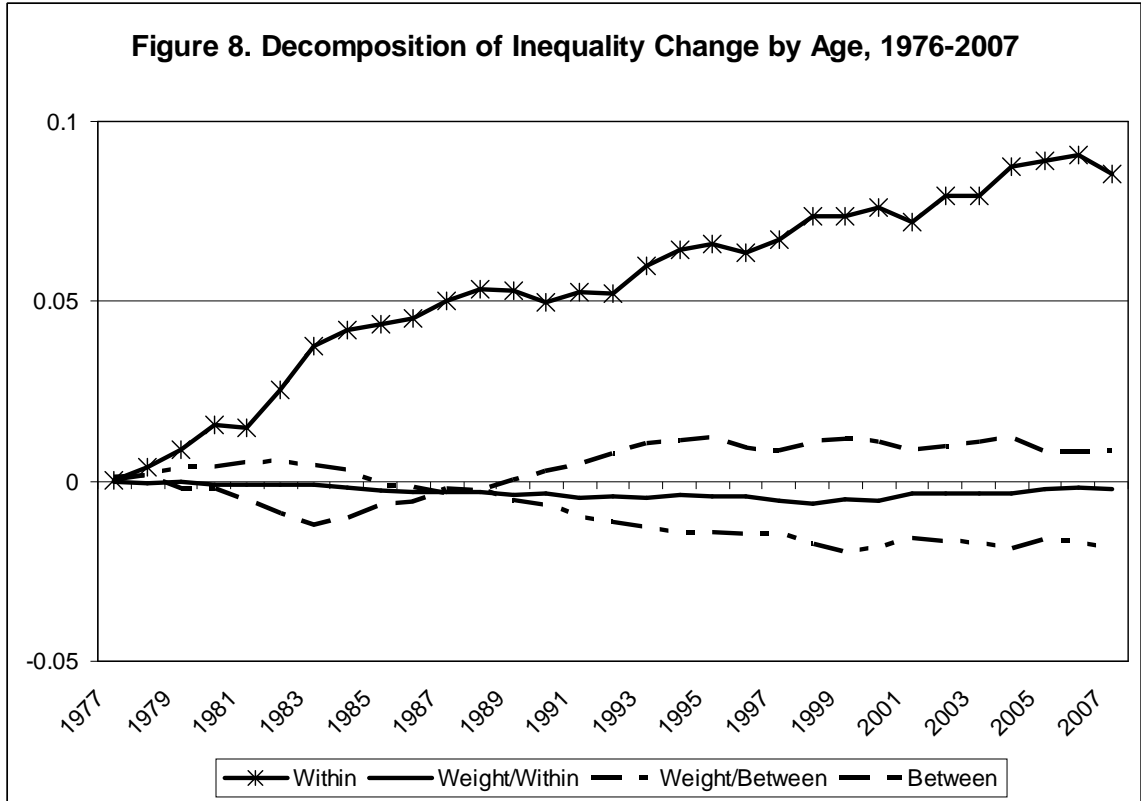


Table 4 shows the decomposition in inequality change by education. As described above, we see that inequality has grown with increasing inequality within education groups, with the high school educated leading the way (.034). We also see a strong positive trend in between-group inequality (.216) driven by the disproportionate income growth for the college educated.

Much of the growth in inequality, though, has been offset by a demographic shift. The “Less than High School” group has the lowest income and the highest within-group inequality, so as its numbers have shrunk this demographic trend has had a negative impact on aggregate inequality (-.086 weight/within and -.153 weight/between).

	Within	Weight		Between	Total
		Within	Between		
< High School	0.016	-0.086	-0.153	0.111	-0.111
High School	0.034	-0.004	-0.002	0.087	0.115
Some College	0.013	0.040	0.000	0.019	0.072
College	0.012	0.031	-0.044	-0.001	-0.002
Total	0.075	-0.019	-0.200	0.216	0.073

Finally, I have repeated the decomposition on inequality change using an age structure framework. In other words, I have decomposed inequality change using 44 categories, 11 age categories within each of 4 education categories. In Table 5, I have added up the results of the decomposition within education groups but across age groups to compare these results to those in Table 4. Effectually, Table 5 is a counterfactual representation of the contributions to aggregate inequality by changes within, between and in the size of education groups while holding the age distribution of the population constant.

	Within	Weight		Between	Total
		Within	Between		
< High School	0.027	-0.083	-0.149	0.095	-0.111
High School	0.035	-0.004	0.006	0.078	0.115
Some College	0.015	0.036	-0.002	0.023	0.072
College	0.013	0.029	-0.049	0.005	-0.002
Total	0.090	-0.022	-0.195	0.201	0.073

While most of the results are similar, there is one notable difference in the contribution from within-group inequality. The contributions of the “Less than High School” group increased from .016 to .027. In other words, by adjusting for the

processes of intracohort differentiation we see that changes in the age structure of the “Less than High School” (it is generally getting younger) have dampened the impact of structural changes on inequality within that group.

The other major difference is found in the contributions from between-group inequalities. As noted earlier, the “Less than High School” group has been getting relatively younger, which means that incomes have fallen in part because the members of this group have not had time to gain experience and skill. On the other hand, the college educated group is getting older, so that income gains are in part a reflection of experience and tenure. When we adjust for these age structure shifts, we see that the contribution of between group inequality falls from .216 to .201. In other words, the growing gap between education groups was slightly inflated by changes in the age structure.

DISCUSSION

Income inequality in the United States has been increasing since the last years of the 1970s. As presented in Figure 4, this rise in inequality since the beginning of the 1990s appears to be attributable in part to a growing income gap between the college educated and everyone else. These results are consistent with structural changes in the US economy that have reshaped the distribution of rewards for particular skills.

Income inequality, though, also appears to be influenced by events over the life course. Within-cohort inequality increases with age from the time the cohort is fully engaged in the workforce until retirement. This result is consistent with a cumulative disadvantage life course perspective and a status redistribution perspective with an

emphasis on the effect of social policy for retirees. The strength of the relationship between intracohort differentiation and age has become weaker over the last three decades as within-group inequality is growing fastest among the younger age groups—perhaps in part because education now delays more people’s entrance into the labor force longer than before.

But we cannot simply relate population aging, measured as the mean age of the population, with higher levels of inequality. First, this presumption does not take into account that household incomes generally follow the same trend line as within-group inequality (and not coincidentally) and so, as more of the population reaches the high inequality ages they are also better off financially, increasing the size of the middle class. Second, to suggest that an aging population has higher inequality does not adequately account for population trends in the United States. As shown in Figure 7, the bulk of the baby boom in 2007 was yet to reach the ages of highest inequality, an age range that is currently populated by the much smaller “birth dearth” generation. This suggests that demographic trends could have a more important impact on inequality in the next two decades than it has over the last three.

Finally, I applied the age structure framework to that inequality within and between education groups. I proposed that, because the college educated group was aging the apparent increase in within-group inequality among the college educated and the growing income gap between the college educated and non-college educated was, in part, a product of this aging (such that the group experienced both higher incomes and greater intracohort differentiation with age). The results appear to support the second of these propositions, that the educational income gap is in part a product of age structure,

but offers no support for the first proposition that inequality within the college educated is a product of population aging.

CONCLUSION

Income inequality has been rising in the United States now for three decades. Despite a host of powerful explanations, researchers have failed to fully explore the implications of age structure on income inequality. Intracohort differentiation increases along many fronts with age within a cohort because of cumulative disadvantages in education, health and family formation, factors which can breed negative or positive feedback loops and enable or hinder an individual's or household's ability to pursue greater opportunity and income.

Decomposing US inequality by age for 1976 to 2007, we find that age structure does have a real, if complicated, effect on aggregate income inequality. When considering the effect of population aging on aggregate income inequality it is important to consider both the entire population distribution (and not just the mean age) and to account for income patterns by age.

Age structure may also influence within and between-group inequality when the population is divided by other characteristics. For example, the income gaps between age groups may be moving in response to population aging. Likewise, within-group inequality for those with less than a high school degree appears to be stagnant because that population is getting younger.

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