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10

The Effect of Population Aging on the Aggregate Labor Market

Bruce Fallick, Charles Fleischman, and Jonathan Pingle

10.1 Introduction

Economists have long noted the role that population growth plays in economic growth and other economic outcomes (e.g., Hagen 1959; Kuznets 1956, 1958; Becker, Glaeser, and Murphy 1999). Prior to World War II, the dominant question was how economies would grapple with declining population growth (Hansen 1939; Keynes 1937), as fertility had been declining and immigration had slowed. However, that all changed as the end of World War II ushered in an unprecedented jump in fertility rates, which Easterlin (1961) described as an "abrupt break with historical experience." In 1946 the U.S. fertility rate leapt by an astounding 19 percent, and then jumped by another 11 percent in 1947, finally peaking in 1957 at 40 percent above the World War II levels. This rapid surge in births created an extraordinary population bulge now known as the baby boom. That the baby boom

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was followed by a fertility trough only reinforced the former's uniqueness.[1] Indeed, fertility rates began to decline in 1958, and demographers typically date the end of the baby boom in 1964. Over the next several years, fertility rates fell more sharply. By 1973 they were well below not only the World War II rates, but well below any fertility rate since 1909, when the National Center for Health Statistics' published series begins.[2]

In addition to their large numbers, the baby boomers are expected to live longer than the cohorts that preceded them. For example, in 1949, an American aged fifty-five could expect to live another twenty-one years, on average; by 2002, a fifty-five-year-old could expect to live another twenty-six years.

In this chapter, we examine the direct implications of the shifting population age distribution for several labor market measures: the unemployment rate, the participation rate, gross labor force flows, and wage rates. We find that the largest effects on the aggregate labor force participation rate are yet to come, while the effects on the unemployment rate have mostly run their course. In addition, the movement of the baby boomers into the high-earnings age groups has pushed up mean wages and changed the average flows though labor market states only modestly.

Because the cohorts both preceding and following the baby boom were relatively small, the aging of the baby boomers has had a pronounced influence on the population distribution. Figure 10.1 shows the shares of selected age groups in the age sixteen and over Civilian Noninstitutional Population (CNIP) taken from the Current Population Survey (CPS), along with how those population shares are expected to evolve in the years ahead, based on Census Bureau projections. The share of older Americans has already begun to rise, and this increase is projected to continue until around 2030.

Labor market behavior varies substantially over the life cycle. As a result, the aging of the U.S. population has affected headline measures of labor market activity, sometimes even obscuring more structural changes in the economy. Perry (1971) was among the first to realize that the increase in the number of baby boom teenagers in the labor force was confounding interesting economic measurement. He was interested in inflation, and the role the unemployment rate played as a proxy for labor market tightness. Increases in the share of teens in the labor force had increased the share

1. See also Montgomery and Trussell (1986), who provide more detail of the demographic changes, not only the fertility increase of the baby boom, but also changes in age at first marriage, marital status, and other contributing factors that underlay this pattern.

2. Fertility data is available from the National Center for Health Statistics website at http://www.cdc.gov/nchs/data/statab/natfinal2002.annvol1_01.pdf. Life expectancy tables can be found at http://www.cdc.gov/nchs/products/pubs/pubd/lftbls/life/1966.htm, for example. In 1945 in the United States there were 85.9 births per 1,000 women aged fifteen to forty-four. In 1946 there were 101.9 and in 1947 there were 113.3. In 1957 there were 122.7 births per 1,000 women aged fifteen to forty-four, but by 1973, the fertility rate had fallen to 68.8.

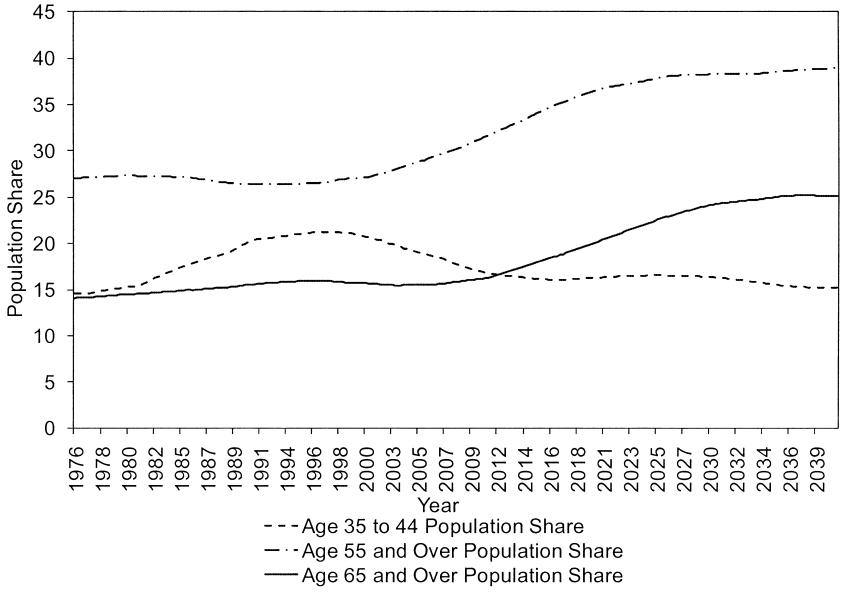

Fig. 10.1 Population shares (history and projection)

of a demographic group with relatively high unemployment rates. This demographic shift alone put upward pressure on the unemployment rate during the 1970s, and made using the level of the unemployment rate as a proxy for labor market tightness inconsistent over time. Perry constructed a demographically adjusted unemployment rate to abstract from this change, holding constant fixed labor force shares to remove the fluctuations in the relative share of boomers.[3] More recently, Shimer (1998), Abraham and Shimer (2001), and Valletta and Hodges (2005) have noted that the declines in the shares of teenagers and young adults in the labor force have put measurable downward pressure on unemployment rates beginning in the late 1980s.

Even more striking are the implications for the labor force participation rate. Participation rates rise sharply with age through the early-to-mid-twenties, and continue to rise through the thirties and forties. Although we fondly think of forefathers who worked diligently until death, participation has declined sharply with age for most of the nation's history, and retirement has been a feature of life cycle labor supply since at least 1870 (Ransom and Sutch 1988).[4] Indeed, it has long been recognized that participation rates level off from the mid-forties through about age fifty or fifty-five, and then

3. See also Summers (1986) and Flaim (1990).
4. See also Tuma and Sandefur (1988).

decline precipitously. As a result, Aaronson et al. (2006) showed that the pronounced shift in the population toward older age groups recently began to put noticeable downward pressure on the aggregate participation rate. This marked the start of what is likely to be a sharp decline in participation that will last another half-century. As a result, in contrast to labor supply growth of 2 percent a year for much of the 1960s, 1970s, and 1980s, the Social Security Administration (SSA) projects labor supply growth will slow to 0.5 percent by 2015, and 0.3 percent by 2025.[5]

If the levels of unemployment and the labor force are sensitive to the age distribution, it is natural to ask how the flows across labor force statuses are affected. Blanchard and Diamond (1990), for example, note that the rates of labor force transitions vary by age. Younger individuals are more likely to move from out of the labor force into employment, while prime-age males are quite likely to enter unemployment after job loss instead of going back to school. However, little research has addressed how the changing age distribution has altered aggregate flows over time, and Blanchard and Diamond's sample ends in 1986. We update their observation, and describe how the shifting age distribution has changed the evolution of labor market flows over time, and how they are likely to evolve going forward as the baby boomers age.

Wage rates also vary substantially over the life cycle. Moreover, relative cohort size may influence earnings. In particular, as the baby boomers entered the labor force as lower-skilled young workers, evidence suggests that their sheer numbers depressed their wages, perhaps by as much as 10 percent (Murphy, Plant, and Welch 1988). We show later that the mere shifting of the baby boomers in and out of high wage age groups has measurably altered aggregate mean wages, pushing them up in recent decades.

In addition, a large literature on the implications of aging on the economy has focused primarily on the influence of population aging on old age programs like social security and the related estimates of the dependency ratio (e.g., Weil 1997; Borsch-Supan 2003), rather than emphasizing the effects of aging on macroeconomic quantities that concern us here. Our contribution is to focus more specifically on quantifying or updating estimates of the direct effects of the shifting age distribution on some of the major aggregate measures of labor market activity, and to project how these measures are likely to be influenced in the years ahead.

The rest of this chapter proceeds as follows. In section 10.2 we describe the CPS data that we use. In sections 10.3 through 10.6 we consider the influence that aging has had on each measure of labor market activity and how the continued aging of the population will likely affect it going forward. Section 10.7 concludes.

5. See also Toossi (2006).

10.2 Data

The official statistics on the labor force published by the Bureau of Labor Statistics (BLS) come from the Current Population Survey (CPS), a survey of roughly 60,000 households conducted monthly by the U.S. Census Bureau. We use these published data along with the underlying CPS microdata to analyze labor force participation, unemployment, labor market flows, and levels of earnings.

The labor force questions are asked of all civilians age sixteen and over. Individuals are in the sample for four months, get an eight-month break, and are then interviewed for another four months. At the fourth and eighth interview months workers are asked about earnings and hours of work (these are the "outgoing rotation groups"), which form the basis of the wage measures used later. The survey includes data on the labor force status of each individual as well as basic demographic information. We have adjusted the data for the effects of survey redesigns, revisions to population weights, and other inconsistencies that would influence the interpretation of time series constructed from the microdata.

The individual observations in the CPS are weighted according to estimates of the population provided by the U.S. Census Bureau. These estimates are real-time assessments of the size and makeup of the U.S. population. The Census Bureau, of course, conducts the decennial census. In between the decennial censuses, which serve as benchmarks, the agency produces estimates that update how many people are living in the United States based on a variety of sources ranging from the National Center for Health Statistics to the Department of Defense and incorporating estimates from surveys such as the American Community Survey. The Census Bureau updates its estimates as new data become available, and at any given time represent the nation's best estimates of the population over history.

Both the Census Bureau and the Social Security Administration (SSA) produce population projections broken down by age and gender groups. The Census Bureau projections are based on the sizes of birth cohorts, assumptions about fertility rates, estimated death rates, and assumptions for net international migration, and currently extend out to 2050.[6] The SSA

6. The Census population estimates are updated annually while the Census projections are updated about twice a decade. Therefore, the Census projections for population levels may not be consistent with the Census' best current estimate of the historical population. This highlights where some projection risks may lie. For example, the age distribution in the population estimates reflected in the 2005 CPS population shares imply more downward pressure from aging on aggregate labor force participation than does the age distribution in the projections that the estimates have superseded. Similarly, revisions to population estimates in January of 2006 prompted revisions to the weights in the Current Population Survey, from which participation is officially measured. The resulting new population estimates, taken alone, caused the labor force participation rate to revise down by two basis points.

produces its own projections that differ primarily in the assumptions for net international migration, including undocumented immigration. Both agencies project that the population's age distribution will continue to shift markedly toward older age groups. Our analysis following relies on Census Bureau projections, but qualitatively there would be little difference if we had used SSA projections.[7]

10.3 The Labor Force Participation Rate

Of all the major labor market indicators, the labor force participation rate is likely to be influenced the most profoundly by the aging of the population. Figure 10.2 shows the aggregate participation rate since 1948. Broadly speaking, the participation rate over the second half of the twentieth century has had three regimes: a period of relative stability until the mid-1960s, a period of steady increase between the mid-1960s and the late 1980s, and another recent period of relative stability. This experience was dominated by movements in women's labor force participation, which rose sharply over the twenty-five years following 1965, and leveled off after about 1990. As noted previously, the aging of the population appears already to be making itself felt in the decline in participation since about the year 2000, which likely marks the beginning of a fourth regime: a period of falling participation.

10.3.1 The Aging of the Population

The reason that the aging of the population has the potential to drastically slow labor supply growth is that labor force participation rates decline precipitously after age fifty. Thus, as the baby boomers move into their sixties and as life expectancies continue to lengthen, the rising proportion of older Americans has the potential to lower the share of Americans who are working or looking for work. For example, by 2035 the share of the sixteen and over population who are aged eighty or above is expected to double to approximately 15 percent, and 97 percent of this age group currently do not participate in the labor force. The current downward pressure of the age distribution on participation is primarily because two forces—the aging of the baby boomers and longer life expectancies—are now pushing in the same direction, after many years in which the upward pressure of baby boomers moving into high participation rate ages offset the downward pressure from longer life expectancies.

Figure 10.3 shows the age profiles of labor force participation rates for men and women using 2005 annual averages for fourteen age categories, and the aggregate participation rate for reference. Among women, the

7. For more details on the sensitivity of projected labor force estimates to varying assumptions concerning undocumented immigration see Fallick and Pingle (2007b).

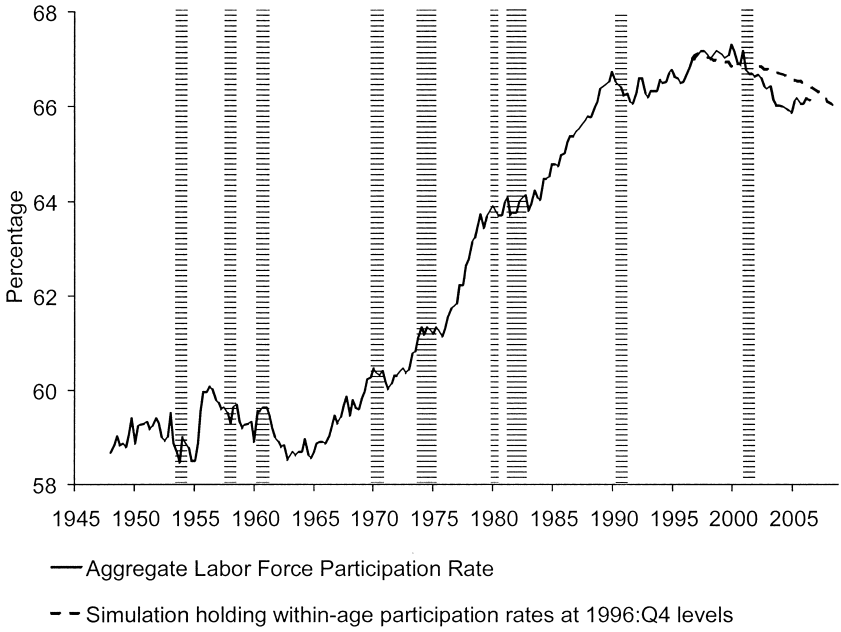

Fig. 10.2 Aggregate labor force participation rate, 1948:Q1–2006:Q3
Source: Bureau of Labor Statistics.
Note: Shaded area is NBER dated recessions.

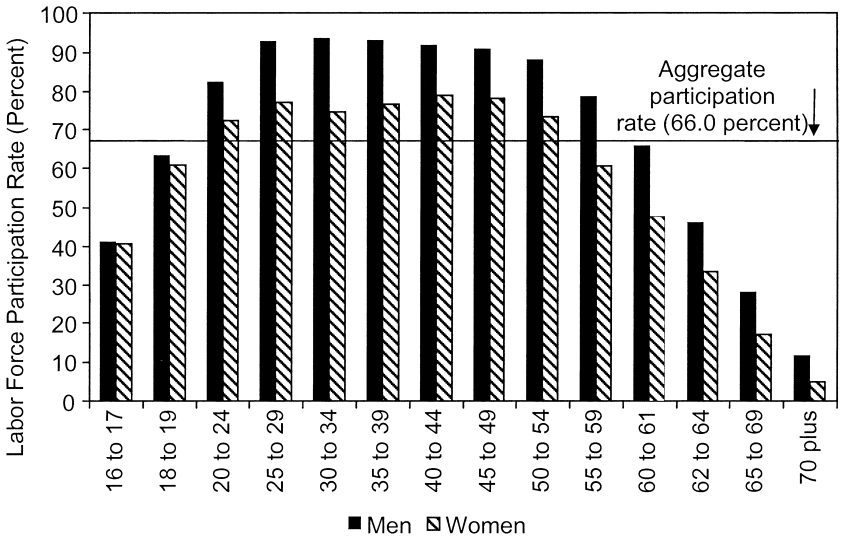

Fig. 10.3 Labor force participation rates by age and gender (2005)

groups over fifty-five years of age have below-average labor force participation rates. Among men, the age groups over age sixty have below average labor force participation rates. In both cases, participation rates begin to fall after about age fifty. Whether this is due to failing health, disability, retirement income, or wealth, it is a feature of life cycle labor supply unlikely to change fundamentally in the next few decades. While the slope of the age-participation function may change, it is quite likely to remain strongly negative.

The implication for labor force participation is striking. Figure 10.4 shows the history of the labor force participation rate through 2006, along with a projection that uses the 2005 labor force participation rate for each age group and allows the population shares to evolve as projected by the Census projections. Although other starting years can produce mildly different patterns, the implications are essentially the same: absent other changes, projected population aging will lower the aggregate labor force participation rate by 6 full percentage points over the next thirty-five years. This pace of decline dwarfs the 0.4 percentage point that shifting population shares have lowered the aggregate rate over the past four years. In sum, the projected aging of the labor force is likely to have a sizeable influence on participation, with the potential to completely unwind the increases in participation attributable to the earlier entry of more women in the workforce.

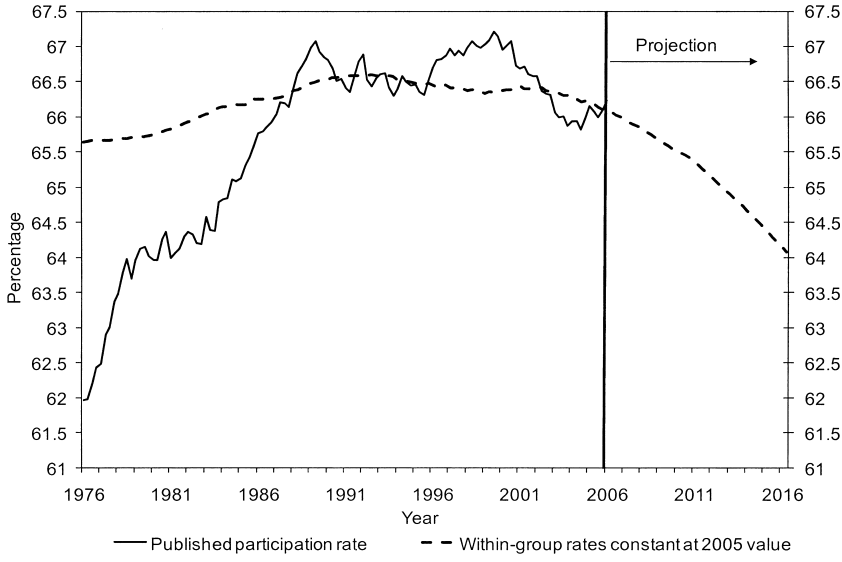

Fig. 10.4 An accounting of effect of aging on the labor force participation rate
Note: Within-group participation rates refer to fourteen age groups for men and women.

10.3.2 The Aging of Particular Cohorts

There is another aspect of aging that has implications for the aggregate labor force participation rate—not changes in the age distribution, but the movement of particular cohorts through the age distribution.

Most of the low-frequency change in the labor force participation rate in the second half of the twentieth century came from changes in participation rates within age groups rather than changes in the age distribution of the population. For women, much of this increase in participation appears to have resulted from the entry into the working-age population of birth cohorts with higher average participation rates than those who preceded them, and the progress of these higher-participation cohorts through the age distribution. As these cohorts have aged, and earlier cohorts have left the scene, the population of women has come to be dominated by cohorts who have proved to have generally higher participation rates throughout their lives. A similar effect seems to have been at work among men, but in the opposite direction, as successive cohorts of men have had generally lower participation rates than their predecessors.

This evolution of participation rates by cohort likely reflects numerous factors—such as evolving tastes, reproductive technology, wealth, education, social attitudes, retirement, welfare, and financial systems—some of which were internalized into the behavior of new generations more easily than into the behavior of mature cohorts who had already made "sticky" choices, an idea that goes back at least as far as Durand (1948).

The phenomenon is illustrated in figure 10.5, which shows the labor force participation rates for three age groups of women: age thirty-five to forty-four, age forty-five to fifty-four, and age fifty-five to sixty-four. Each line shows the participation rate of an age group over time. However, the horizontal axis shows the birth year for the middle age of the group, rather than the year of observation. In this way, the lines are shifted so that each birth cohort is vertically aligned with itself at different ages. The participation rate of the forty-five- to fifty-four-year-old group (the dashed line) appears to exhibit three rough inflections, in the vicinity of years 1960, 1975, and 1997. These correspond to the cohorts born around 1910, 1925, and 1947. The first two of these inflections line up well with the fifty-five- to sixty-four-year-old group (the dotted line), meaning that the inflection points in both age groups seem to occur when the cohorts born in 1910 and 1925 passed through those age groups. The cohort associated with the third inflection (those born around 1947) are not quite old enough to exhibit that inflection in the older group, but it can be seen when that cohort was thirty-five to forty-four years old (the solid line). Similarly (not shown), beginning in the mid-1960s and ending in the late 1970s, successive cohorts of sixteen- to twenty-four-year-old women had higher participation rates than their predecessors. Participation rates of successive cohorts twenty-five to thirty-four years old stopped

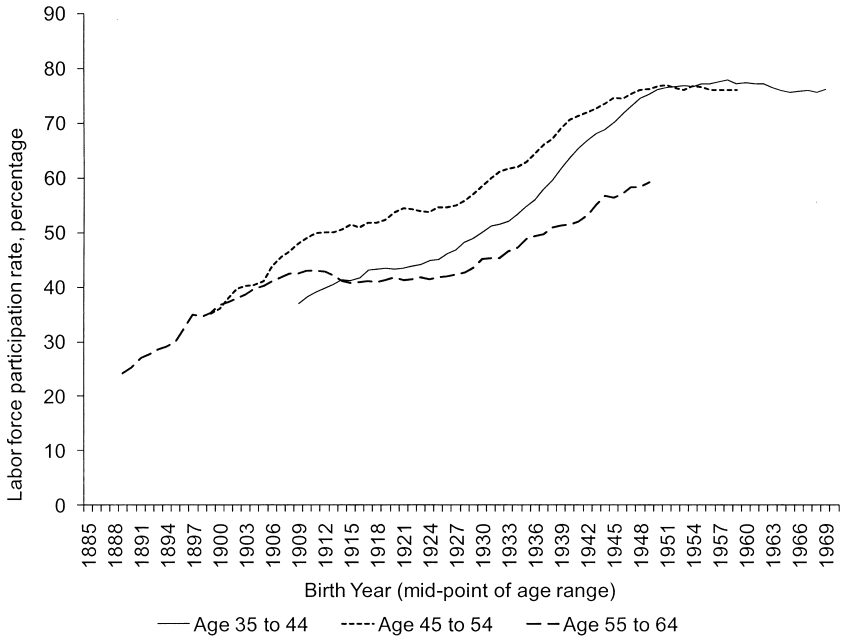

Fig. 10.5 Participation of women by birth cohort (actual data–not a projection)

rising about ten years later, in the late 1980s, suggesting that the participation rate in each of these age groups at a given time is at least partly related to which birth cohort is passing through that age at that time.

Of course, not all inflection points in all age groups line up so well by birth year; clearly, there have been developments in participation that are not well-represented by the aging of birth cohorts. However, the coincidences that do exist are sufficient to indicate that birth cohort has played a significant role in describing participation rates. Consequently, the aging of particular birth cohorts has played an important role in the evolution of the aggregate participation rate. In particular, the long increase in the aggregate participation rate from the early 1970s through the late 1980s can be attributed largely to the successively higher participation rates of cohorts born up through the beginning of the baby boom. And the end of that long period of increase can be attributed to the baby boom cohorts, who have roughly similar average participation rates, coming to dominate the population as they moved through the age distribution. Looking ahead, the same phenomenon of the aging of particular cohorts can be expected to put downward pressure on the aggregate participation rate, as successive cohorts of men and women appear to have generally lower propensities to participate.

These ideas are developed more fully in Fallick and Pingle (2007a), which develops a model of aggregate labor force participation that incorporates

both changes in the age distribution of the population and the movement of cohorts through the age distribution, as well as exploring other measurable factors that appear to influence participation rates. The model relies on cohort effects in order to predict the future path of participation for individual birth years—essentially using the observed information shown in figure 10.5 to form a baseline of relative labor force attachment going forward. The authors' model contains cyclical controls, variables representing education, fertility, and socioeconomic trends, as well as the features of public programs. While we will not explicate that model here, figure 10.6 shows its implications for the future of the participation rate under one reasonable set of assumptions. The combination of the aging of population in general, the aging of cohorts in particular, and other factors imply a steeply falling participation rate over the next decade or so. In addition, although the model appears to fit closely the annual averages in 2006 and 2007, model estimation was stopped in 2005, so the subsequent years are an out-of-sample projection, and thus not necessarily end-point bias.

Most relevant to the discussion of aging, however, is that the declines projected incorporate the expectation that the baby boomers will have much more labor force attachment than prior cohorts (despite not often exhibiting this during their prime working years). As shown in figure 10.7, the participation rate of men age sixty-five and over is expected to increase as the baby boomers enter the age sixty-five and older age group, although the pace of increases is estimated to slow near 2015. In the Fallick/Pingle model the increases are attributable to a combination of longer life expectan-

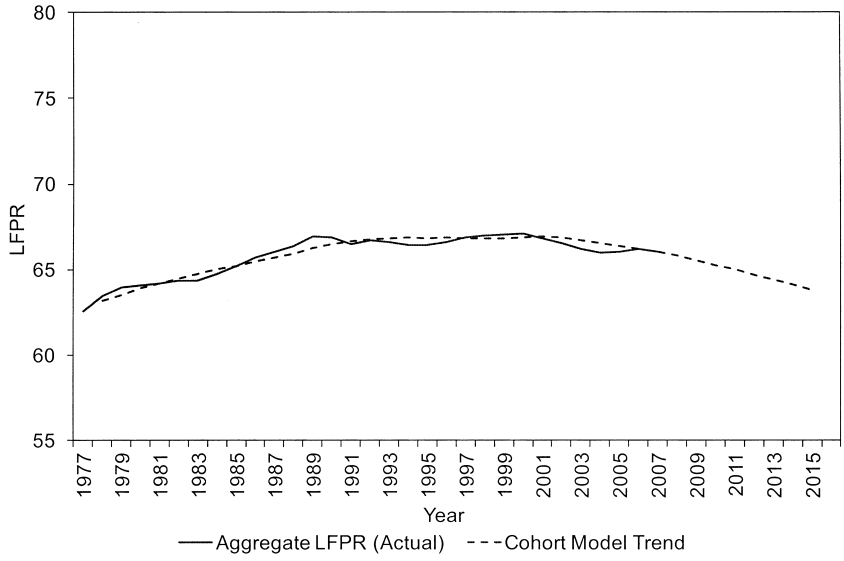

Fig. 10.6 Aggregate LFPR projections

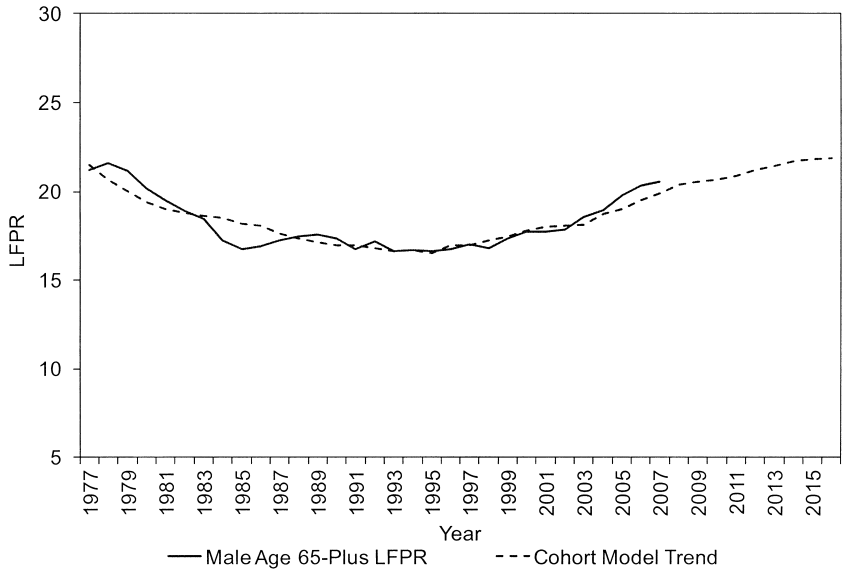

Fig. 10.7 Male age 65-plus projections

cies, higher education among the cohorts reaching these ages, and favorable social security incentives (the rising retirement age and the increases in the delayed retirement credit).

For women aged sixty-five and over, the forecast is for quite robust increases in participation as the baby boom cohorts exhibit greater attachment than the average of the preceding cohorts already over age sixty-five (figure 10.8). The cohort model trend estimates for older women are slightly steeper than forecasts produced by government agencies such as BLS and SSA, but a little less steep for the forecasts of older men. For the older men, the difference is likely attributable to the fact that baby boomer males, during their prime working ages, tended to work less than men of earlier cohorts, and our model perhaps carries forward more of these "unobserved preferences" than the BLS or SSA projections.[8] In a similar vein, for the older women, the model may carry more of the high degree of attachment of the cohorts who raised prime-age female labor supply from 1970 to 1990 into this older age category. If we look at the rough estimates, the projections expect gains of nearly 1/2 percentage point per year in this group's participation rate. The share of age sixty-five-and-over women is expected to increase from 9 percent to 10 percent of the population over this period. Roughly speaking, this implies this demographic group alone would add nearly 5

8. For BLS estimates see Toossi (2006). For a more detailed and thorough discussion and decomposition of the differences in long-run forecasts see Fallick and Pingle (2007a, 2007b).

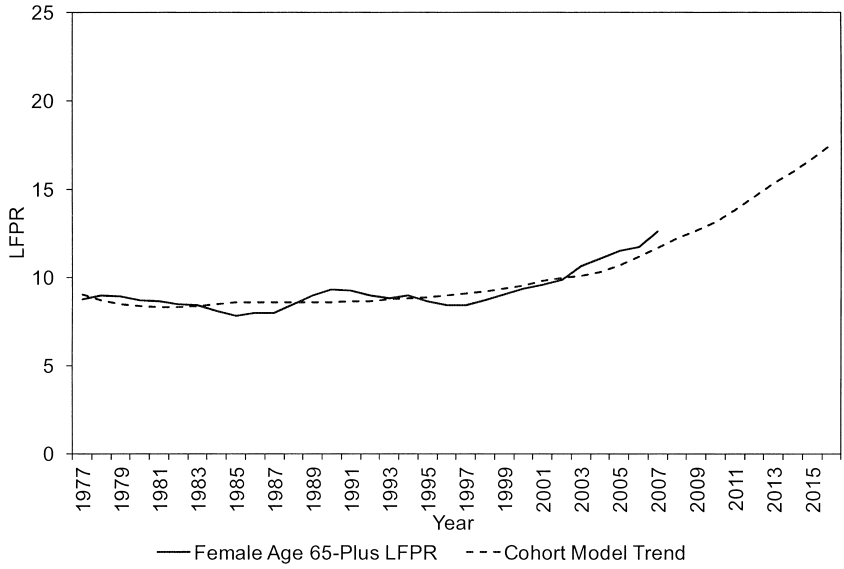

Fig. 10.8 Female age 65-plus projections

basis points to the aggregate participation rate per year. The pace of decline due to population aging shown in figure 10.5 is roughly 2 percentage points per year, on average, between 2005 and 2040. Thus, the projected increase in participation among older women would offset roughly 1/4 of that decline. In the end, the shifts in the population age distribution are a relatively powerful force for even significant behavioral changes to overcome.[9]

10.4 Unemployment Rate

Looking back over the past forty years, figure 10.9 shows that the movements in the aggregate unemployment rate can be divided into two phases: from the mid-1960s through the early 1980s, the unemployment rate moved higher; since then the unemployment rate has shown a pronounced down-

9. The sensitivity of these projections are evaluated in Fallick and Pingle (2007a and 2007b). In particular, alternative assumptions for population growth and immigration are evaluated. Under even large margins of error in these assumptions, the downward pressure on the participation rate from population aging (big boomer cohort followed by smaller cohort behind) dominates the other influences. In fact, as shown by the revised participation rate estimates published by the BLS in the January 2008 employment situation report, population growth was shown to have been overestimated thus far this decade by a substantial amount, and the aging of the population underestimated, altogether revising down the labor force participation rate by 0.1 percentage point. Although the next decennial census in 2010 will be more revealing, the downward pressure of population aging seems likely to be the dominant driver of trend labor force participation for the next few decades.

Fig. 10.9 Aggregate U.S. unemployment rate, 1967–2006

trend. These movements reflect more than business cycle fluctuations. The lowest unemployment rate achieved at the cyclical peaks and the highest unemployment rate hit at the cyclical troughs both ratcheted up from the 1960s through the early 1980s. Subsequently, both cyclical high and low unemployment rates have declined consistently, with the unemployment rate bottoming out in 2000 at its lowest level since 1969.

The apparent trends in the unemployment rate have not been associated with changes in inflationary pressures. On the contrary, core price inflation moved higher through the 1970s, and has trended downward since. This suggests that at least some of the low frequency movements in the aggregate unemployment rate have reflected changes in the structural or natural rate of unemployment. In this section, we examine several factors that help explain these low frequency movements. To preview, we show that shifting labor force shares related to the age distribution of the population can explain a good deal of both the earlier rise and subsequent decline in the aggregate unemployment rate. However, even after accounting for the effects of changing labor force shares, significant movements in the aggregate unemployment rate remain unexplained by these "between" group factors.

10.4.1 The Age Distribution of the Population

The most obvious way in which the aging of the population affects the aggregate unemployment rate is simply that some age groups tend to have higher unemployment rates than others. Figure 10.10 shows the average

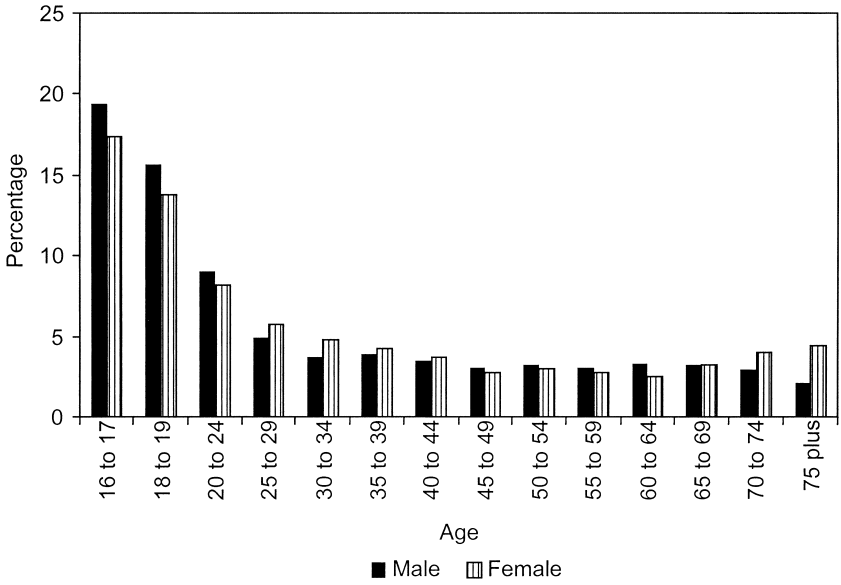

Fig. 10.10 Unemployment rates by age and sex (1997)

unemployment rates in 1997 for men and women in various age groups. The variation in unemployment rates across age is substantial but is concentrated among the younger age groups. In particular, unemployment rates fall from the sixteen to seventeen group to the twenty-five to twenty-nine group, then are pretty stable from age thirty on. Thus, as population shares change, the aggregate unemployment rate can be expected to change.

For many years it has been a common practice to adjust the unemployment rate for such changes in the age/sex composition of the labor force. The usual method is to recalculate the unemployment rate by weighting the unemployment rates of the various demographic groups by their labor force shares in some base year (Perry 1971) rather than allowing those shares to change over time.

Here we follow this practice with a couple of variations. First, most demographic adjustments to the unemployment rate are performed using fairly broad age groups, which may miss some subtleties in the evolution of the unemployment rate; we use fourteen age groups. Second, we are interested in decomposing changes in the demographic shares of the labor force into the two components of changes in population shares and changes in relative participation rates. Therefore, to compute the contribution to changes in the unemployment rate of the aging of the population alone, we hold group-specific labor force participation rates and group-specific unemployment rates constant at their 1997 average levels, and apply those rates to changing population shares to yield a counterfactual aggregate

unemployment rate. The difference between this counterfactual unemployment rate and the actual unemployment rate in 1997 provides one measure of the direct influence of changes in the age distribution of the population on the aggregate unemployment rate. This difference is shown in figure 10.11.

Because the differences in unemployment rates across age groups are concentrated at younger ages (under thirty), the changing age distribution of the population had its most notable accounting influence on the aggregate unemployment rate from the 1960s through the 1980s, when the baby boomers were moving through these younger ages. In contrast, the influence of shifts in the age distribution on the unemployment rate over the past decade has been small, as the baby boom moved through ages with fairly similar unemployment rates. From 1967 to 1976, the aging of the population pushed the unemployment rate up through this channel by 0.2 percentage point; since 1976, this channel has reduced the unemployment rate by 0.6 percentage point, but only 0.2 percentage point of this decline has come since 1991. As the population continues to age in coming years, we can expect this downward pressure on the unemployment rate to increase somewhat, but not to the degree that we saw in the 1980s.

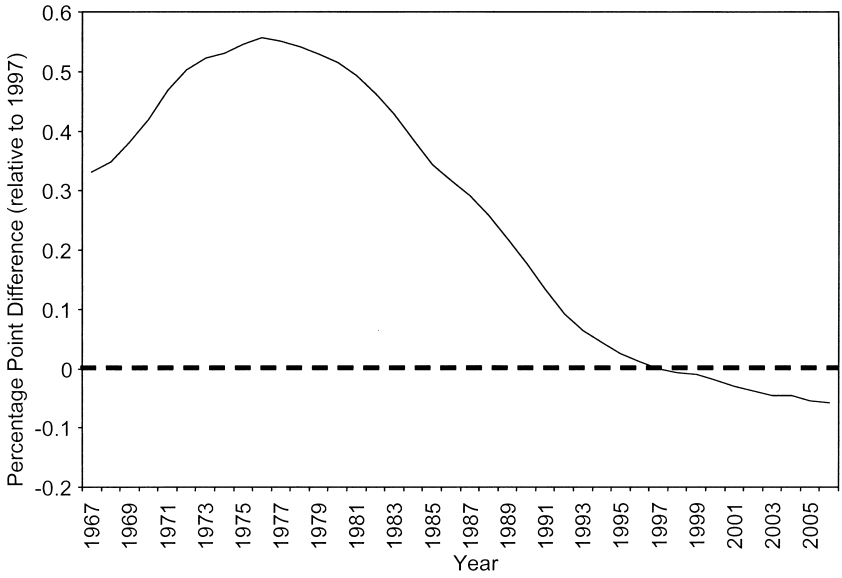

Fig. 10.11 Effect of changing population shares on the aggregate unemployment rate (relative to 1997 actual unemployment rate)

Note: Difference between reweighted 1997 age-sex specific unemployment rates (weights are age-sex specific population shares times the 1997 labor force participation rates) and the 1997 aggregate unemployment rate.

10.4.2 The Age Distribution of the Labor Force

There is, however, another way in which the aging of the population can be thought of as influencing the unemployment rate. Beyond changing the age distribution of the population, over time different cohorts of people come to dominate the labor market. As previously noted, and in previous work, we argued that as newer cohorts came to replace older cohorts in particular age groups, the labor force participation rates of those age groups changed. This is not the only source of changes in age-specific participation rates, but it has been an important one. These changes in age-specific participation rates have meant that the age distribution of the labor force has often changed more than has the age distribution of the population. In particular, as the cohorts of women with higher participation rates moved into the younger age groups and then into older groups, the share of these high-unemployment-rate age groups in the labor force rose and then fell in excess of what population shares alone would dictate. This is illustrated in figure 10.12, which shows the share of sixteen- to twenty-four-year-olds in the population and in the labor force.

The implications for the aggregate unemployment rate have been substantial. The dashed line in figure 10.13 reproduces the measure of the direct influence of changing population shares on the unemployment rate, while the solid line shows the influence of labor force shares, which comprises both changing population shares and changing participation rates. We construct

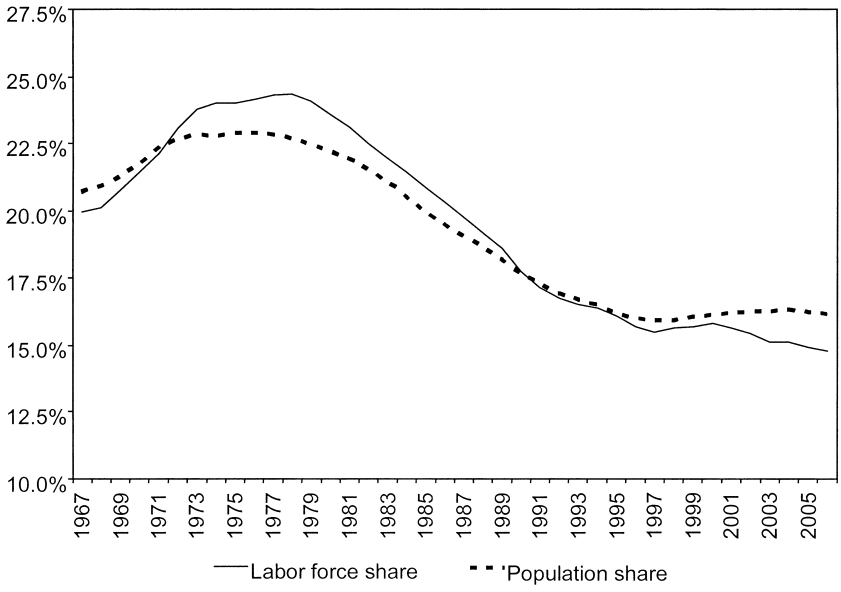

Fig. 10.12 Population and labor force shares ages 16–24

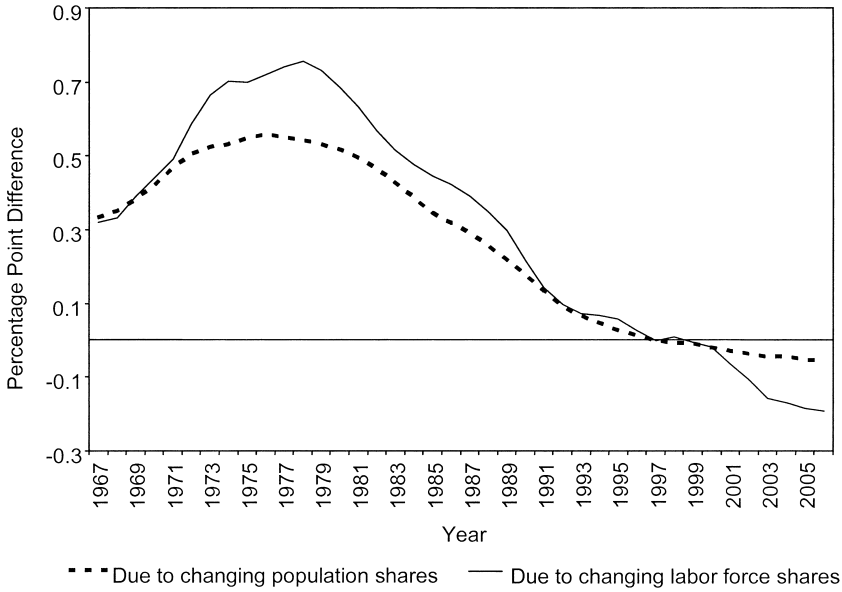

Fig. 10.13 Effect of changing population and labor-force shares on the aggregate unemployment rate (relative to 1997 actual unemployment rate)

Note: Solid line is the difference between reweighted 1997 age-sex specific unemployment rates (weights are the age-sex specific labor force shares) and the aggregate unemployment in 1997. Dashed line is the difference between reweighted age-sex specific unemployment rates (weights are age-sex specific population shares times the 1997 labor force participation rates) and the 1997 aggregate unemployment rate.

the latter by holding within-group unemployment rates constant at their 1997 levels, but allowing both the population shares and participation rates to change, and subtracting this counterfactual unemployment rate from the 1997 unemployment rate. The difference between the two lines is a measure of the influence of the changing participation rates. In total, changes in labor force shares raised the unemployment rate by 0.4 percentage point from 1967 to 1977—about twice as much as the change due only to changing population shares. Since 1977, shifts in the labor force shares have lowered the aggregate unemployment rate by 0.9 percentage point, 0.3 percentage point of which has come since 1991. Once again, the decline is bigger than can be accounted for by changing population shares alone, owing largely to the declining participation rates for young men and women.

10.4.3 Within-Age Unemployment Rates

A third element in the evolution of the aggregate unemployment rate has been changes in within-age unemployment rates. Figure 10.14 shows how unemployment rates within age group have moved over time. As one can see, a major development in the demographics of the labor market over the

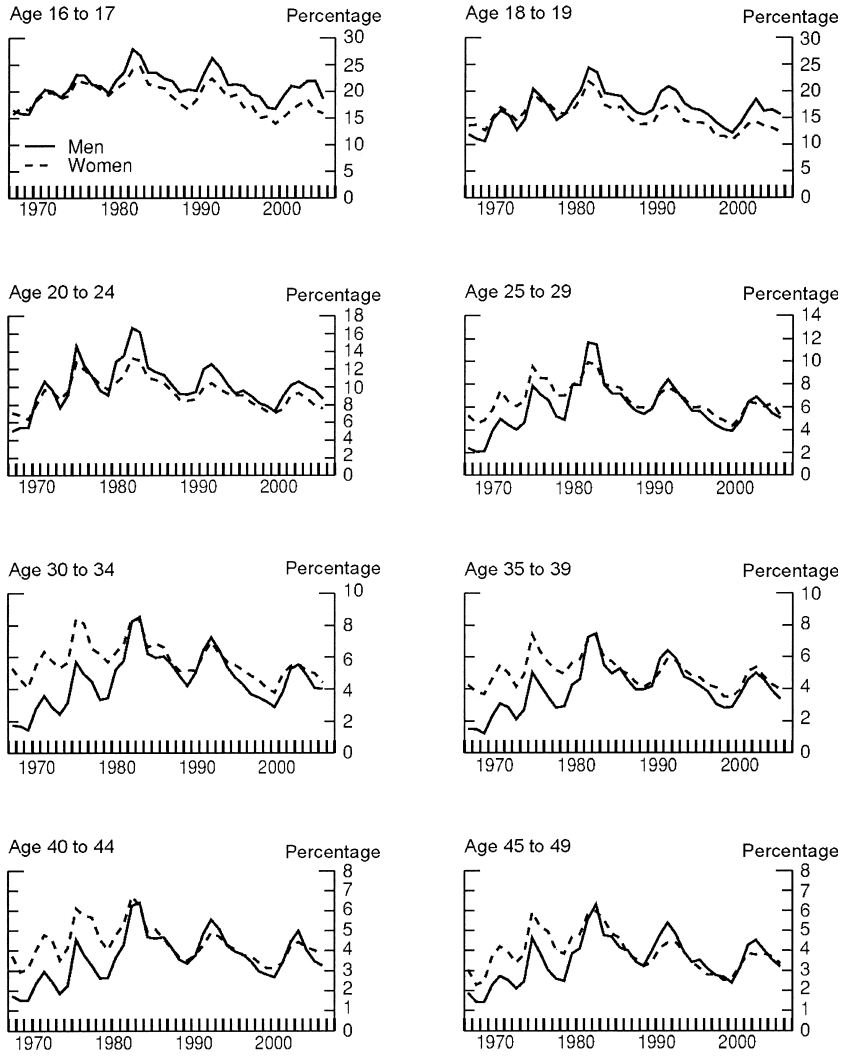

Fig. 10.14 Unemployment rate by age and sex

past several decades has been the convergence of female and male unemployment rates.

For our current purposes, we would like to know whether this convergence in unemployment rates reflects one aspect of the aging of the population—not changes in the age distribution, but the movement of particular cohorts through the age distribution. As we noted previously, the rise in female labor force participation occurred as cohorts of women with participation rates more similar to men's entered the population and replaced cohorts of

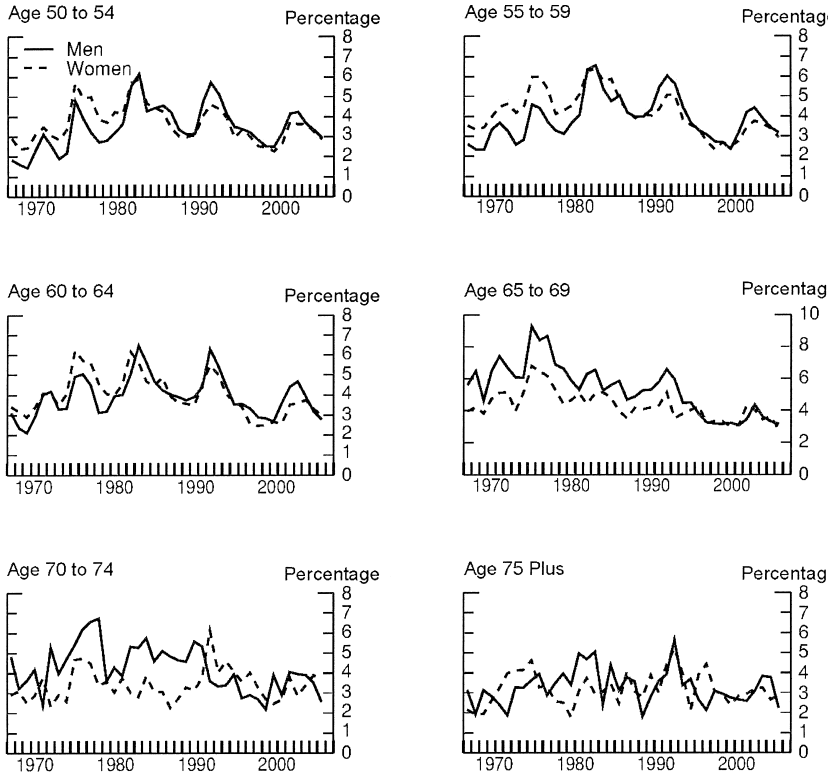

Fig. 10.14 (cont.)

women with less similar participation rates. By our estimates, the cohorts of the baby boom marked the end of decades of steadily rising cohort-specific participation rates for women. As these cohorts moved through the age distribution, they raised the aggregate participation rate. A natural question is whether the convergence of female and male unemployment rates can be described the same way. That is, did female unemployment rates converge toward male unemployment rates because cohorts of women with unemployment rates more similar to men's entered the working-age population and replaced cohorts of women with unemployment rates less similar to men's?

In order to begin to answer this question, we estimated a model similar to the basic model in Fallick and Pingle (2007a). In this setup, within each gender, the unemployment rate of an age group in a particular year is a function of an age-specific constant and the identity of the birth cohorts passing though those ages in that year, as well as cyclical controls. That is,

$$(1) \qquad \log UR_{g,t} = \alpha_g + \lambda_g X_t + \frac{1}{n_g} \sum_{b=1907}^{1989} C_{g,b,t}\beta_b + \varepsilon_{g,t} \qquad g = 1 \text{ to } 14,$$

where g indexes the age groups, t indexes the calendar year, and b indexes birth years. The $C_{g,b,t}$ are indicator variables that equal one if the corresponding cohort b appears in that age group g at time t, and n_g is the number of ages in age group g. Variable X_t is a vector of cyclical control variables, the α are age group fixed effects, and the β are birth year or cohort fixed effects. The degree of cyclical sensitivity (λ) varies by age group, while the cohort effects do not—that is, the cohort effects are constrained to be the same across all equations in which the cohort appears. The age effects (α) are constant.

In this setup, the shape of the age-unemployment-rate profile is common to all persons of the same gender, but each birth cohort has a particular "propensity" to be unemployed that shifts the age profile up or down.

An alternative formulation assumes that, within each gender, the unemployment rate of an age group in a particular year is a function of an age-specific constant and a common effect of calendar time.

$$\log UR_{g,t} = \alpha_g + \lambda_g X_t + \beta_t + \varepsilon_{g,t} \qquad g = 1 \text{ to } 14. \tag{2}$$

In this alternative, the shape of the age-unemployment profile is likewise common to all persons of the same gender, but this age profile is shifted by conditions that change over time but affect the unemployment rates of all ages proportionately.

Comparing the fit of these two specifications provides an indication of whether the aging of specific cohorts can explain the evolution of the unemployment rate. In the case of women, the evidence in favor of a cohort effect in explaining the increase in labor force participation was so strong that we expected the evidence to favor a cohort explanation of the evolution of unemployment rates as well. In fact, as shown in figure 10.15, the estimated trend from the basic cohort specification does a reasonably good job of capturing the low frequency movements in women's unemployment rates, at least since the mid-1970s, suggesting that the decline in women's unemployment rates over that span can be usefully described in terms of lower-unemployment cohorts replacing higher-unemployment cohorts. However, the specification that substitutes time effects—modeled as a cubic time trend—for cohort effects, does a somewhat better job of capturing the initial increase in female unemployment rates through the mid-1970s.

Table 10.1 reports measures of model fit. For women, the adjusted R-squared (column [3]) for these two specifications are the same, when the model is estimated over the period 1967 to 2006. However, the adjusted R-squared for the full panel regression (fourteen age groups times forty time periods) measures the model's ability to explain both the "between"-group differences in average unemployment rates as well as the "within"-group variation that is of more interest here. As a result, the adjusted R-squared overstates how well the model fits the data for any one age group.

Columns (5) and (7) report the average R-squared (not adjusted for degrees of freedom) for the youngest eleven age groups—from age sixteen

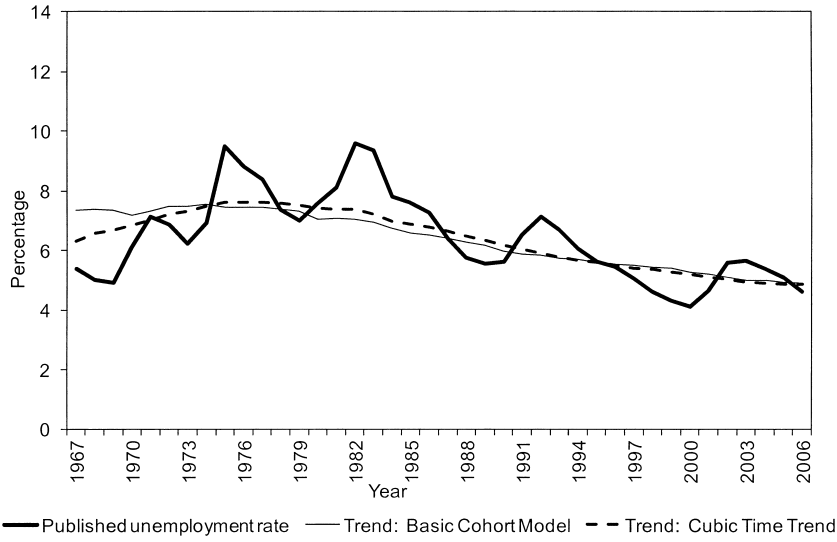

Fig. 10.15 Estimates of trend unemployment rates: Women

Table 10.1 Measures of model fit: Unemployment rate model

	Adjusted R^2		Average R^2 (11 age groups, ages 16–64)[a]		Average R^2 (All age groups)	
Model specification	*Men*	*Women*	*Men*	*Women*	*Men*	*Women*
Long sample (1967–2006)						
Cohort dummies	0.934	0.954	0.77	0.82	0.73	0.74
Cubic time trend	0.936	0.954	0.81	0.85	0.68	0.71
Cohort dummies and cubic time trend	0.961	0.959	0.86	0.85	0.80	0.76
Short sample (1977–2006)						
Cohort dummies	0.944	0.959	0.75	0.85	0.75	0.76
Cubic time trend	0.949	0.953	0.81	0.83	0.70	0.69
Cohort dummies and Cubic time trend	0.961	0.959	0.86	0.86	0.82	0.76

[a]To construct *R*-squared for individual age groups, we calculated the variances of the group-specific unemployment rates and the group-specific residuals from the regressions using all fourteen age groups. We did not correct for differences in degrees of freedom across specification.

to sixty-four—(column [5]) and for the full complement of groups (column [7]). We omit the oldest age groups from these columns because the specification with cohort dummies can "overfit" the unemployment rate for these groups. This is because most of the cohorts included in the sixty-five and older age groups are not well-represented in younger age groups in our data. Moreover, as shown in the last three panels of figure 10.14, the unemployment rates for the two oldest age groups are more idiosyncratic and less cycli-

cal than those for those ages sixteen to sixty-four. The average *R*-squared for the groups between ages sixteen and sixty-four is a little higher for the model with the cubic time trend, even though this model has many fewer explanatory variables.

As shown on the third line, adding the cohort dummies to the specification with the cubic time trend does not improve the model's ability to explain female unemployment rates for women ages sixteen to sixty-four. Thus, we find little evidence for a substantial role for birth-year cohort effects on women's unemployment rates, in contrast to the earlier results for labor force participation.

For men, the results suggest a somewhat more nuanced interpretation. As shown in figure 10.16, the model with only cohort effects does a poor job of capturing either the increase in male unemployment rates through the early 1980s or their subsequent decline.[10] In contrast, the specification with the cubic time trend rises and falls more closely with the actual unemployment rate. These visual impressions are borne out by the measures of model fit. As shown in column (4) of table 10.1, the average *R*-squared for the eleven age groups aged sixteen to sixty-four improves more notably when cohort effects are replaced by a cubic time trend.

But, unlike the results for women, the model fit is notably improved when we include both cohort effects and time effects. Thus, it seems that the movements of relative unemployment rates for the different age groups are more important for men than for women, which may in turn reflect that age plays a more significant role in how men have responded to aggregate labor market developments.

Clearly there is much more work to be done in modeling the trends in unemployment rates, and a discussion of the economic factors at work is beyond the scope of the current chapter. Nevertheless, we are confident that the aging of the population per se plays only a relatively minor role in the evolution of the aggregate unemployment rate at present.

10.5 Labor Market Flows

10.5.1 The Age Profile of Unemployment Rates

The modest size of the effects of population aging on the unemployment rate in recent years stems from the fact that although unemployment rates fall rapidly with age from the teenage years through the early thirties, unemployment rates are fairly stable across ages from the early thirties into the seventies. Some of this, no doubt, reflects selection biases, as those types

10. The rise and subsequent decline in the trend unemployment rate from the cohort model primarily reflects the changing demographics of the labor force that we discussed previously. Holding labor force shares fixed at their 1997 values, estimated trend from the cohort model is nearly flat from 1967 to 2006.

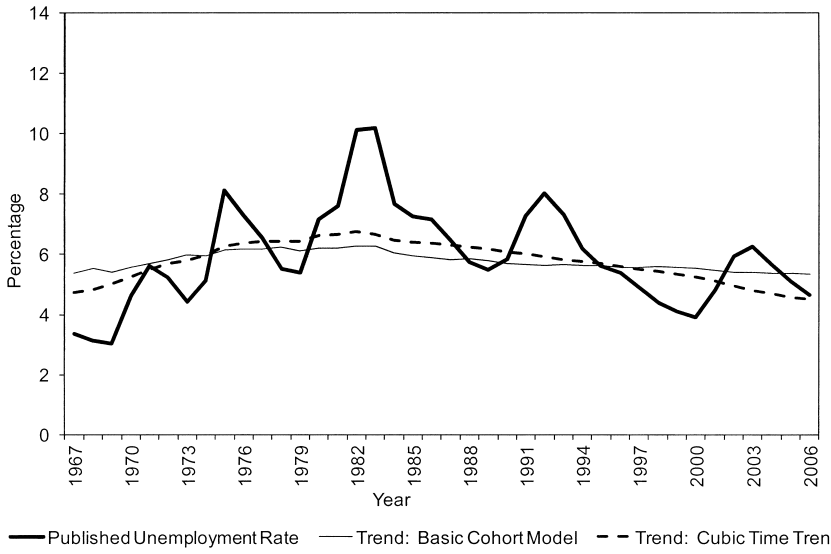

Fig. 10.16 Estimates of trend unemployment rates: Men

of persons who would tend to have higher unemployment rates leave the population or the labor force at different rates than those who tend to have lower unemployment rates. But the stability is nevertheless surprising given the profundity of the changes in labor force attachment over the life cycle. Indeed, the stability of the unemployment rates masks large but offsetting changes in labor force behaviors that, taken individually, might be expected to significantly affect unemployment rates.

The most obvious of these is retirement behavior and associated withdrawal from the labor force. Figures 10.17 and 10.18 show the average monthly hazard rates, by age, out of the labor force from employment and from unemployment, for the period 1996 to 2006, calculated from matched CPS data. Both rates rise rapidly beginning at ages in the fifties, increases that we would associate with retirements. At least qualitatively, the changes in these flows as persons age offset each other in terms of their implications for the unemployment rate.

However, other labor force flows vary over the entire range of ages over which unemployment rates are stable. Job finding rates—the hazard rates from unemployment to employment and from not in the labor force into employment—both fall over the entire range from about age thirty on (figures 10.19 and 10.20). One would expect that because of this unemployment rates would rise with age, but over the same age range the rate at which new entrants and reentrants move from out of the labor force into unemployment falls (figure 10.21). Meanwhile, the flow that one might associate most directly with the unemployment rate, the hazard rate from employment to

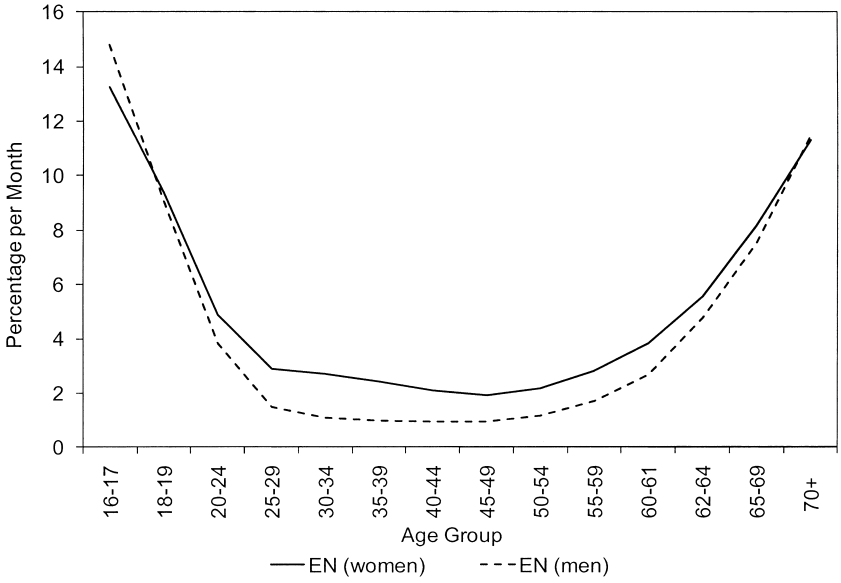

Fig. 10.17 Hazard rates from employment to NLF (1996–2006)

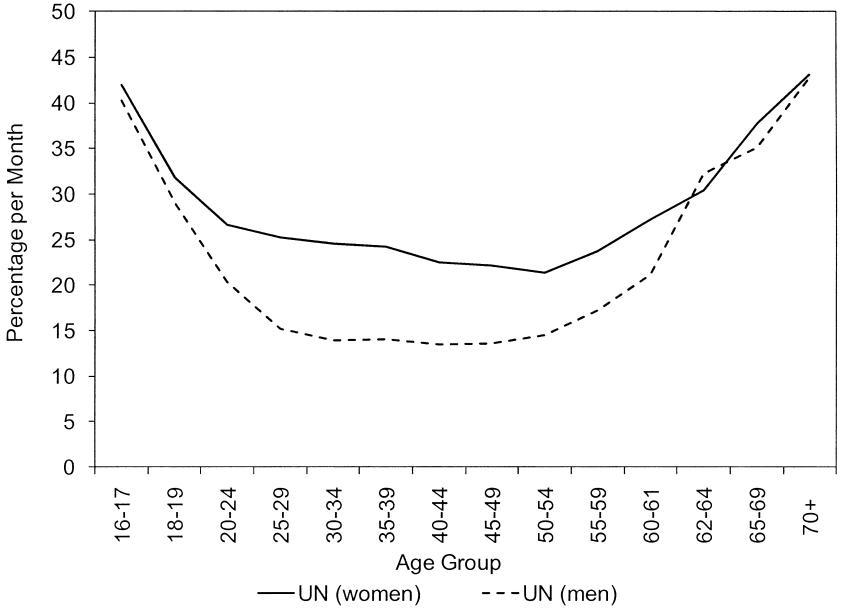

Fig. 10.18 Hazard rates from unemployment to NLF (1996–2006)

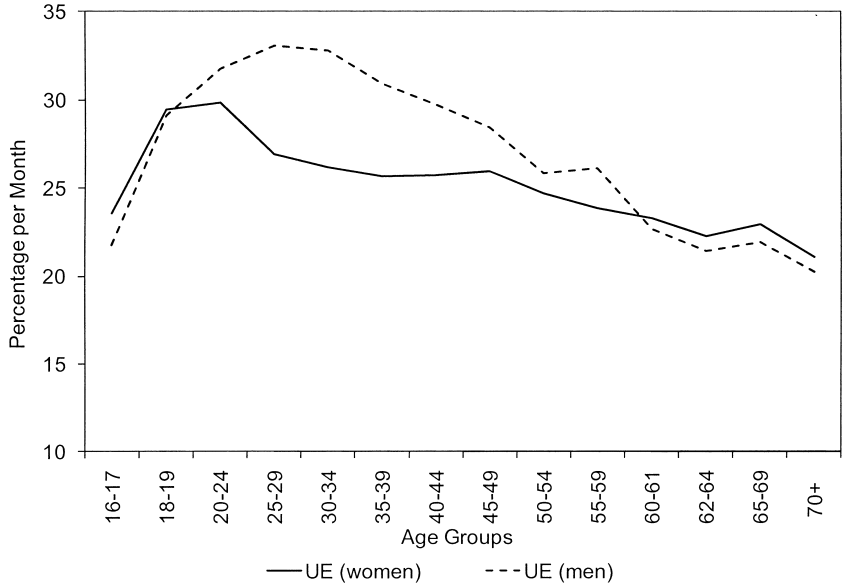

Fig. 10.19 Hazard rates from unemployment to employment (1996–2006)

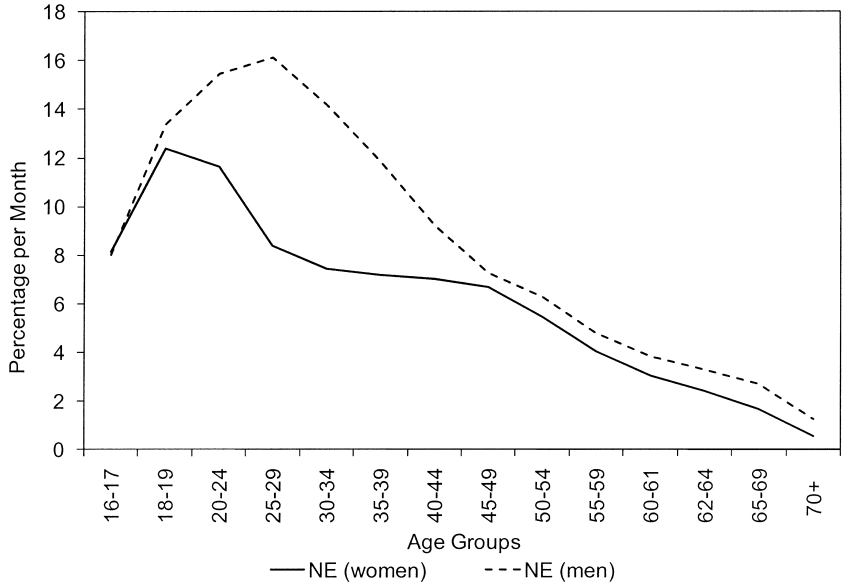

Fig. 10.20 Hazard rates from NLF to employment (1996–2006)

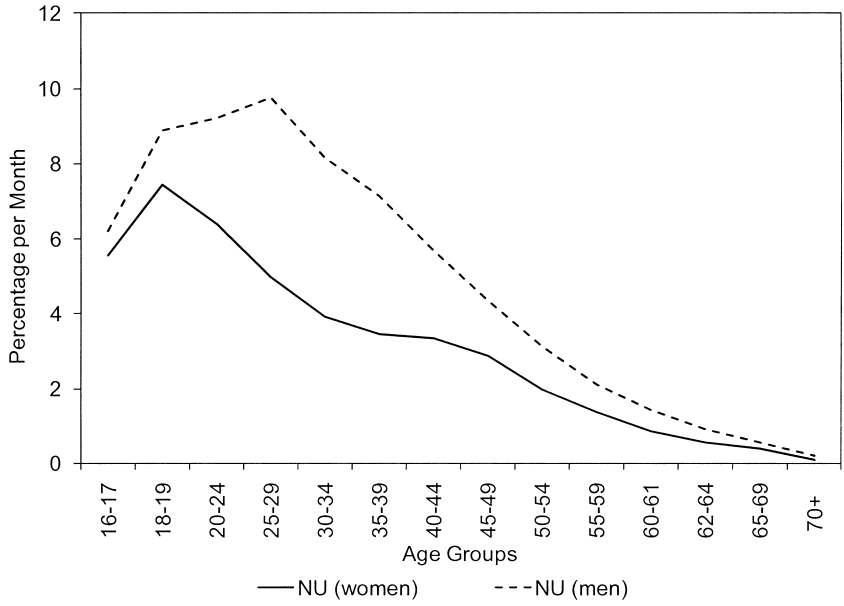

Fig. 10.21 Hazard rates from NLF to unemployment (1996–2006)

unemployment, remains fairly stable throughout life once past the turbulent younger ages (figure 10.22).[11]

10.5.2 Employment to Unemployment

Although the age profiles of labor force flows have relatively small implications for the aggregate unemployment rate, some of the particular flows are interesting in their own right. Among these is the rate of movement from employment to unemployment (the EU flow). Changes in this rate induced by demographic shifts may have implications for trends in prominent indicators of labor market conditions, such as claims for unemployment insurance, as well as for the relative importance of job separations in explaining movements in the unemployment rate, a topic that has attracted considerable attention of late (e.g., Shimer 2007; Fujita and Ramey 2009).

11. An aging population might be expected to affect the duration of unemployment in contradictory ways. As the population ages away from the high turnover young years to the more attached prime years, durations might lengthen, while as the population ages from the more attached prime years to the less attached older years, durations would shorten. We have taken a quick look at this question by approximating the expected duration of unemployment within each age group by the reciprocal of the mean hazard rate for leaving unemployment (to any destination). By this measure, aging has little influence on the expected durations, especially on the duration of unemployment. For E and N, we are looking at top differences of 1/2 and 1 – 1/2 months on levels of thirty-two and forty-eight months, respectively—for unemployment, a top difference of less than a day on levels of sixty days. However, for a more detailed analysis of the influence of the baby boomers on unemployment durations, see Abraham and Shimer (2001).

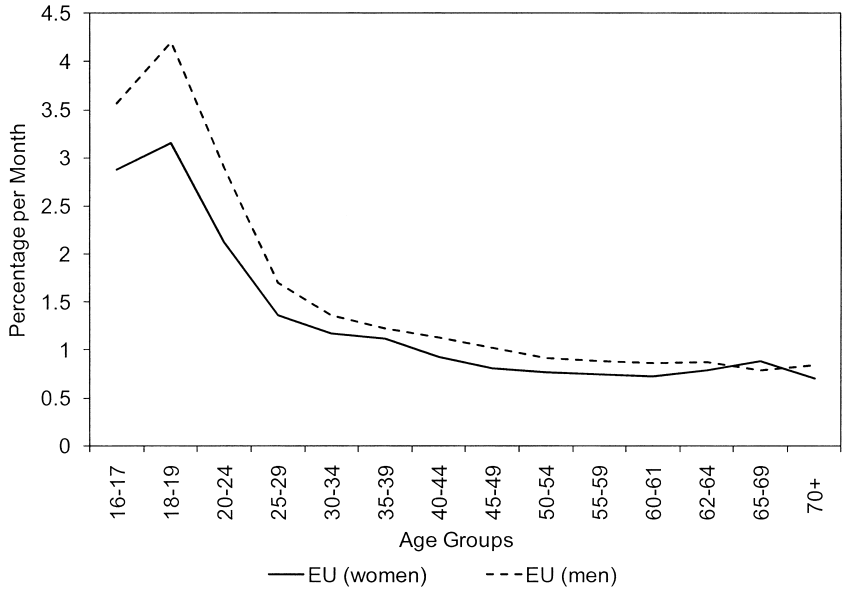

Fig. 10.22 Hazard rates from employment to unemployment

As noted previously, however, the hazard rate for EU transitions is relatively stable after age thirty, despite falling rapidly from the teenage years. Therefore, as with the unemployment rate, the direct effect of aging on the EU rate is modest. Figure 10.23 shows the effect of shifts in the age distribution of the population on the EU hazard rate, relative to the rate in 1996, by holding constant both the within-age EU hazard rates and the within-age employment-to-population (e/p) ratios while letting population shares evolve. The mean aggregate EU hazard rate over this period is about 1.4 percent, and the aging of the population changes the rate by only hundredths of a percentage point, even out as far as 2015.

Figure 10.24 puts this in terms of numbers of workers rather than rates. If we hold the level of payroll employment constant at its 2006 level, the difference in the EU flow from the change in the aggregate EU hazard between 1996 and 2006 is on the order of 30,000 workers per month; between 1996 and 2015, it is 50,000 workers per month. The largest effects of aging on the EU flow come not from the induced changes to the hazard rate, but from the changes to the base of employment to which these rates can be applied. Mainly because the aggregate participation rate falls as the population ages, this base of employment falls. Holding the aggregate population and age-specific e/p ratios constant at their 2006 levels, but allowing the age distribution to evolve, yields a decrease in the level of the aggregate EU flow of close to 45,000 workers per month between 1996 and 2006, and about 125,000 per month between 1996 and 2015. Whether

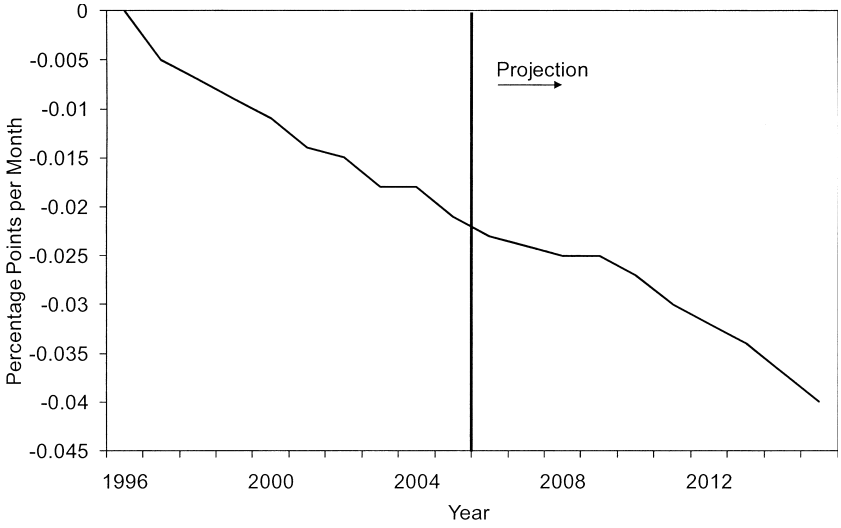

Fig. 10.23 Effect of aging on the EU hazard rate (relative to 1996)

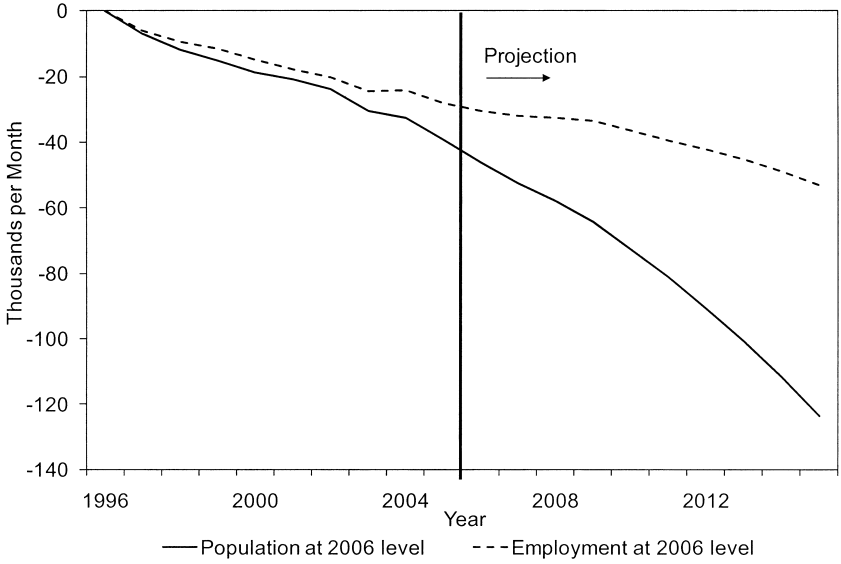

Fig. 10.24 Effect of aging on EU flow

this number is small or large depends upon the context. In terms of the importance of EU flows for the unemployment rate, 125,000 is still only a small percentage of the overall EU flow. However, it implies a substantial reduction in the number of weekly claims for unemployment insurance that one would expect to associate with a healthy rate of economic growth.

10.5.3 Unemployment vs. Nonparticipation

A related issue is the degree to which nonparticipation replaces unemployment as the alternative to employment as the population ages. Not only in the sense of retirement, but also as the state in which potential workers reside between stints of employment. Put another way, to what extent are movements into and out of employment mediated by a period of unemployment? Much of the literature that models or investigates labor market flows recognizes the importance of movements between employment and nonparticipation, and the importance of these flows rises as the population ages.

Figure 10.25 shows the percentage of transitions into employment for which nonparticipation, rather than unemployment, is the state of origin; that is, new entrants and reentrants who move into employment without a period of unemployment as measured by the CPS. The figure also shows the percentage of transitions out of employment for which nonparticipation, rather than unemployment, is the destination state. These

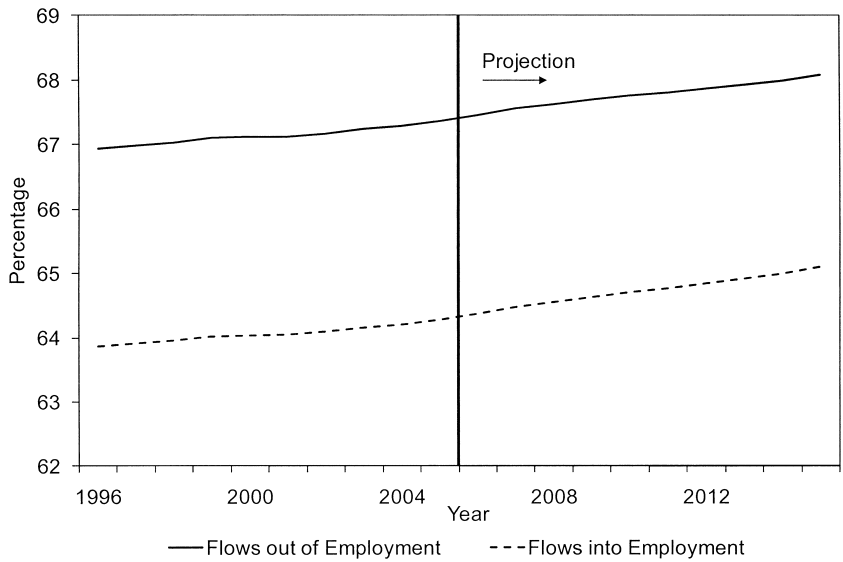

Fig. 10.25 Percent of flows involving employment that involve NLF

transitions may include retirements, discouraged workers, persons going back to school, leaving work to raise families, and a number of other categories.

As the population ages, the percentage of transitions that involve nonparticipation rises, but not by much. Between 1996 and 2015, we can expect the shifting age distribution of the population to increase the percentage of transitions that involve nonparticipation by about 1 point.

10.5.4 Aggregate Turnover

One typically thinks of older persons as being more stable in their jobs, but the relationship is not monotonic. Figure 10.26 shows average separation rates by age. These include both transitions out of employment, and transitions from one main employer to another, which can be measured using matched CPS data since the redesign of that survey in 1994. (See Fallick and Fleischman 2004.) Overall separation rates fall sharply with age into the late twenties, decline further gradually through the late forties, then rise into and through retirement ages.

As a result, the direct effect of the shifting age distribution on the aggregate separation rate, graphed in figure 10.27, is also not monotonic. Aging has mostly driven the aggregate separation rate down since 1996, as the youngest of the baby boomers entered the low-separation ages and the oldest of the baby boomers had not left those ages. Beginning a few years ago,

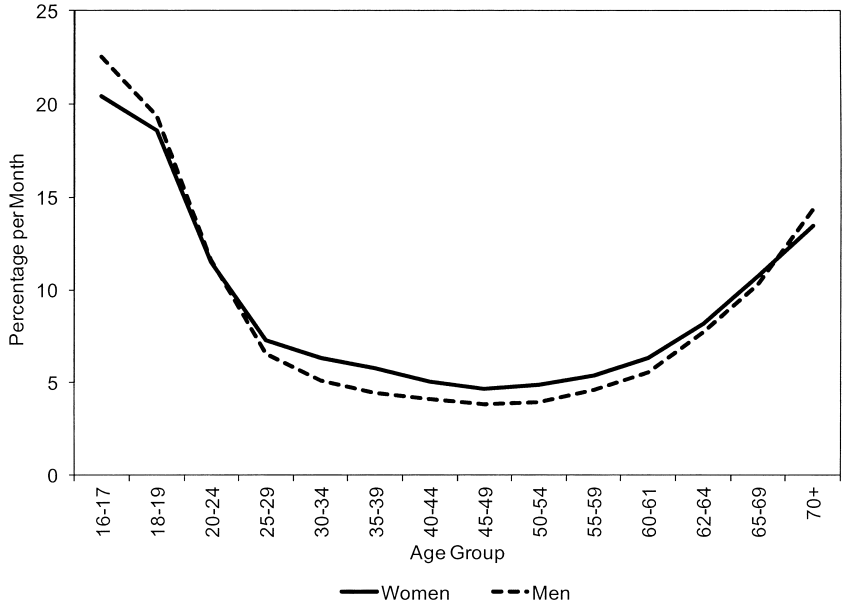

Fig. 10.26 Separation rates by age

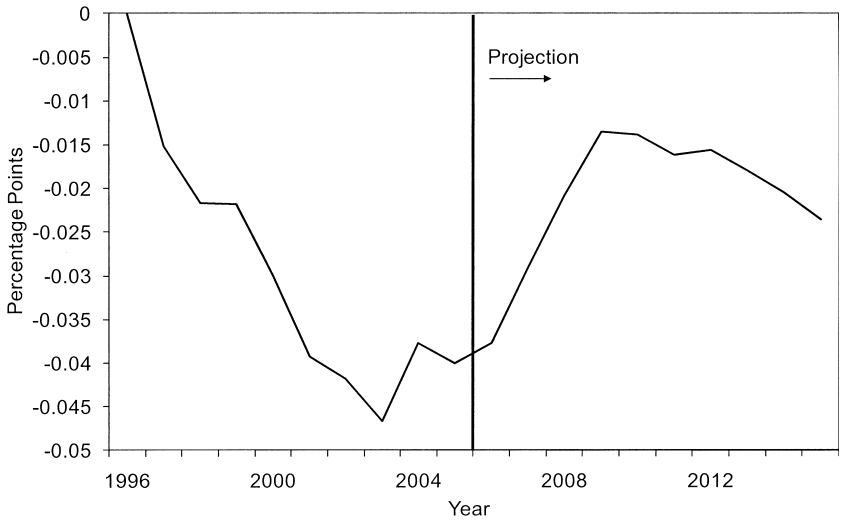

Fig. 10.27 Effect of aging on the monthly separation rate (relative to 1996)

however, the oldest of the baby boomers began to enter the upward-sloping part of the separation rate profile, and this began to push up the aggregate separation rate.

Again, however, the implications for the separation rate are relatively small, in the hundredths of a percentage point on a level of 6.8 percent per month. And again, the larger effects come from the implications of aging for the level of employment, which reduces the level of aggregate turnover (figure 10.28).

10.6 Hourly Wages

Upward sloping age-earnings profiles have long been recognized as a feature of the labor market and an influence on life cycle labor supply. Human capital theory provided an explanation for why young workers would work for low wages, and as skills and experience increase so too does marginal productivity and thus wages, as noted by Mincer (1958) and detailed by Willis (1986). Kotlikoff (1988) further argued that productivity rose over the life cycle, but not by as much as wages. Workers were paid low wages at the start of their career and high wages at the end as part of contracts with employers that provided other benefits to both parties like retention and income security. Hourly wages generally rise with age, and then decline slightly in older age groups above sixty.

To evaluate the influence of the shifting age distribution on wages, we use the reported earnings from the outgoing rotation groups in the CPS, pro-

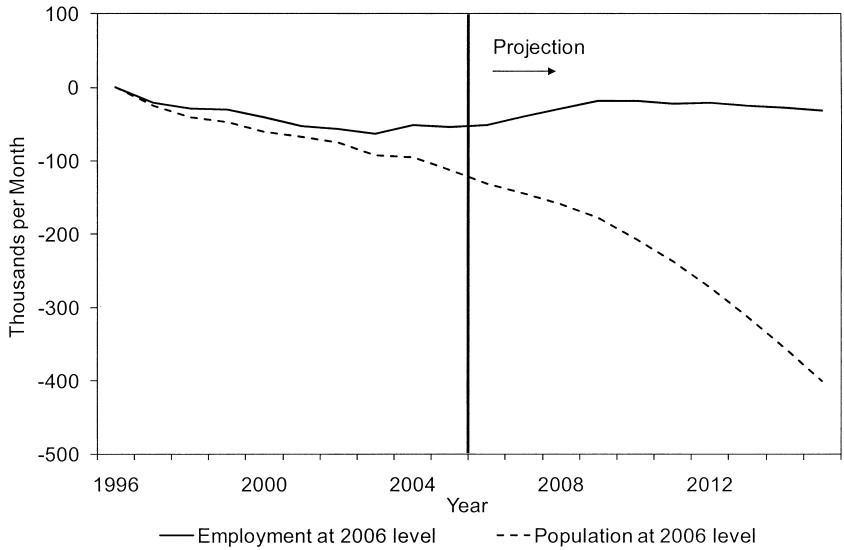

Fig. 10.28 Effect of aging on separations

vided by the National Bureau of Economic Research (NBER) CPS extraction file. Earnings were converted to an hourly wage, aggregated to an annual frequency, and deflated by the Consumer Price Index. In cleaning the data, special consideration was given to trimming and removing outliers. For example, Lemieux (chapter 1 in this volume) removes hourly wages under $1 an hour and over $100 an hour. A common adjustment, this reduces substantially the volatility in the mean and variance of wages over time, and is useful for evaluations of wage inequality. However, because the variance of wages rises with age, such trimming will bias downwards any estimate of the effect of aging on mean wages or the variance—there are a lot more fifty-year-old men making $100 an hour than eighteen-year-old men. For our purposes, avoiding this bias was judged a better trade-off than a smoother variance series over time. Instead, because most hourly earnings outliers in the CPS are due to combinations of unusually low hours combined with unusual high wages and vice versa, we dropped hourly workers who reported fewer than five hours of work a week but whose weekly earnings were over $1,000, which essentially eliminated most outliers. After that, workers reporting earnings less than a dollar an hour (in 2005 dollars) were also eliminated, which largely eliminated clumps of observations around zero, but otherwise had essentially no effect on the results. For evaluation of such trimming, using exactly the same data as shown here, see Schmitt (2003), who notes little effect on the path of mean wages once the extreme outliers are removed. Thus we feel comfortable with our data cleaning, despite

the fact that our estimates of wage variance are more volatile than those in other studies.[12]

Figure 10.29 plots the age-wage profile of men in three different years: 1979, the earliest data for the reported wage measures in the NBER data; 1990; and 2005, the most recent data. The profiles follow roughly the same pattern in each year. Although, as the authors noted earlier have suggested, the sheer size of the baby boomers' cohort may have depressed their wages all else equal, the opposite pattern is observed in these profiles. Teen wages have declined since the baby boomers left those age groups and earnings of older workers have risen as the boomers have entered those age groups. No doubt the higher levels of education of the boomers are swamping other microeconomic effects.

Not only does the mean wage vary substantially over the life cycle, but the variance of wages does as well. Figure 10.30 shows the age-variance profile for men in 1979, 1990, and 2005. As has been well-established in the literature on wage inequality, the variance of wages has risen at almost every age group for men over the few decades, with a noticeable increase across age groups between 1979 and 1990. There has been an especially noticeable widening of the wage distribution among older workers, no doubt due to the rising return to skills and experience for some members of the oldest age groups. If this trend continues, as shares of the workforce begin to shift toward older age groups, this has the potential to put additional upward pressure on aggregate wage variance as the higher variance among older age groups interacts with the population shifts into those age groups.

Wages are determined in equilibrium as a function of supply and demand, and labor is a derived demand. In addition, wages are cyclical. These forces confound, decomposing the "pure" effects of population aging on the mean and the variance of wages. However, as with the other measures noted earlier, we attempt to estimate a first-order effect by using fixed weight alternatives to observe how the shifting population shares have influenced the path of wages over time. That is, we fix wages and the employment-to-population ratios to a base year (we choose 2005 in the graphs), and allow the population shares to evolve as they have in the past and are projected to do in the future. Other base years yield similar conclusions.

Figure 10.31 shows the mean real hourly wage from the CPS plotted

12. As noted before, implausibly high earnings were often the result of low reported hours combined with high weekly earnings, and thus hourly workers reporting fewer than five hours of work a week combined with weekly earnings over $1,000 were dropped. Workers with implausibly low hourly earnings were also dropped. Earnings above the CPS topcodes were imputed, within each age-sex category, using a lognormal distribution. Pareto distributions proved too unstable for imputation within narrowly defined demographic categories. For discussion of the sensitivity of the imputation and trimming procedures see Schmitt (2003), who convincingly argues in favor of using a lognormal distribution instead of a pareto distribution. Schmitt was also nice enough to provide STATA code for imputations, as well as comparable wage series over time for comparison. The details are described in his paper.

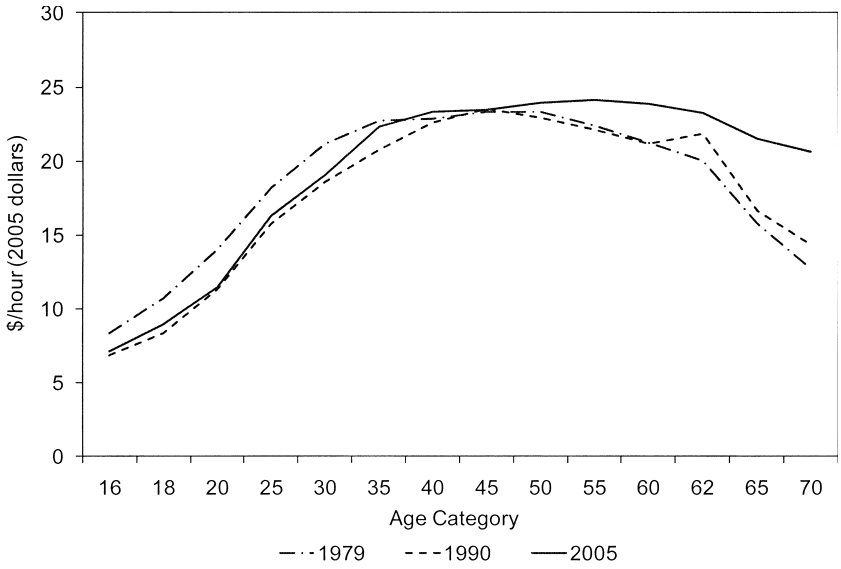

Fig. 10.29 Age-wage profiles for men

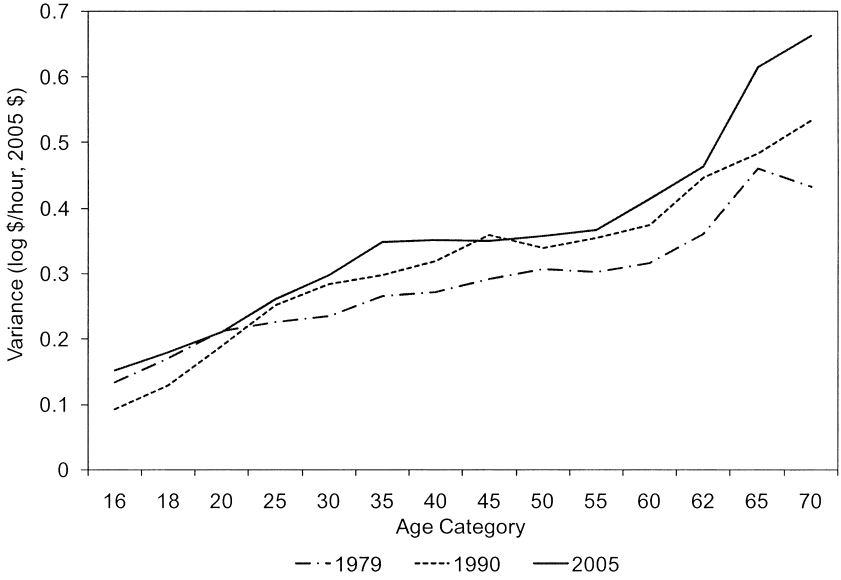

Fig. 10.30 Age-variance profile for men

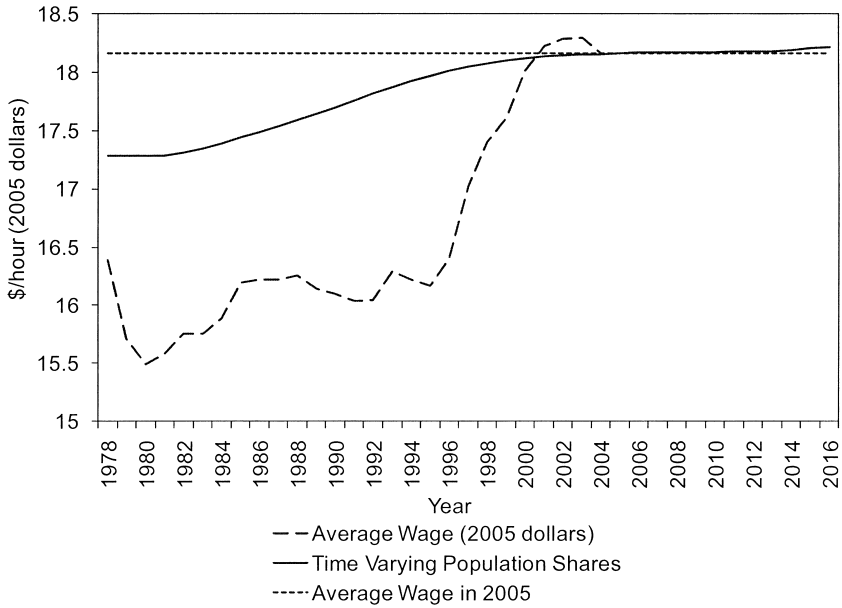

Fig. 10.31 Mean real wages and fixed-weight comparison

against a fixed-weight alternative where the employment-to-population ratios and mean wage rates within each wage-sex group were held at their 2005 averages. The actual real wage has risen from $16.39 an hour (in 2005 dollars) in 1979 to $18.17 an hour in 2005. For much of the 1980s the real wage hovered around $16 an hour, before rising in the late 1990s, and then leveling off in recent years.[13]

The fixed-weight alternative, where the increases in the series are due only to shifting population shares, rises significantly as well. At face value, the fixed-weight alternative rose by $0.89 between 1979 and 2005 while actual real wages rose by $1.78. Thus, half the increase in real wages over the period is accounted for simply by the baby boomers moving into their high wage years. Note that with the sharp drop in actual real wages in 1979, the exact contribution will depend on one's starting point. However, the shift in the age distribution of the population clearly contributed a substantial portion

13. Average hourly earnings reported by the payroll survey of establishments was $16.13 in 2005, compared to our CPS-based series of $18.17 an hour. The payroll survey excludes nonproduction and supervisory workers in addition to the self-employed, among other conceptual differences. The payroll survey series has a similar path as the series shown here, except for one difference: the payroll survey's average hourly earnings shows more decline in real wages between 1979 and the early 1990s than the series we derive from the CPS. Although it reflects the wages of only production and nonsupervisory workers and is based on 1982 dollars, the published BLS real earnings series available at http://www.bls.gov/ces has essentially the same contour for mean wages over the years as the data we present here.

of the measured real wage gains in the last two decades. Looking ahead, as the projections in the figure show, this upward pressure on mean real wages from aging has pretty much ended, as the baby boomers have completed their transition into high wage age groups.

Similarly, the mere shifting of the population shares has put upward pressure on wage variance. However, the amount of pressure has been small. The actual variance of log wages since 1979, deflated using the CPI, is shown as the solid line in figure 10.32. The variance, although volatile, shows the steep upward trend since 1979 that one would expect to see given the long literature on wage inequality (see similar series in Schmitt [2003]). The long dashed line shows the change in variance due to shifting population shares, holding within-group variances constant at their 2005 values and allowing the employment-to-population ratios to vary.

As is readily apparent, although shifting population shares have put upward pressure on wage variance, the effect is small relative to the secular trend since the end of the 1970s. The effect is small partly because under the surface there have been two offsetting effects at work. This is shown in figure 10.33. As one would expect, as the population has aged it has shifted toward older age groups, which have higher within-group variances. This increase in within-group variance has worked to push the overall variance up. However, at the same time the aging of the population has reduced the between-age-group variance, which has largely offset the increase in average

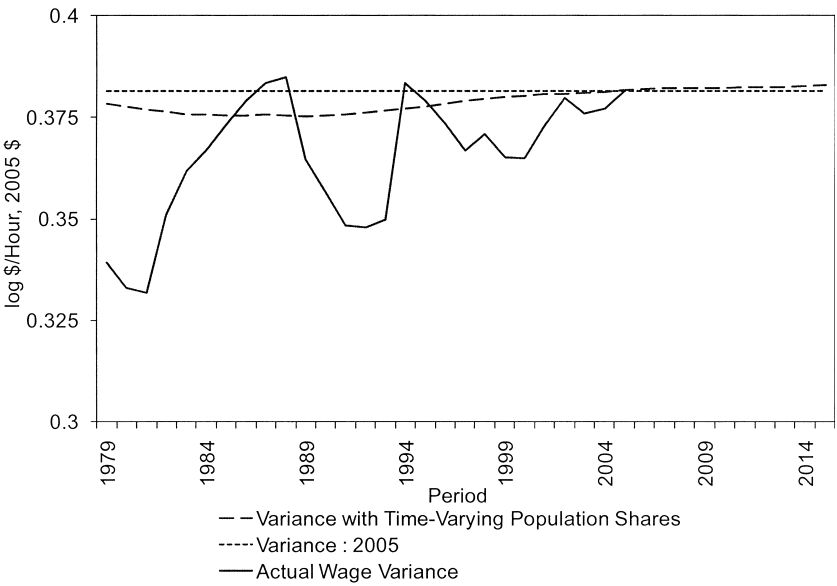

Fig. 10.32 Effect of changing age distribution on wage variance (variance log real wage; within-age/gender group variance set at 2005 values)

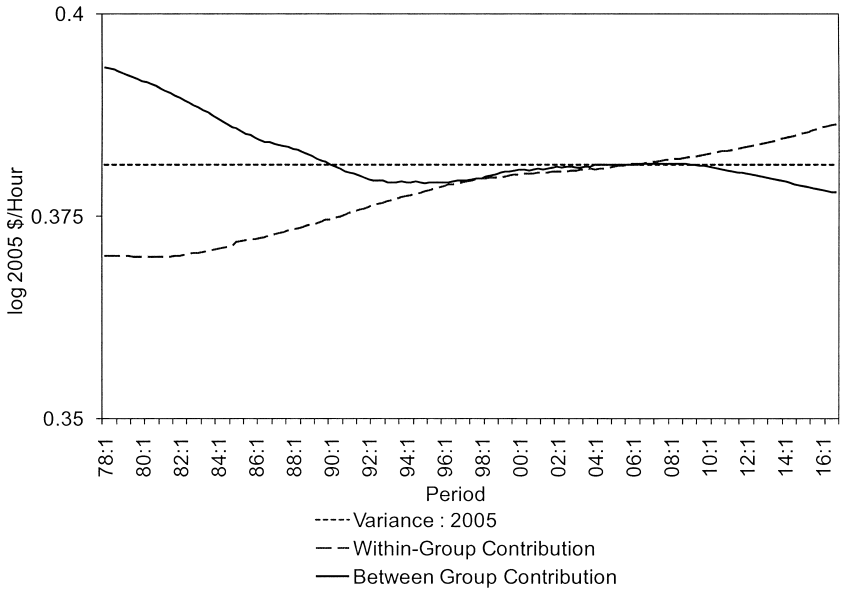

Fig. 10.33 Effect of changing age distribution on wage variance (variance of log(wage); within-age/gender group variance set at 2005 values)

within-group variance. In any case, even such upward pressure as there has been has pretty much run its course, and we can expect little further pressure in the years ahead.

10.7 Conclusion

Although changes in behavior within age groups may offset some of the influence of the shifting age shares, the aging of the baby boomers, increased longevity, and other forces influencing the age distribution have been and are likely to remain important determinants of labor market statistics. In the years ahead, the aggregate measure of the labor market likely to be affected in the most pronounced way is the labor force participation rate, as the share of labor market participants continues to shrink in the years ahead at even a faster pace than over the last several years. Offsetting some of the downward pressure, baby boomers are expected to remain in the labor force longer than prior cohorts. However, labor supply declines severely with age and, even among the baby boomers, it is unlikely that a someone born in 1950 will be as likely to work at age sixty-five as they were at age forty-five. Given this feature of labor supply over the life cycle, the shifting age distribution of the population is likely to put substantial downward pressure on the aggregate participation rate for the next thirty years.

Economists have long noted the influence of labor force composition on

unemployment rates. In order to assess labor market slack, wage pressure, or the health of the labor market over time, movements in the unemployment rate must be decomposed into cyclical movements and more structural changes like an aging population. However, in contrast to the participation rate, for which large aging-induced changes lie ahead, the influence of the aging of the baby boomers on the unemployment rate has largely run its course. More important to the aggregate unemployment rate of late are other factors, such as the decline in teenage participation that continues to shrink the share of a high unemployment rate age group in the labor force.

The aging population has also changed how individuals flow through the labor market states, their persistence in a given state, and the likelihood they drop out of the labor force entirely. Although the projected changes are small, we anticipate the transitions through nonparticipation will continue to rise in the years ahead. In addition, the corresponding influence on the separation rate, which fell over time and has begun to rise again, has been relatively modest. However small these effects might be, the influence aging has on interpreting labor market statistics remains important. As we noted earlier, the analysis implies a substantial reduction in the number of weekly claims for unemployment insurance (one of the most watched high-frequency economic indicators) that one would expect to associate with a healthy rate of economic growth.

Finally, mean earnings derived from the CPS have also been influenced by population aging. The baby boomers moving into their high earnings years has put upward pressure on mean wages. Although this is a partial equilibrium accounting that does not account for such offsetting influences as how the relative supply or skill supply might have offset the influence of population aging, the effect is still dramatic. The upward pressure that the baby boom has had on mean wages has largely run its course. Without that influence the gains in mean real wages in the 1990s likely would not have been as great. Going forward, the shifting age distribution is no longer going to put upward pressure on mean wages. Thus, this contribution to related measures like the aggregate wage bill will diminish in the years ahead.

None of the projections for population are set in stone. That said, the baby boom exists and baby boomers are aging. Projections of shifts in the age distribution of the population have wide confidence intervals, but carrying forward the baby boomers from age group to age group as they pass through each year is not as uncertain as, say, projecting undocumented immigration. Life expectancy will lengthen, perhaps faster than projected (which would cause the aggregate labor force participation to decline even more quickly than projected). All in all, the population is shifting toward older age groups and, short of a substantial shift in policy not currently on the horizon, nothing will change that feature of population growth in the United States. As economists continue to study economic time series, accounting for these shifts will remain at least as important in the future as it has in the past, if

not more so. Accounting for such changes will also shed clearer light on pressing economic issues and problems, analysis of which might otherwise be confounded by the influence of population aging on economic measures.

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Comment Gary Burtless

This chapter traces out the effects of population aging on a few key labor market variables: the labor force participation rate; the unemployment rate;

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