Earnings Volatility in the U.S.: Short-Term and Long-Term Trends

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Abstract: This paper uses data from the U.S. Census Bureau's Survey of Income and Program Participation (SIPP) and Current Population Survey (CPS) to analyze the year-over-year earnings fluctuations experienced by the American work-force. Using the 2004 Panel of the SIPP, we find that a significant share of the U.S. work force experiences year-over-year economic fluctuations, although people with more stable labor force attachment experiences less volatility. Earnings volatility is widespread across demographic groups as well as industry and occupation groups. The earnings of self-employed workers, however, are much more volatile than their wage and salaried counterparts. The CPS results spanning the last three decades suggest that earnings volatility changes seasonally and over business cycles, and has risen over time. It is, however, not clear how much of the upward trend in measured earnings volatility is due to changes over time in the design of the CPS itself.

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1. Introduction

People's earnings in general rise over their lifetime, primarily because of human capital investment (educational attainment, work experience, job tenure), but in the short run earnings can fluctuate for a number of reasons. Some fluctuations are the direct results of changes in individual-specific attributes, like changes in employment characteristics like occupation and industry and movements in and out of labor force. Some earnings fluctuations are due to aggregate shocks, like macroeconomic, technological or geographic factors that affect the overall economic and employment conditions including wage and price levels, and bonus and commission. Other earnings fluctuations could occur because of random shocks at the individual level, such as illness, crime, climate, lotteries and other idiosyncratic events. These categories are not always independent from one another and a number of these factors could be at work simultaneously. In addition, while some of these factors are voluntary, others are entirely exogenous or involuntary at the individual level.

This paper attempts to measure the extent of earnings fluctuations experienced by the American work-force. The extent of ups and downs in people's earnings is an important indicator of wellbeing. Yet, such aspects are not captured in static or aggregate statistics. Static measures like the unemployment rate, the poverty rate, per capita GDP or median household income provide an overall snapshot of the population. While they are essential for understanding aggregate economic trends, they do not provide much information about the extent of volatility experienced at the individual level from one year to another. This is because the static measures are not based on true panels but on randomly selected samples of population which are different every year. In order to measure economic volatility, it is necessary to follow the economic outcomes of the same group of people over time.

The findings of this paper are presented in two main sections. The first main section (Section 3) uses data from the Census Bureau's longitudinal household survey, the Survey of Income and Program Participation (SIPP), to shed light on the following questions: how much year over year economic fluctuations do Americans experience and how do demographic characteristics, poverty status and employment characteristics

correlate with the extent of earnings volatility. Hence, the first section analyzes how earnings volatility during a short span of time (two years) is affected by individual-specific characteristics. We find that a significant share of the U.S. work force experiences year-over-year economic fluctuations, although people with more stable labor force attachment experiences less volatility. One in every five year-round employed workers saw their earnings change by at least 25% between 2006 and 2007 whereas close to one in ten saw changes of at least half. Earnings volatility is widespread across demographic groups --- while there is some variation in volatility across demographic groups, no specific age, race or gender group seems to be driving the overall trend. The earnings of self-employed workers (who constitute a small fraction of the overall work force), however, are much more volatile than their wage and salaried counterparts Earnings volatility is also particularly high among the work force in poverty. Finally, earnings volatility varies quite a bit across industry and occupation sectors.

The second main section (Section 4) of this paper uses Current Population Survey data to put the results of the first half of the paper in the context of longer-term trends and business cycle effects. The CPS results spanning the last three decades suggest that earnings volatility changes seasonally and over business cycles, and has risen over time. It is, however, not clear how much of the upward trend in measured earnings volatility is due to the evolution of the CPS itself. The results exhibit similar relationships between earnings volatility and age, gender, marital status, race, ethnicity, education, and industry as in the results derived from the SIPP. In addition, changes in demographic variables over time are associated with sharp increases in earnings volatility.

2. Literature Review

A large volume of studies have focused on short-term absolute changes or fluctuations in earnings at the individual level. The existing studies have primarily looked at long term trends, i.e., whether earnings volatility has risen or declined over long periods of time.

Much of the theoretical framework for studying earnings fluctuations originate

from Gottschalk and Moffitt (1994). They decompose the variance in annual earnings[2] into a permanent and a transitory component. The transitory variance reflects transitory shifts in earnings and can be seen as "earnings instability" or short-term earnings volatility because these reflect short-term changes that gradually diminish over time, i.e., are mean-reverting. Permanent shifts, on the other hand, reflect a permanent change in a person's earnings trajectory. Using data from the Panel Study of Income Dynamics (PSID), Gottschalk and Moffitt (1994) define a person's permanent earning by averaging the person's annual earnings over a 9-year period. Transitory shifts are defined as deviations in annual earnings from the 9-year average. Their study looks at white, male, non-student heads of households, aged between 20 and 59, for two periods, 1970-1978 and 1979-1987, and finds that the transitory variance of male earnings rose between the 1970s and1980s. They also find that the rise in short-term earnings volatility or transitory variance accounts for about half the rise in earnings inequality among white men during this period. In order to understand how labor market characteristics affect the rise in volatility, they look at industry of employment, union status and job turnover. Industries vary across a number of dimensions, including but not limited to, the required level of worker skill, the seasonal or cyclical pattern of demand, the extent of unionization, the extent of temporary workers, exposure to trade and globalization, firm size and innovation. All of these are likely to affect the overall variability of earnings across industries. These are important areas to study not only for understanding earnings volatility but also the overall earnings distribution because of the potential impact of short-term volatility on earnings inequality.[3] Gottschalk and Moffitt (1994) find that the extent of volatility at a given (9 year) period varies across industry sectors, however, all sectors saw a rise in volatility during the 1980s relative to the 1970s. Similarly, they find that while unionized workers experienced significantly lower levels of variability at a given period than their non-unionized counterparts, both groups saw a rise in earnings volatility during the 1980s. As a result, the rise in the overall transitory variance in earnings in their sample is not explained by a particular sector. Excluding part-time and

[2] They decompose earnings residual which is the residual portion of earnings after controlling for a person's age and education.

[3] As opposed to explanations like skill-biased technological change which reflect a change in price of skill and therefore permanent shifts in earnings.

self-employed individuals from their sample lowers both the level and rise in volatility implying that these groups experience more earnings fluctuations than their counterparts. However, the pattern of widespread rise across sectors still holds. Finally, Gottschalk and Moffitt (1994) compare the transitory variance for workers who stayed in the same job vs. who switched jobs. They again find that earnings variability rose for both movers and non-movers.

Gottschalk and Moffit (1995) update their 1994 study by using a formal model of earnings dynamics for the decomposition exercise. Using data from the PSID for white, male heads of household, they find that the transitory variance of earnings have risen during the 1969-1991 periods. Gottschalk and Moffitt (2008) use both a formal model as well as an extension of the method used in their 1994 paper to estimate transitory variance. They find that the transitory variance in earnings rose during the 1980s and began to level off during the 1990s, although the variance stayed at the high level reached in the 1980s through 2004. They also find that the transitory variance has a cyclical component, so earnings volatility varies with the business cycle. In addition, they find that the rise in volatility accounts for about a third of the rise in earnings inequality between the 1990s and mid-2000s. The authors did not provide an update of their results by industry, union status and job movers in the later versions of their 1994 paper.

Cameron and Tracy (1998) use a similar model of earnings dynamics and decomposition method to study the long-term trends of permanent and transitory variance in earnings residual using data from the Current Population Survey (CPS). They look at men, between 18 and 63 years of age during the 1967-1996 period. They exclude self-employment earnings from their earnings measure. They find that earnings volatility vary with the business cycle; apart from the cyclicality, however, volatility rose during the 1970s, reached a peak during early 1980s and then slowly and gradually fell until the mid 1990s, although the levels in the 1990s were still higher than that during the beginning of their sample period in the late 1960s. In addition, they find that the trends in volatility vary across industries --- while some industries (like manufacturing and government) saw only mild rises in volatility, others (like trade and construction) experienced larger increases during their sample period.

Other studies have also looked at long-term trends of earnings volatility but none

to my knowledge has looked at volatility across detailed industry and occupation sectors. For example, Haider (2001) used data from the PSID on white, male heads of households, performed a similar model-based decomposition as Gottschalk and Moffit and found that earnings volatility rose between the early 1970s and late 1980s. The Congressional Budget Office (2008) used administrative data from the Social Security Administration's Continuous Work History Sample (CWS) to look at earnings volatility for male and female workers between 25 and 55 years of age. They define earnings volatility by the fraction of workers experiencing at least a 25% and a 50% change[4] in annual earnings (their measure of earnings does not include self-employment earnings). CBO finds that earnings volatility has a cyclical component; however, apart from the cyclicality, overall volatility during the 1984-2003 period has not changed much.

3. Short-Term Context

As mentioned above, this paper has two main sections. The first measures how much year over year earnings fluctuations Americans experience and how demographic and employment characteristics correlate with the extent of the earnings volatility. For this purpose, we use data from the Census Bureau's Survey of Income and Program participation (SIPP) which contains detailed demographic and economic data at the household level.

3.1 Data and Methods

The SIPP is a longitudinal survey of a representative sample of the U.S. non-institutional civilian population, and provides detailed monthly data on labor force participation, income, assets, welfare program participation, and demographic characteristics of households. The SIPP collects monthly data on individuals of participating households for 3 or 4 years.[5]

Because the SIPP provides detailed demographic and labor force data for every member, age 15 and over, of participating households, we do not have to limit ourselves

[4] Earnings volatility is defined as the deviation in earnings in a given year from the 2 year average (the denominator).
[5] The 2004 panel is the most recently completed panel of the SIPP. It started in February 2004 with about 46,500 households. The 2001 panel interviewed households from February 2001 through January 2004.

to looking at only heads of households. The studies based on the PSID data suffer from this limitation. In addition, for working individuals the SIPP reports earnings, industry and occupation data for up to two jobs and businesses. This enables us to study in detail the self-employed population. Because of their highly variable earnings (Gottschalk and Moffit; 1994), they are an important group for getting a comprehensive understanding of overall earnings fluctuations. The CBO (2008) study excludes this group because of lack of data. In addition, because the SIPP data are monthly, we can more precisely calculate job tenure, identify individuals and businesses that go through transitions, and correlate earnings fluctuations with job transitions. The identification of such transitions are not completely precise in annual data. For example, if a person moves from one industry to another in a particular year, it is not clear how much of her annual earnings from that year come from which industry.

The SIPP data, however, does not enable us to study long-term trends in earnings because it follows the same households for a maximum of 3-4 years. As a result, while we can study earnings volatility across detailed demographic and labor force categories at a given point in time, we are unable to say much about trends over long periods of time, which is why the next section of this paper uses data from the CPS to look at longer term trends.

In this section, we measure earnings volatility between 2006 and 2007, the two most recent years covered by the 2004 panel of SIPP (which is the most recently completed panel of the SIPP). In order to make sure the trends seen during 2006-2007 are not unique, we also look at 2004-2005 and these results are presented in the Appendix. The volatility measures are not based on model-based parameters, so they are much easier to understand. Earnings volatility is defined by the fraction of the 25-65 year old work force whose year-over-year change in real earnings exceeds a minimum threshold amount. The thresholds used in this report are 25% and 50%, so earnings volatility is measured by the share of the 25-65 year old work force experiencing a 25% or larger change in real earnings, and a 50% or larger change in real earnings between two consecutive years. Annual earnings are adjusted for inflation using the Consumer price Index Research Series (CPI-U-RS).

In order to minimize the impacts of schooling and retirement on earnings volatility, we restrict our sample to the 25-65 year old age group. While schooling and retirement decisions may still impact economic volatility between the ages of 25-65, they are likely to be less prevalent for this age group than their younger and older counterparts. We also exclude those with zero earnings in either year in order to limit the impact of very large fluctuations on overall volatility.

We look at two samples. The first sample includes all 25 to 65 year old people who are in the labor force (either working, on layoff, or looking for a job) for at least one month during the two year sample period. So people who move in and out of the labor force during the sample period are included in this sample as long as they have positive earnings in both years. The second sample includes those who report working (i.e. no unpaid absence from job) every month during the two year period. The 2006-2007 sample size for the first group is 11,971 and for the year-round worker sample is 8,539 observations.[6] Since the first sample includes people who move in and out of the labor force whereas the second sample strictly focuses on year-round employed people, comparing the two samples enables us to see how earnings volatility varies with labor force attachment.

3.2 Results

Table 1 presents data on real average annual earnings for 2006 and 2007 as well as on earnings volatility between 2006 and 2007 by demographic characteristics for the first sample. The last two columns show that a sizeable share of the population experiences earnings volatility: 17% or almost 1 out of every 5 people saw their real earnings change by at least half between 2006 and 2007, while 31% or almost 1 out of 3 saw their earnings change by 25% or more.

It is useful to simultaneously look at mean earnings for two reasons. First, it gives an idea about the magnitude of a 25% or 50% change in earnings on average. With average earnings at $44,600 in 2006, a 25% and 50% change from average earnings is equivalent to roughly $11,100 and $22,300 respectively. These are not small changes

[6] The 2004-2005 sample sizes are 28,904 and 18,892 respectively. The number of households in the 2004 panel of SIPP declined significantly after Wave 8, which is why the 2006-2007 samples are smaller than the 2004-2005 samples.

year over year. Second, the change in average earnings between 2006 and 2007 masks the extent of fluctuations seen at the individual level. For example, comparing the two columns with average annual earnings for 2006 and 2007 shows that real average earnings remained unchanged (the drop is not statistically significant) between 2006 and 2007 --- while this tells us that workers on average earned the same in 2007 as they did in 2006, it does not give any information about the extent of earnings fluctuations experienced at the individual level during this period.

In general, women are slightly more likely than men to experience earnings volatility.[7] The differences across the race categories are not statistically significant.[8] In addition, people in the middle of the age distribution are less likely to experience earnings volatility than their younger and older counterparts. For example, 15% of the 25-34 year old and 35-44 year old groups saw their earnings change by half or more compared to 19% and 21% of the youngest and oldest group. People in the youngest group are much more likely than their middle-aged counterparts to be completing school and going through other transitions like part-time to full-time employment, switching jobs to find a better match and so on. The 55-65 year old group is closer to retirement than the two younger groups. All of these would translate into significant earnings volatility.

Those with less education are more likely than their more educated counterparts to experience earnings volatility. For example, 21% of those with less than a high school degree saw large earnings volatility compared to 16% of college graduates and 13% of advanced degree holders. The more educated workers are likely to hold jobs with more job security and stable earnings paths.

Table 2 presents the same results for the year-round employed sample. Excluding people who were either not in the labor force or on layoff or looking for a job part of the year significantly reduces the extent of earnings volatility. For example, 9.1% of year-round workers between 25-65 years of age experienced large earnings fluctuations, compared to almost double or 17.2% in the first sample. This pattern holds across the

[7] All comparisons made in this paper are significant at least at the 10% level.
[8] During 2004-05, however, Whites were slightly less likely than Blacks and Hispanics to experience volatility of 25% or more. For large volatility of 50% or more, there was no difference.

demographic groups. This implies that the extent of earnings volatility is strongly related to a person's labor force attachment.

Contrary to the first sample, women in the year-round worker sample are slightly less likely than men to experience earnings volatility (50% or larger). This means that large volatility among women who are either not in the labor force or on layoff or job searching for part of the year are much higher than their male counterparts, which is why the overall result by gender reverses in the first sample.

Some of the differences by age, particularly between the youngest and two middle-aged groups, diminish while looking at year-round workers. The oldest group, those between 55 and 65, however, still experiences more volatility than the younger groups.

The correlation between education and volatility is also weaker in the year-round employed sample.[9] This means that although people with less education earn less on average than their more educated counterparts, once we condition on year-round work status, the less educated don't always see more volatility than their more educated counterparts. This again reiterates that labor force attachment is a strong indicator of the extent of economic fluctuations experienced by people, perhaps a stronger indicator than other characteristics like the level of education and age.

Table 3 presents mean earnings and volatility results by poverty status. The top half of Table 3 shows that, in the first sample, 45% or almost half the people in poverty in 2006 saw their earnings change by at least half, compared to only 13% of their wealthier counterparts. The data on mean earnings show that those in poverty in 2006 experienced almost a 36% rise in average earnings by 2007, compared to a 4% drop for higher income individuals. This implies that the people in poverty experience much larger fluctuations in earnings than their wealthier counterparts.

The bottom half of Table 3 presents the results for year-round workers. The poverty rate is lower, average earnings higher, and the fluctuations lower among this group than the first sample. This makes sense since we are conditioning on year-round

[9] For example, in the 2006-2007sample, the differences between people with less than a college degree and those with a college degree or more disappear once we condition on year round work status. In the 2004-2005 sample, the difference remains only between high school dropouts and those with college degree or more for 25% or more volatility only.

employment status in the second group. Almost a third of the people in poverty, 29.7%, see their earnings change by half or more by the next year, compared to 8% of their wealthier counterparts. Real average earnings rose by 24% for the people in poverty in 2006, compared to a 4% drop for higher income individuals.

An interesting question (and a short digression from earnings volatility) that arises from this analysis is: how persistent is poverty? What fraction of the population in poverty move out of poverty within a year? In the first sample (top half of Table 3), 3.9% of our 25-65 year old sample is poor in 2006 and 2.4% remain poor in 2007. This implies that 38% (1.5/3.9)of the poor in 2006 are no longer poor in 2007. In the second sample, 33% of the poor in 2006 move out of poverty by 2007.[10]

Since the likelihood of experiencing earnings volatility is strongly related to labor force attachment, the rest of this section will focus on employment characteristics of people. Does a certain segment of the labor force, either an industry or occupation sector or business owners vs. salaried employees, have significantly more stable earnings? We will focus on the year-round employed sample for the rest of the analysis. The SIPP asks respondents about whether they worked for employers or owned their business (i.e. self-employed). As a result, it is possible to identify on a monthly basis whether a person held a job for an employer or was self-employed or both. Table 4 reports mean earnings and volatility for wage and salary earners vs. self-employed people. The vast majority of the sample worked for an employer year-round. A much smaller, 11%, were self-employed only and did not hold any job for an employer. There is a big difference in the extent of earnings volatility experienced by the two groups. Almost 40% of the self-employed group or 2 out of every 5 saw their earnings change by half or more, compared to only 4%-5% of wage and salary earners and 9% of the overall sample. This means that excluding the small share of the self-employed people reduced overall large volatility by half.

Another interesting question is: do workers in certain industries and occupations experience more earnings fluctuations than their counterparts in other sectors? Also how do variations across industry and occupation sectors compare for wage and salaried workers vs. self-employed workers? The last four tables focus on shedding light on these

[10] In the 2004-05 sample, about 45% of the people in poverty in 2004 moved out of poverty by 2005.

issues. Since the group consisting of wage and salaried workers are much larger compared to the self-employed, Tables 5 and 6 focus on the former sample to take a detailed look at volatility across industries and occupations. Tables 7 and 8 compare volatility across aggregate industries and occupations for workers vs. business owners.

The SIPP collects information for up to two jobs and/or businesses for each employed individual. The analysis in this paper focuses only on the main industry and occupation reported by the respondent. The SIPP reports 4-digit industry codes (based on NAICS) on a monthly basis. In order to look at year-over-year earnings fluctuations conditional on a person's industry, it is necessary to identify the pertinent industry for the entire sample period. People who move from one industry to another during the sample period are assigned the industry where they worked the longest, i.e. spent the most number of months during the 2006-2007 period. The 4-digit industries are then aggregated into broader 2-digit categories. The same steps were implemented to identify a respondent's occupation.

Tables 5 and 6 provide data on real average earnings and earnings volatility by major industry and occupation sectors for year-round wage and salaried workers. Because of the relatively small sample size of some of the sectors, the tables focus on aggregated industry and occupation sectors. Both mean levels of earnings as well as earnings volatility vary quite a bit across sectors. For example, as shown in Table 5, mean earnings in 2007 ranged from $34,000 (arts, entertainment, recreation, accommodation and food services) to $63,000 (professional, scientific, management, administration, support, waste). Between a tenth (public administration) and almost a fifth (18% in arts, entertainment, recreation, accommodation and food services) of the workers saw their earnings change by 25% or more; between 3% (manufacturing) and 6% (arts, entertainment, recreation, accommodation and food services) saw changes of half or more.

Higher average earnings do not necessarily indicate more stability. For example, trade and the combined professional, scientific, management sectors have similar volatility but the latter pays significantly more than the former. There are also examples of higher paying sectors that have more stable earnings. For example, public administration has lower volatility and higher earnings than the combined arts,

entertainment, recreation, accommodation, and food sectors. The cyclicality of demand and required levels of skill and education as well as the average length of tenure, the share of part-time and full-time workers, rate of unionization, sensitivity to trade and globalization, and sensitivity to business cycles vary across industry sectors which all in turn are likely to impact the volatility of earnings across sectors.

Table 6 provides data on earnings and volatility by major occupation sectors. Just like industry, both mean levels of earnings as well as earnings volatility vary by occupation sectors. For example, mean earnings in 2007 ranged from $33,000 in services to $77,000 in management, business and financial occupations. Between 8% (installation, maintenance, repair) and 18% (service) of the workers saw their earnings change by 25% or more; between 3% (production; installation, maintenance, repair) and 6% (service; sales and related) saw changes of half or more. Just like industries, higher earnings did not always indicate more stability. For example, the management, business and financial sector had the highest levels of earnings on average but higher volatility than some lower paying occupations.

So far, the analysis by industry and occupation has focused on year-round wage and salaried employees only. Tables 7 and 8 compare the industry and occupation specific volatility for wage and salaried employees and self-employed workers. The high volatility among self-employed workers is widespread. In other words, self-employed workers have much more volatile earnings than their wage and salaried counterparts in all industry and occupation sectors. The distribution of the two groups of workers also varies significantly. For example, education, health, social services and manufacturing have the two largest concentrations of workers whereas professional, scientific, management, administration and construction contain the largest shares of business owners.

4. Business Cycle and Longer-Term Contexts

The results discussed above focus on a relatively narrow period of time – the mid-2000s – which was a period of economic growth and expanding employment. In this section we attempt to place these results within a broader timeframe to examine business cycle and longer-term trends in year-to-year income volatility. To do this, we use Current Population Survey (CPS) data, which contain many more observations than the

SIPP data and are available over a much longer period. Preliminary graphical analysis of CPS data suggests procyclical, long-term rising weekly earnings volatility.

4.1 Data and Methods

The data used in this section are drawn from the CPS Merged Outgoing Rotation Group (MORG) data published on the National Bureau of Economic Research website (Feenberg and Roth, 2007). In the CPS, sampled housing units are surveyed for four months, at the end of which much additional economic data are collected; then the housing units are out of sample for 8 months, and then surveyed again for four months, at the end of which the additional economic data are again collected and the housing unit drops out of the sample. Thus, the more extensive economic data are collected once for each housing unit and then again one year later, providing the opportunity to examine changes in economic and other characteristics of persons over a one-year period.

The CPS, however, is not expressly designed to perform such longitudinal studies. This means that certain adjustments and safety measures have to be added into the analysis to ensure the accuracy of the results. In order to study the change in economic data between two consecutive years for a person in the sample, the housing unit data must be matched to the corresponding data for the following year, and then checked for consistency by age, gender, and race and other characteristics in an attempt to ensure that the same persons are being matched over the two years and to avoid duplications. (We adapted programs originally developed by Madrian and Lefgren (2000) to match the March CPS data to match the NBER MORG data.) Data couldn't be matched between parts of 1984-86 and 1993-95 because of sample redesigns, so these periods are not included in our analysis. We exclude self-employed persons from our sample since some researchers have suggested that earnings data for self-employed people in the CPS MORG data are of suspect quality (Feenburg and Roth). In addition, we exclude persons with allocated earnings and/or hours in either of years t or t+1. (For purposes of reporting monthly or annual statistics, CPS uses other person-specific data to allocate hours and earnings to the records of persons who do not respond to questions on those topics. The estimation methodology for filling in such data gaps is not necessarily designed for estimating year-to-year changes in hours and earnings in a longitudinal

sense.) Data are dropped for t=1988-1994 because only about 25 percent of allocation flags were available in the data for those years (consequently, estimated earnings and hours volatility for those years -- not reported here -- were much higher than in the years when complete allocation flags were available, even after dropping those observations with allocation flags).

Table 10a in the Appendix shows sample means for a wide range of economic and demographic variables for persons that have allocated earnings in year t or t-1 (or both) versus persons with allocated earnings in neither year t nor year t-1. Roughly one-third of the persons in the sample have allocated earnings in year t or t-1, and they have much higher earnings volatility than persons without allocated earnings, which presumably reflects the noisiness of the allocation process, which is heightened by looking at differences in earnings over time. Persons with allocated earnings tend to be more concentrated in later periods, consistent with Hirsch and Schumacher (2004), who found that allocation rates have increased since the 1980s. Allocated earnings are more likely to be associated with changes in pay status (to or from hourly pay) and industry; otherwise the two groups are fairly similar.

4.2 Results

Table 9 provides a kind of "bridge" between the SIPP-based results reported earlier and (roughly) corresponding CPS-based results. The table reports percentages of workers with earnings rising or falling by more than 25 and 50 percent between 2006 and 2007 (all earnings are adjusted for inflation using the CPI-U). The SIPP results based on data for persons in the labor force in both 2006 and 2007 (column (a)) are roughly similar to the CPS results for persons employed in both 2006 and 2007 (column (c)); and the SIPP results based on persons employed in all months in 2006 and 2007 (column (b)) are also roughly similar to the CPS results for persons working 35 or more hours per week (column (d)), which provides some basis for using the CPS data to provide longer-term context for the SIPP findings. (Hereafter the focus is on full-time workers in both t and t+1.)

Unfortunately, the combination of the allocation flag problem and sample redesign leaves rather wide holes in the CPS data in the mid-1980s and between the late

1980s and the mid-1990s. This gap makes it a bit difficult to interpret what happened before and after that period: do changes in the variables under examination reflect changes in the economy over that period or do they reflect changes in CPS methodology? Moreover, the weekly earnings data in the CPS are top-coded and infrequently adjusted for inflation ($999 in 1979-1988; $1,923 in 1989-97; and $2,884 in 1998-2008). However, it appears that top-coding may not have a huge impact on our findings. The left panel of Figure 1 shows for each quarter the percent of persons with 25% and 50% changes in weekly earnings (raw percentages in red; smoothed percentages in green). It appears that weekly earnings mobility increased in the 1980s and plateaued at a higher level in the 1995-2007 data. The right panel of Figure 1, shows the same chart but imposing the minimum (in 2000 dollars) top-coding for the entire 1979-2008 period ($1,454 in 1988). Even this rather drastic solution to the top-coding problem only mutes but does not eliminate the long-term trend shown in the left panel of figure 1.

Figure 2 also shows that earnings volatility has a distinctly seasonal dimension. Simple smoothing of the data reveals no clear cyclicality in earnings volatility: volatility peaked after the 1980-82 recessions, but it peaked before the 2001 recession (the data limitations noted above imply that no analysis of earnings volatility can be made around the 1990-91 recession). Since our focus is on persons employed full-time, both the seasonal and business cycle movements in earnings mobility are likely to be related to movements in overtime hours.

We estimate ordinary least squares regressions of various measures of earnings volatility on demographic and economic variables in levels and changes in an attempt to explore the characteristics of high- versus low-volatility workers and the circumstances under which they may experience higher or lower earnings volatility. The results are summarized in Tables 10-12 (full results including standard errors are shown in Table 10b in the Appendix). For each table, the dependent variable in the first column is the absolute value of the change in log weekly earnings; in the second third columns the dependent variables are indicator variables taking the value of one if a person experienced an absolute change in earnings greater than 25 percent and 50 percent, respectively (and zero otherwise).

Table 10 focuses on time and age independent variables. There appears to be a slight downward trend in earnings volatility, though dummies for the late 1980s and the mid-1990s through 2007 (controlling for changes in CPS sample design and other changes) are positive. Together these findings suggest that much of the increase in earnings volatility shown in Figure 1 may be more due to changes in the way CPS has been sampled, worded, and conducted than structural changes in the economy, but more research would be needed before any definitive conclusions could be reached (Hirsch and Schumacher note, however, that allocation rates jumped after the 1994 changes in the CPS). Coefficients on second, third, and fourth calendar quarters suggest that earnings volatility typically peaks in the fourth quarter (October–December) perhaps because of holiday seasonal effects on overtime hours. The coefficient on an indicator variable for recession is very small and not statistically significant, which is consistent with Figure 1.

Table 10 shows coefficients for a quadratic in age (as is typically done in wage regressions). Since these coefficients are hard to interpret, Figure 2 shows the marginal effect of age on earning volatility (more details are shown in Table 10d in the Appendix). As workers age from their twenties to their thirties earnings volatility decreases (perhaps because their wage/experience profile flattens), while it increases starting in their late fifties (perhaps because they begin to work more hours).

Table 11 shows coefficients for demographic right-hand side variables. Interestingly (but consistent with the SIPP results reported in Table 9), women full-time workers have less earnings volatility than men (perhaps because working mothers are more constrained from working over time than working fathers), while black, Hispanic, and other race workers have more earnings volatility than non-Hispanic whites. Married workers experience more earnings volatility than unmarried workers (as was the case with the SIPP results reported in Table 9), although the effect is small; change in marital status has a much greater (positive) impact on earnings volatility (it seems reasonable to expect that changes in any status are likely to increase earnings volatility). Workers with higher educational attainment have less earnings volatility, but increasing educational attainment from one year to the next appears to sharply increase earnings volatility.

Table 12 focuses on hourly pay status and industry. As expected, workers in public administration have relatively low earnings volatility; workers in non-

manufacturing, private-sector industries generally have higher earnings volatility than manufacturing workers (the omitted industry category); exceptions are professional services and utilities. Hourly workers have less earnings volatility than salaried workers which is somewhat surprising (and which may be reversed if the sample were broadened to include part-time workers, which we will look at in future research), but changing pay status from hourly to salaried or vice versa results in sharply higher earnings volatility.[11]

In conclusion, the CPS results spanning three decades suggest an upward trend in measured earnings volatility, although it is not clear how much of this trend is due to the evolution of the CPS itself. The results exhibit similar relationships between earnings volatility and age, gender, marital status, race, ethnicity, education, and industry as in the results for this decade reported in Table 9. In addition, changes in demographic variables are associated with sharp increases in earnings volatility.

5. Future Work

We plan to expand this paper in a number of ways. First, we would like to analyze how much of the year-over-year earnings volatility seen on the SIPP results from earnings rises vs. declines. Second, we would like to perform a more in-depth analysis on job transitions using the SIPP. The monthly nature of the SIPP data makes it possible to identify transitions and may enable us to answer questions such as:

- Do workers who transition from job to job experience more volatility than those who do not?
- Are job transitions more prevalent in certain sectors?
- For self-employed people, is there a correlation between the size and age of the business with volatility?

In addition, we will examine subgroup decomposable mobility measures (such as those Fields and Ok, 1999).

[11] We also include the full regression results when observations with allocated earnings are included (see Appendix Table 10c) to show the impact on our results of omitting such observations.

Table 1: Earnings Volatility, 25-65 year old in Labor Force one or more months, 2006-07

	Sample share	Mean Annual Earnings ($2007)		Earnings Volatility (%)	
	%	2006	2007	>=25% change	>=50% change
All	100	44,612	44,106	31.4	17.2
		(813)	(734)	(0.6)	(0.4)
Gender					
Men	53	54,270	53,301	29.9	15.9
		(1197)	(1086)	(0.8)	(0.6)
Women	47	33,814	33,827	33.1	18.7
		(666)	(597)	(0.8)	(0.6)
Race					
White, not Hispanic	72	47,705	47,115	30.6	17.0
		(878)	(764)	(0.6)	(0.4)
Black	10	34,392	34,061	33.0	17.8
		(1521)	(1620)	(1.9)	(1.4)
Hispanic (of any origin)	12	30,446	30,364	32.6	17.8
		(1307)	(1258)	(1.9)	(1.3)
Age					
25-34	25	37,535	38,186	34.7	19.1
		(1200)	(1138)	(1.1)	(1.0)
35-44	30	46,372	46,546	29.2	15.2
		(1025)	(996)	(1.0)	(0.7)
45-54	29	48,088	47,348	28.4	15.4
		(1198)	(1127)	(0.9)	(0.7)
55-65	17	46,078	42,983	35.6	21.2
		1911	1438	(1.3)	(1.0)
Marital Status					
Married	63	48,541	48,109	30.6	16.6
		(976)	(926)	(0.6)	(0.5)
Not Married	32	37,824	37,003	32.1	17.8
		(940)	(851)	(1.0)	(0.7)
Education					
Less than HS Degree	5	21,259	20,418	36.5	20.5
		(686)	(671)	(2.6)	(2.0)
HS Degree/Some College	63	35,139	35,113	32.5	18.1
		(551)	(554)	(0.8)	(0.6)
College Degree	21	58,175	56,537	30.0	15.8
		(1738)	(1357)	(1.1)	(0.8)
Advanced Degree	12	80,989	80,059	26.2	13.4
		(2572)	(2480)	(1.4)	(1.1)

Source: Author's calculations from the 2004 Panel of Survey of Income and Program Participation, U.S. Bureau of the Census.

Note: Standard errors in parentheses. The margin of error, calculated by 1.6*standard error, added to and subtracted from the estimate provides the 90-percent confidence interval.

Sample includes all 25-65 year old people who are in the labor force (working, on layoff or looking for a job) for at least one month during the 2006-2007 period. Those with zero earnings in either year are excluded. The data are weighted by longitudinal panel weights. Sample includes 11,971 person records.

Table 2: Earnings Volatility, 25-65 Year Old Year-Round Employed, 2006-2007

	Sample share	Mean Annual Earnings ($2007)		Earnings Volatility (%)	
	%	2006	2007	>=25% change	>=50% change
All	100	50,608	50,020	20.2	9.1
		(953)	(870)	(0.6)	(0.4)
Gender					
Men	53	59,771	58,782	21.0	9.7
		(1390)	(1272)	(0.8)	(0.5)
Women	47	38,950	38,873	19.6	8.4
		(778)	(696)	(0.9)	(0.6)
Race					
White, not Hispanic	72	53,880	53,198	20.2	9.5
		(1040)	(911)	(0.7)	(0.5)
Black	10	38,352	37,402	18.8	7.0
		(1890)	(1939)	(1.8)	(1.2)
Hispanic (of any origin)	12	34,899	35,338	19.6	8.4
		(1632)	(1616)	(1.9)	(1.2)
Age					
25-34	25	43,375	43,821	21.2	8.5
		(1662)	(1580)	(1.2)	(0.8)
35-44	30	51,976	51,803	18.8	7.5
		(1231)	(1162)	(1.0)	(0.6)
45-54	29	53,250	52,783	18.8	9.7
		(1372)	(1339)	(0.9)	(0.7)
55-65	17	53,317	50,284	23.7	12.2
		2537	1792	(1.3)	(0.9)
Marital Status					
Married	63	54,684	54,049	20.4	9.7
		(1171)	(1101)	(0.7)	(0.5)
Not Married	32	43,018	42,217	19.0	8.0
		(1157)	(1027)	(1.0)	(0.6)
Education					
Less than HS Degree	5	24,831	24,035	23.3	11.6
		(820)	(819)	(2.9)	(2.3)
HS Degree/Some College	63	39,707	39,816	20.3	9.2
		(671)	(688)	(0.8)	(0.5)
College Degree	21	64,502	62,923	19.8	8.9
		(2169)	(1727)	(1.2)	(0.8)
Advanced Degree	12	89,007	86,809	18.7	8.2
		(2936)	(2795)	(1.3)	(1.1)

Source: Author's calculations from the 2004 Panel of Survey of Income and Program Participation, U.S. Bureau of the Census.

Note: Standard errors in parentheses. The margin of error, calculated by 1.6*standard error, added to and subtracted from the estimate provides the 90-percent confidence interval.

Sample includes all 25-65 year old people who report having paid employment (i.e. no unpaid absence) during all months of 2006 and 2007. Those with zero earnings in either year are excluded. The data are weighted by longitudinal panel weights. Sample includes 8,539 person records.

Table 3: Earnings Volatility by Poverty Status, 25-65 Year Old, 2006-2007

	Population share	Mean Annual Earnings ($2007)		Earnings Volatility (%)	
	%	2006	2007	>=25% change	>=50% change
Sample: Those in labor force at least one month during 2006-2007					
All	100	44,612	44,106	31.4	17.2
		(813)	(734)	(0.6)	(0.4)
Poverty Status					
Poor in 2006	3.9	8,888	12,065	58.8	45.2
		(364)	(481)	(2.7)	(2.7)
Remain poor in 2007	2.4	9,220	9,177	48.1	32.0
		(465)	(425)	(3.5)	(3.1)
Not poor in 2007	1.5	8,356	16,684	76.0	66.1
		(535)	(1085)	(4.0)	(5.1)
Income-to-poverty ratio>=4 in 2006	48.3	65,231	62,548	25.8	13.0
		(1165)	(1049)	(0.7)	(0.5)
Sample: Those with paid employment during all months in 2006-2007					
All	100	50,608	50,020	20.2	9.1
		(953)	(870)	(0.6)	(0.4)
Poverty Status					
Poor in 2006	2.4	11,120	13,770	42.5	29.7
		(581)	(884)	(3.8)	(3.8)
Remain poor in 2007	1.6	11,705	11,538	32.3	18.7
		(662)	(671)	(4.7)	(3.9)
Not poor in 2007	0.8	9,964	18,186	62.6	51.6
		(1012)	(2283)	(6.4)	(8.4)
Income-to-poverty ratio>=4 in 2006	52.6	70,423	67,933	17.6	7.6
		(1388)	(1249)	(0.7)	(0.5)

Source: Author's calculations from the 2004 Panel of Survey of Income and Program Participation, U.S. Bureau of the Census.

Note: Standard errors in parentheses. The margin of error, calculated by 1.6*standard error, added to and subtracted from the estimate provides the 90-percent confidence interval.

Sample excludes those with zero earnings in either year. The data are weighted by longitudinal panel weights. The labor force sample includes 11,971 person records and the year round employed sample includes 8,539 person records.

Table 4: Earnings Volatility, Wage and Salary Earners vs. Self-Employed (Business Owners), 25-65 Year Old, 2006-2007

	Population share	Mean Annual Earnings ($2007)		Earnings Volatility (%)	
	%	2006	2007	>=25% change	>=50% change
Sample: Those with paid employment during all months in 2006-2007					
All	100	50,608	50,020	20.2	9.1
		(953)	(870)	(0.6)	(0.4)
Year round (YR) Wage and Salary Earners only	83	48,849	49,236	13.1	4.3
		(761)	(811)	(0.5)	(0.3)
YR Wage and Salary Earners (plus self-employed YR or part-year)	86	49,728	49,992	14.1	4.8
		(824)	(865)	(0.5)	(0.3)
YR Self-employed only	11	56,716	50,531	61.6	39.8
		(3941)	(2446)	(1.9)	(2.0)
YR Self-employed (plus work for employer YR or part-year)	14	59,067	53,023	58.2	36.2
		(3821)	(2568)	(1.8)	(1.8)
YR Self-employed plus YR wage and salary earner	2	77,196	71,982	37.0	15.4
		(10,735)	(10,378)	(4.3)	(3.2)

Source: Author's calculations from the 2004 Panel of Survey of Income and Program Participation, U.S. Bureau of the Census.
Note: Standard errors in parentheses. The margin of error, calculated by 1.6*standard error, added to and subtracted from the estimate provides the 90-percent confidence interval.
Sample excludes those with zero earnings in either year. The data are weighted by longitudinal panel weights. Total sample size is 8,539 observations.

Table 5: Earnings Volatility by Industry, Wage and Salary Earners, 2006-2007

Major Industry Categories	Population Share	Mean Annual Earnings ($2007)		Earnings Volatility (%)	
(Based on NAICS)	%	2006	2007	>=25% change	>=50% change
All YR Wage and Salaried workers	100	49,728 (824)	49,992 (866)	14.1 (0.5)	4.8 (0.3)
Construction & Natural Resource (Agriculture, Mining, Forestry, Fisheries)	6.3	49,336 (2160)	48,805 (2073)	15.3 (1.9)	5.0 (1.1)
Manufacturing	14.4	54,233 (1913)	54,110 (1812)	10.9 (1.0)	2.6 (0.5)
Wholesale & Retail Trade	13.8	43,120 (1418)	42,868 (1302)	14.4 (1.4)	5.4 (0.8)
Transportation, Warehousing, Utilities	5.3	52,599 (2470)	52,801 (2834)	12.6 (2.1)	3.7 (1.0)
Information, Finance, Insurance, Real Estate, Rental, Leasing	9.3	59,165 (2657)	58,072 (2702)	15.3 (1.5)	3.9 (0.8)
Professional, Scientific, Technical, Management, Administration, Support, Waste Management, Remediation	9.7	62,112 (2687)	63,397 (2786)	16.8 (1.6)	4.9 (0.9)
Education, Health Care and Social Assistance	23.2	47,076 (1724)	47,115 (1615)	13.3 (1.0)	5.0 (0.6)
Arts, Entertainment, Recreation, Accommodation and Food Services, Other services	9.4	33,783 (1190)	33,988 (1262)	17.5 (1.7)	6.2 (1.1)
Public Administration	8.3	55,152 (2026)	56,840 (2280)	10.0 (1.3)	3.8 (1.0)

Note: Standard errors in parentheses. The margin of error, calculated by 1.6*standard error, added to and subtracted from the estimate provides the 90-percent confidence interval.
Source: Author's calculations from the 2004 Panel of Survey of Income and Program Participation, U.S. Bureau of the Census.
Sample includes all 25-65 year old people who report working for an employer during all months of 2006 and 2007. Sample excludes those with zero earnings in either year. The data are weighted by longitudinal panel weights. Total sample size is 7,396 observations.

Table 6: Earnings Volatility by Occupation, Wage and Salary Earners, 2006-2007

Major Occupation Categories	Population Share	Mean Annual Earnings ($2007)		Earnings Volatility (%)	
Based on 2000 SOC	%	2006	2007	>=25% change	>=50% change
Management, Business, Financial	15.3	77,210 2441	77,077 2480	14.3 (1.2)	4.8 (0.7)
Professional and Related	24.2	60,234 1242	60,558 1244	12.5 (0.9)	4.2 (0.5)
Service	12.7	33,494 2648	33,145 2294	18.1 (1.4)	6.1 (0.9)
Sales and related	8.9	47,751 1882	47,788 1904	16.3 (1.6)	6.1 (1.0)
Office and Administrative Support	15.3	35,466 784	36,649 921	12.6 (1.1)	3.9 (0.7)
Construction, Extraction & Farming, Fishing, Forestry	4.6	42,109 1665	40,404 1353	14.6 (2.3)	3.7 (1.1)
Installation, Maintenance, Repair	3.9	47,200 2283	47,425 2291	8.2 (1.9)	2.9 (1.0)
Production	8.0	37,213 995	37,711 1032	11.5 (1.5)	2.9 (0.8)
Transportation and Material Moving	6.3	39,311 1675	38,526 1882	14.8 (1.8)	5.0 (1.1)

Note: Standard errors in parentheses. The margin of error, calculated by 1.6*standard error, added to and subtracted from the estimate provides the 90-percent confidence interval. Source: Author's calculations from the 2004 Panel of Survey of Income and Program Participation, U.S. Bureau of the Census. Sample includes all 25-65 year old who report working for an employer during all months of 2006-2007. Those with zero earnings in either year are excluded. The data are weighted by longitudinal panel weights. Total sample size is 7,396.

Table 7: Earnings Volatility by Industry, Wage and Salary Earners vs. Self-Employed (Business Owners), 2006-2007

	Workers (7396 obs)			Business owners (1204 obs)		
Major Industry Categories	Population Share	Earnings Volatility (%)		Pop Share	Earnings Volatility (%)	
(Based on NAICS)		>=25% change	>=50% change		>=25% change	>=50% change
Construction & Natural Resource (Agriculture, Mining, Forestry, Fisheries)	6.3	15.3 (1.9)	5.0 (1.1)	22.6	61.5 (4.0)	38.0 (3.8)
Manufacturing	14.4	10.9 (1.0)	2.6 (0.5)	4.3	64.1 (7.3)	34.2 (8.3)
Wholesale & Retail Trade	13.8	14.4 (1.4)	5.4 (0.8)	13.1	61.7 (4.1)	39.9 (4.3)
Transportation, Warehousing, Utilities	5.3	12.6 (2.1)	3.7 (1.0)	3.3	66.1 (8.1)	34.9 (8.9)
Information, Finance, Insurance, Real Estate, Rental, Leasing	9.3	15.3 (1.5)	3.9 (0.8)	9.5	57.3 (5.1)	41.8 (5.3)
Professional, Scientific, Technical, Management, Administration, Support, Waste Management, Remediation	9.7	16.8 (1.6)	4.9 (0.9)	22.0	57.8 (3.5)	33.1 (3.6)
Education, Health Care and Social Assistance	23.2	13.3 (1.0)	5.0 (0.6)	9.1	63.3 (5.0)	37.3 (5.3)
Arts, Entertainment, Recreation, Accommodation and Food Services, Other services	9.4	17.5 (1.7)	6.2 (1.1)	16.2	56.9 (4.0)	37.1 (3.7)
Public Administration	8.3	10.0 (1.3)	3.8 (1.0)	NA	NA	NA

Note: Standard errors in parentheses. The margin of error, calculated by 1.6*standard error, added to and subtracted from the estimate provides the 90-percent confidence interval.
Source: Author's calculations from the 2004 Panel of Survey of Income and Program Participation, U.S. Bureau of the Census.
Sample includes all 25-65 year old people who have paid employment (either for an employer or owning business) during all months of 2006 and 2007. Sample excludes those with zero earnings in either year. The data are weighted by longitudinal panel weights.

Table 8: Earnings Volatility by Occupation, Wage and Salary Earners vs. Self-Employed (Business Owners), 2006-2007

	Wage & Salaried workers (7396 obs)			Self-employed (1204 obs)		
Major Industry Categories	Population Share	Earnings Volatility (%)		Pop Share	Earnings Volatility (%)	
(Based on SOC)		>=25% change	>=50% change		>=25% change	>=50% change
Management, Business, Financial	15.3	14.3 (1.2)	4.8 (0.7)	25.5	56.7 (3.5)	34.5 (3.4)
Professional and Related	24.2	12.5 (0.9)	4.2 (0.5)	15.6	53.4 (4.0)	32.7 (3.9)
Service	12.7	18.1 (1.4)	6.1 (0.9)	14.1	64.3 (4.1)	34.2 (4.1)
Sales and related	8.9	16.3 (1.6)	6.1 (1.0)	17.8	59.4 (3.7)	40.6 (3.9)
Office and Administrative Support	15.3	12.6 (1.1)	3.9 (0.7)	3.9	52.7 (8.2)	26.0 (6.7)
Construction, Extraction & Farming, Fishing, Forestry	4.6	14.6 (2.3)	3.7 (1.1)	12.6	66.9 (4.3)	42.6 (5.2)
Installation, Maintenance, Repair	3.9	8.2 (1.9)	2.9 (1.0)	3.2	61.5 (8.4)	42.9 (8.8)
Production	8.0	11.5 (1.5)	2.9 (0.8)	3.6	67.8 (8.1)	48.4 (8.4)
Transportation and Material Moving	6.3	14.8 (1.8)	5.0 (1.1)	3.4	70.3 (7.9)	43.9 (8.8)

Note: Standard errors in parentheses. The margin of error, calculated by 1.6*standard error, added to and subtracted from the estimate provides the 90-percent confidence interval.
Source: Author's calculations from the 2004 Panel of Survey of Income and Program Participation, U.S. Bureau of the Census.
Sample includes all 25-65 year old people who have paid employment (either for an employer or owning business) during all months of 2006 and 2007. Sample excludes those with zero earnings in either year. The data are weighted by longitudinal panel weights.

Table 9: Comparison of Earnings Volatility in SIPP and CPS Data, 2006-07
(percents)

	SIPP				CPS			
	(a) Table 1 (in labor force one or more months)		(b) Table 2 (worked all months)		(c) Employed both years		(d) Employed 35+ hours both years	
	>=25%	>=50%	>=25%	>=50%	>=25%	>=50%	>=25%	>=50%
All	31.4	17.2	20.2	9.1	28.2	11.4	24.3	8.6
Gender								
Men	29.9	15.9	21.0	9.7	28.0	10.7	26.3	9.4
Women	33.1	18.7	19.6	8.4	28.3	12.1	21.9	7.6
Race								
White, not Hispanic	30.6	17.0	20.2	9.5	26.5	11.0	22.5	8.2
Black	33.0	17.8	18.8	7.0	35.1	13.8	32.1	11.3
Hispanic (any origin)	32.6	17.8	19.6	8.4	33.7	12.8	30.1	9.8
Age								
25-34	34.7	19.1	21.2	8.5	32.4	12.7	28.1	9.7
35-44	29.2	15.2	18.8	7.5	28.6	12.3	25.2	9.8
45-54	28.4	15.4	18.8	9.7	25.6	10.8	21.9	7.1
55-65	35.6	21.2	23.7	12.2	25.3	10.0	21.6	7.6
Marital Status								
Married	30.6	16.6	20.4	9.7	27.8	11.1	23.9	8.5
Not Married	32.1	17.8	19.0	8.0	29.0	12.1	24.7	8.9
Education								
Less than HS Degree	36.5	20.5	23.3	11.6	32.6	12.8	28.7	9.6
HS Degree					30.0	11.0	25.7	8.3
HS Degree/Some College	32.5	18.1	20.3	9.2				
Some College					28.2	12.1	24.3	9.2
College Degree	30.0	15.8	19.8	8.9				
College/Adv. Degree					25.7	10.8	22.4	8.3
Advanced Degree	26.2	13.4	18.7	8.2				

Sources: Columns (a) and (b): See notes to Tables 1 and 2. Columns (c) and (d): Author's calculations from NBER's 2006 and 2007 Current Population Survey Merged Outgoing Rotation Group data (Feenberg and Roth, 2007).
Note: CPS sample does not include self-employed persons or persons with hourly wages averaging less than $1. Earnings are adjusted for inflation using CPI-U. The sample for column (c) includes all persons who were employed the week prior to their interview (N=22,974); for column (d), the sample includes all persons who worked 35 hours or more in the week prior to their interview (N=19,182).

Table 10
Regression Analysis of Weekly Earnings Volatility: Time and Age Variables

	|Δ(log earnings)|	|Δ(earnings)| > 25%	|Δ(earnings)| > 50%
Time trend	-0.000112***	-0.000110**	-2.61E-05
2nd Quarter	-0.00144	-0.0021	-0.00119
3rd Quarter	0.00044	0.00286	-0.000682
4th Quarter	0.00427***	0.00662***	0.00263**
In 1985_1987	0.00450***	0.0119***	0.00908***
In 1995_2007	0.0222***	0.0356***	0.0178***
Recession	0.000136	0.000826	0.00062
Age	0.0309***	0.0516***	0.0308***
Age^2	0.00105***	0.00167***	0.00105**
Age^3	-1.60e-05***	-2.44e-05**	-1.58e-05**
Age^4	9.02e-08***	1.34e-07**	8.86e-08**
R-squared	0.033	0.027	0.017

*** p<0.01, ** p<0.05, * p<0.1. Standard errors available on request.

Table 11
Regression Analysis of Weekly Earnings Volatility Using CPS: Demographic Variables

	|Δ(log earnings)|	|Δ(earnings)| > 25%	|Δ(earnings)| > 50%
Female	-0.0185***	-0.0324***	-0.0130***
Married	0.00267***	0.00444***	0.000938
Married status change	0.0279***	0.0421***	0.0255***
Black	0.0315***	0.0566***	0.0247***
Hispanic	0.0183***	0.0364***	0.0120***
Other race	0.0150***	0.0203***	0.0107***
High school only	-0.00338***	-0.00468**	-0.000649
Some college	-0.00277**	-0.00571**	0.00126
College degree or more	-0.00639***	-0.0120***	-0.00151
Increase education attainment	0.0289***	0.0409***	0.0330***

*** p<0.01, ** p<0.05, * p<0.1

Table 12
Regression Analysis of Weekly Earnings Volatility Using CPS: Industry and Pay Status Variables

	|Δ(log earnings)|	|Δ(earnings)| > 25%	|Δ(earnings)| > 50%
Paid hourly	-0.0279***	-0.0453***	-0.0248***
Paid hourly status change	0.0710***	0.123***	0.0569***
Accommodation and Food & Drink	0.0409***	0.0648***	0.0394***
Administration and Waste Management	0.0118***	0.0208***	0.0130***
Agriculture, Forestry and Fishing	0.00163	0.000563	0.00593
Arts & Recreation	0.0129***	0.0246***	0.0168***
Construction	0.0133***	0.0247***	0.00788***
Education	0.0251***	0.0483***	0.0199***
FIRE & Leasing	0.0165***	0.0215***	0.0181***
Health & Social Services	0.00405***	0.00563**	0.00805***
Information	-0.0024	-0.00792*	0.00154
Mining	0.0296***	0.0444***	0.0217***
Organizations & Households	0.00942***	0.0120**	0.0132***
Personal & Services	0.0205***	0.0353***	0.0165***
Professional Services	-0.00844***	-0.0170***	-0.00425*
Public Administration	-0.0125***	-0.0241***	-0.00495***
Retail	0.0141***	0.0230***	0.0166***
Transportation & Warehousing	0.0208***	0.0320***	0.0179***
Utilities	-0.00667***	-0.00942**	-0.00158
Wholesale	0.000668	0.0037	0.000505
Industry change	0.0477***	0.0784***	0.0426***

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Appendix

Table 1b: Earnings Volatility, 25-65 year old in Labor Force one or more months, 2004-05

	Population share	Mean Annual Earnings ($2007)		Earnings Volatility (%)	
	%	2004	2005	>=25% change	>=50% change
All	100	43,841	44,247	36.4	20.3
		(561)	(604)	(0.3)	(0.3)
Gender					
Men	53	53,034	53,674	35.3	19.5
		(805)	(876)	(0.5)	(0.4)
Women	47	33,534	33,678	37.5	21.3
		(388)	(444)	(0.5)	(0.4)
Race					
White, not Hispanic	72	47,259	47,545	35.5	19.9
		(620)	(666)	(0.4)	(0.3)
Black	11	33,969	34,913	38.3	20.9
		(849)	(1159)	(1.2)	(0.9)
Hispanic (of any origin)	12	30,405	30,476	39.6	21.6
		(829)	(788)	(1.3)	(1.0)
Age					
25-34	27	36,189	37,954	38.2	21.0
		(616)	(692)	(0.7)	(0.6)
35-44	30	45,981	46,386	34.7	19.2
		(730)	(827)	(0.6)	(0.5)
45-54	28	48,511	48,462	33.6	18.7
		(740)	(837)	(0.6)	(0.5)
55-65	15	44,562	43,344	41.8	24.7
		(1106)	(1187)	(0.8)	(0.8)
Marital Status					
Married	62	47,815	48,124	34.9	19.7
		(650)	(696)	(0.4)	(0.4)
Not Married	32	36,609	37,265	38.9	21.5
		(589)	(647)	(0.6)	(0.5)
Education					
Less than HS Degree	9	23,677	23,410	42.3	24.3
		(556)	(495)	(1.1)	(1.0)
HS Degree/Some College	60	35,367	35,118	37.2	20.7
		(332)	(339)	(0.4)	(0.4)
College Degree	20	57,429	57,951	34.0	19.1
		(921)	(957)	(0.7)	(0.6)
Advanced Degree	11	80,930	85,167	31.3	17.2
		(1885)	(2218)	(1.0)	(0.8)

Source: Author's calculations from the 2004 Panel of Survey of Income and Program Participation, U.S. Bureau of the Census.
Note: Standard errors in parentheses. The margin of error, calculated by 1.6*standard error, added to and subtracted from the estimate provides the 90-percent confidence interval.
Sample includes all 25-65 year old who are in the labor force (working, on layoff or looking for a job) for at least one month during the 2004-2005 period. Those with zero earnings in either year are excluded. The data are weighted by longitudinal panel weights. Sample includes 28,904 person records.

Table 2b: Earnings Volatility, 25-65 Year Old Year-Round Employed, 2004-2005

	Population share	Mean Annual Earnings ($2007)		Earnings Volatility (%)	
	%	2004	2005	>=25% change	>=50% change
All	100	51,714	52,449	23.6	11.1
		(667)	(752)	(0.4)	(0.3)
Gender					
Men	56	60,433	61,571	24.7	12.3
		(930)	(1055)	(0.5)	(0.4)
Women	44	40,500	40,717	22.1	9.7
		(488)	(570)	(0.5)	(0.4)
Race					
White, not Hispanic	73	55,128	55,852	23.6	11.5
		(730)	(824)	(0.4)	(0.3)
Black	10	40,130	41,745	22.5	9.1
		(1145)	(1713)	(1.2)	(0.8)
Hispanic (of any origin)	11	37,087	36,919	25.0	10.7
		(1100)	(1113)	(1.5)	(1.0)
Age					
25-34	24	43,721	45,767	21.2	9.1
		(750)	(891)	(1.2)	(0.5)
35-44	31	53,842	53,964	18.8	10.5
		(925)	(1046)	(1.0)	(0.5)
45-54	30	55,470	55,705	18.8	11.1
		(871)	(1025)	(0.9)	(0.5)
55-65	14	52,648	53,556	23.7	16.1
		(1547)	(1663)	(1.3)	(0.8)
Marital Status					
Married	65	55,373	56,064	23.3	11.3
		(776)	(886)	(0.5)	(0.4)
Not Married	30	44,162	44,901	24.1	11.1
		(765)	(842)	(0.7)	(0.5)
Education					
Less than HS Degree	7	28,952	28,393	26.0	11.6
		(888)	(784)	(1.5)	(0.9)
HS Degree/Some College	59	41,395	41,414	23.6	11.0
		(411)	(438)	(0.5)	(0.4)
College Degree	22	65,267	65,986	23.0	11.1
		(1089)	(1222)	(0.7)	(0.5)
Advanced Degree	12	90,958	95,918	22.9	11.6
		(2123)	(2629)	(1.0)	(0.8)

Source: Author's calculations from the 2004 Panel of Survey of Income and Program Participation, U.S. Bureau of the Census.

Note: Standard errors in parentheses. The margin of error, calculated by 1.6*standard error, added to and subtracted from the estimate provides the 90-percent confidence interval.

Sample includes all 25-65 year old who report having paid employment (i.e. no unpaid absence) during all months of 2004 and 2005. Those with zero earnings in either year are excluded. The data are weighted by longitudinal panel weights. Sample includes 18,892 person records.

Table 3b: Earnings Volatility by Poverty Status, 25-65 Year Old, 2004-2005

	Population share	Mean Annual Earnings ($2007)		Earnings Volatility (%)	
	%	2004	2005	>=25% change	>=50% change
Sample: Those in labor force at least one month during 2004-2005					
All	100	43,841	44,247	36.4	20.3
		(561)	(604)	(0.3)	(0.3)
Poverty Status					
Poor in 2004	4.5	8,364	14,243	72.3	53.6
		(175)	(527)	(1.4)	(1.6)
Remain poor in 2005	2.5	7,998	8,442	62.9	42.5
		(233)	(253)	(1.9)	(1.9)
Not poor in 2005	2.1	8,802	21,176	83.5	66.8
		(272)	(1043)	(1.8)	(2.5)
Income-to-poverty ratio>=4 in 2004	48.1	64,319	62,602	29.5	15.1
		(680)	(789)	(0.4)	(0.3)
Sample: Those with paid employment during all months in 2004-2005					
All	100	51,714	52,449	23.6	11.1
		(667)	(752)	(0.4)	(0.3)
Poverty Status					
Poor in 2004	2.2	10,050	16,830	60.4	41.5
		(379)	(1133)	(2.7)	(2.9)
Remain poor in 2005	1.2	10,094	10,494	44.0	28.0
		(533)	(485)	(3.7)	(3.8)
Not poor in 2005	1.0	9,997	24,515	80.3	58.0
		(515)	(2202)	(3.5)	(4.6)
Income-to-poverty ratio>=4 in 2004	54.7	69,946	69,255	20.8	9.4
		(807)	(963)	(0.4)	(0.3)

Source: Author's calculations from the 2004 Panel of Survey of Income and Program Participation, U.S. Bureau of the Census.

Note: Standard errors in parentheses. The margin of error, calculated by 1.6*standard error, added to and subtracted from the estimate provides the 90-percent confidence interval.

Sample excludes those with zero earnings in either year. The data are weighted by longitudinal panel weights.

Table 4b: Earnings Volatility, Wage and Salary Earners vs. Self-Employed (Business Owners), 25-65 Year Old, 2004-2005

	Population share	Mean Annual Earnings ($2007)		Earnings Volatility (%)	
	%	2006	2007	>=25% change	>=50% change
Sample: Those with paid employment during all months in 2004-2005					
All	100	51,714	52,449	23.6	11.1
		(667)	(752)	(0.4)	(0.3)
Year round (YR) Wage and Salary Earners only	81	50,599	50,865	14.9	5.0
		(667)	(687)	(0.4)	(0.2)
YR Wage and Salary Earners (plus self-employed YR or part-year)	84	51,154	51,451	15.4	5.3
		(685)	(711)	(0.4)	(0.2)
YR Self-employed only	11	55,809	58,323	69.6	45.2
		(1950)	(2665)	(1.2)	(1.3)
YR Self-employed (plus work for employer YR or part-year)	13	56,185	58,903	68.3	44.0
		(1815)	(2469)	(1.1)	(1.2)
YR Self-employed plus YR wage and salary earner	0.5	77,657	74,355	34.1	14.5
		(8188)	(7184)	(5.1)	(3.8)

Source: Author's calculations from the 2004 Panel of Survey of Income and Program Participation, U.S. Bureau of the Census.
Note: Standard errors in parentheses. The margin of error, calculated by 1.6*standard error, added to and subtracted from the estimate provides the 90-percent confidence interval.
Sample excludes those with zero earnings in either year. The data are weighted by longitudinal panel weights. Total sample size is 18,892.

Table 5b: Earnings Volatility by Industry, Wage and Salary Earners, 2004-2005

Major Industry Categories	Sample Share (15,949 obs)	Mean Annual Earnings ($2007)		Earnings Volatility (%)	
(Based on NAICS)	%	2004	2005	>=25% change	>=50% change
All YR Wage and Salaried workers	100	51,154 (685)	51,451 (711)	15.4 (0.4)	5.3 (0.2)
Natural Resource – Agriculture, Mining, Forestry, Fisheries	1.0	48,860 (4074)	48,194 (3646)	12.0 (2.7)	3.3 (1.5)
Construction	4.7	48532 (1298)	48,394 (1346)	15.7 (1.5)	5.1 (0.9)
Manufacturing	15.4	56181 (1408)	56,502 (1,472)	13.4 (0.8)	4.3 (0.5)
Wholesale Trade	4.2	51,937 (1660)	53,753 (1931)	16.0 (1.6)	5.4 (1.1)
Retail Trade	9.1	40,968 (1365)	41,381 (1421)	16.3 (1.4)	6.2 (0.9)
Transportation, Warehousing, Utilities	5.8	55,451 (1448)	55,486 (1497)	15.5 (1.4)	3.8 (0.7)
Information	2.7	63,135 (2594)	64,661 (2,976)	14.7 (2.1)	5.0 (1.3)
Finance and Insurance	6.1	62,426 (2538)	63,809 (2516)	17.9 (1.4)	6.7 (1.0)
Real Estate, Rental, Leasing	1.5	43453 (2267)	43,087 (1838)	16.3 (2.9)	10.0 (2.8)
Professional, Scientific, Technical PLUS Management of Companies and Enterprises	6.0	75863 (2372)	75,882 (2251)	14.6 (1.4)	4.7 (0.8)
Administration, Support, Waste Management, Remediation	2.8	41569 (2169)	41,023 (2170)	18.1 (2.4)	6.3 (1.4)
Educational Services	9.8	48267 (1088)	48,571 (1118)	12.3 (0.9)	4.5 (0.6)
Health Care and Social Assistance	12.9	45,787 (1255)	45,540 (1241)	17.0 (0.9)	5.2 (0.5)
Arts, Entertainment, Recreation	1.1	40903 (3266)	41,389 (3090)	20.7 (4.3)	8.2 (2.4)
Accommodation and Food Services	3.6	29011 (1143)	28,620 (1075)	22.4 (2.1)	7.3 (1.2)
Other Services (except Public Administration)	3.7	36882 (1378)	36,193 (1405)	20.4 (1.9)	6.8 (1.2)
Public Administration	9.3	54937 (1076)	55,846 (1242)	10.8 (0.9)	3.8 (0.6)

Note: Standard errors in parentheses. The margin of error, calculated by 1.6*standard error, added to and subtracted from the estimate provides the 90-percent confidence interval.
Source: Author's calculations from the 2004 Panel of Survey of Income and Program Participation, U.S. Bureau of the Census.
Sample includes all 25-65 year old people who report working for an employer during all months of 2004 and 2005. Sample excludes those with zero earnings in either year. The data are weighted by longitudinal panel weights. Total sample size is 15,949.

Table 6b: Earnings Volatility by Occupation, Wage and Salary Earners, 2004-2005

Major Occupation Categories	Sample Share (15,949 obs)	Mean Annual Earnings ($2007)		Earnings Volatility (%)	
Based on 2000 SOC	%	2004	2005	>=25% change	>=50% change
Management	11.6	82,439 1957	84,430 2048	15.2 1.0	5.7 0.7
Business and Financial Operations	4.8	61,308 1701	63,416 1955	12.7 1.4	4.8 0.9
Computer and Mathematical	3.8	73,218 1591	73,801 1606	11.1 1.6	3.1 0.9
Architectural and Engineering	2.8	76,140 2508	75,080 2381	8.5 1.4	2.5 0.7
Life, Physical and Social Science	1.3	67,239 2157	67,315 2239	7.1 1.8	2.0 1.0
Community and Social Service	1.9	43,600 1827	43,175 2008	16.3 2.3	4.1 1.2
Legal	1.2	100,229 9258	98,972 8698	16.0 3.0	5.8 2.0
Education, Training, Library	6.0	49,256 1163	49,383 1157	12.9 1.2	4.5 0.8
Arts, Design, Entertainment, Sports, Media	1.3	53,895 2886	54,473 3156	16.0 2.9	4.4 1.6
Health Care Practitioner and Technical	5.5	64,507 2210	63,286 2012	18.3 1.4	6.3 0.9
Healthcare support	1.9	30,040 2898	30,963 3566	18.1 2.3	7.6 1.6
Protective Service	2.9	50,412 1488	51,107 1694	14.1 1.9	3.5 0.9
Food Preparation and Serving-Related	2.8	22,923 848	23,196 789	24.9 2.5	8.6 1.4
Building and Grounds Cleaning and Maintenance	3.0	26,536 969	25,812 774	15.5 1.8	7.7 1.4
Personal care and Service	1.5	27,041 1511	26,488 1495	21.7 3.2	10.7 2.5
Sales and Related	8.4	49,354 1331	49,878 1350	19.1 1.4	7.8 0.9
Office and Administrative Support	16.0	36,674 506	36,857 525	14.7 0.9	4.6 0.5
Farming, Fishing, Forestry	0.4	29,014 1696	30,317 2115	8.4 3.5	7.2 0.7
Construction and Extraction	3.8	43,166 1107	43,203 1024	13.9 1.7	4.5 0.9
Installation, Maintenance, Repair	4.1	46,617 912	47,192 1196	13.3 1.5	3.6 0.7
Production	8.6	38,102 693	37,709 688	15.0 1.3	3.9 0.6
Transportation and Material Moving	5.4	40,502 1077	40,149 1036	18.0 1.5	5.7 1.1

Note: Standard errors in parentheses. The margin of error, calculated by 1.6*standard error, added to and subtracted from the estimate provides the 90-percent confidence interval. Source: Author's calculations from the 2004 Panel of Survey of Income and Program Participation, U.S. Bureau of the Census. Sample includes all 25-65 year old people who work for an employer during all months of 2004 and 2005. Sample excludes those with zero earnings in either year. The data are weighted by longitudinal panel weights. Total sample size is 15,949.

Table 7b: Earnings Volatility by Industry, Wage and Salary Earners vs. Self-Employed (Business Owners), 2004-2005

	Workers (15,949 obs)			Business owners (2,459 obs)		
Major Industry Categories	Population Share	Earnings Volatility (%)		Pop Share	Earnings Volatility (%)	
(Based on NAICS)		>=25% change	>=50% change		>=25% change	>=50% change
Natural Resource – Agriculture, Mining, Forestry, Fisheries	10.0	12.0 (2.7)	3.3 (1.5)	5.1	66.7 (4.0)	43.4 (4.5)
Construction	4.7	15.7 (1.5)	5.1 (0.9)	17.4	66.6 (2.7)	42.3 (2.6)
Manufacturing	15.4	13.4 (0.8)	4.3 (0.5)	4.8	72.1 (4.6)	35.5 (4.7)
Wholesale Trade	4.2	16.0 (1.6)	5.4 (1.1)	4.0	69.7 (5.8)	52.0 (7.0)
Retail Trade	9.1	16.3 (1.4)	6.2 (0.9)	9.9	70.4 (3.4)	47.2 (3.9)
Utilities, Transportation and Warehousing	5.8	15.5 (1.4)	3.8 (0.7)	3.0	77.2 (5.4)	43.7 (7.0)
Information	2.7	14.7 (2.1)	5.0 (1.3)	1.2	40.5 (11.7)	32.3 (10.6)
Finance, Insurance, Real Estate, Rental, Leasing	7.6	17.5 (1.3)	7.4 (1.0)	8.5	70.2 (4.1)	45.5 (4.2)
Professional, Scientific, Technical, Management of Companies and Enterprises, Administration, Support, Waste Management, Remediation	8.8	15.7 (1.3)	5.2 (0.7)	20.5	67.0 (2.5)	44.1 (2.5)
Education, Health, Social Services	22.7	15.0 (0.7)	4.9 (0.4)	9.6	67.4 (3.5)	40.2 (4.0)
Arts, Entertainment, Recreation, Accommodation and Food Services	4.6	22.0 (1.8)	7.5 (1.1)	6.2	75.7 (3.5)	53.4 (4.2)
Other Services (except Public Administration)	3.7	20.4 (1.9)	6.8 (1.2)	9.5	65.9 (3.4)	42.8 (3.5)
Public Administration	9.3	10.8 (0.9)	3.8 (0.6)	0.2	68.8 (25.1)	49.8 (25.9)

Note: Standard errors in parentheses. The margin of error, calculated by 1.6*standard error, added to and subtracted from the estimate provides the 90-percent confidence interval.
Source: Author's calculations from the 2004 Panel of Survey of Income and Program Participation, U.S. Bureau of the Census. Sample includes all 25-65 year old people who have paid employment (either for an employer or owning business) during all months of 2004 and 2005. Sample excludes those with zero earnings in either year. The data are weighted by longitudinal panel weights.

Table 8b: Earnings Volatility by Occupation, Wage and Salary Earners vs. Self-Employed (Business Owners), 2004-2005

	Workers (15,949 obs)			Business owners (2,459 obs)		
Major Industry Categories	Population Share	Earnings Volatility (%)		Pop Share	Earnings Volatility (%)	
(Based on SOC)		>=25% change	>=50% change		>=25% change	>=50% change
Management, Business, Financial	16.5	14.5 (0.8)	5.6 (0.6)	26.1	64.1 (2.4)	39.7 (2.3)
Professional and Related	23.8	13.7 (0.6)	4.3 (0.4)	16.4	67.1 (2.4)	45.2 (2.7)
Service	12.1	18.8 (1.0)	7.5 (0.7)	14.1	75.6 (2.6)	48.6 (3.2)
Sales and related	8.4	19.1 (1.4)	7.8 (0.9)	17.0	68.2 (2.4)	46.4 (2.8)
Office and Administrative Support	16.0	14.7 (0.9)	4.6 (0.5)	3.7	65.3 (5.2)	31.7 (5.1)
Farming, Fishing, Forestry	0.4	8.4 (3.5)	0.7 (0.7)	1.6	62.0 (7.7)	37.7 (7.8)
Construction and Extraction	3.8	13.9 (1.7)	4.5 (0.9)	11.0	70.6 (3.1)	42.9 (3.4)
Installation, Maintenance, Repair	4.1	13.3 (1.5)	3.6 (0.7)	3.6	69.0 (5.3)	53.5 (5.7)
Production	8.6	15.0 (1.3)	3.9 (0.6)	3.4	67.3 (5.8)	47.2 (6.0)
Transportation and Material Moving	5.4	18.0 (1.5)	5.7 (1.1)	2.7	78.6 (5.7)	49.3 (7.8)

Note: Standard errors in parentheses. The margin of error, calculated by 1.6*standard error, added to and subtracted from the estimate provides the 90-percent confidence interval.
Source: Author's calculations from the 2004 Panel of Survey of Income and Program Participation, U.S. Bureau of the Census.
Sample includes all 25-65 year old people who have paid employment (either for an employer or owning business) during all months of 2004 and 2005. Sample excludes those with zero earnings in either year. The data are weighted by longitudinal panel weights.

Table 10a: Variable Means by Earnings Allocation Status

	Allocated	Unallocated
Number of Observations	243,191	430,278
|Δ(log earnings)|	0.441	0.172
|Δ(earnings)| > 25%	0.609	0.220
|Δ(earnings)| > 50%	0.328	0.075
Time trend	74.964	58.116
1^{2t} Quarter	0.207	0.232
2nd Quarter	0.273	0.267
3rd Quarter	0.275	0.259
4th Quarter	0.245	0.241
1979-1984	0.178	0.319
1985-1987	0.063	0.137
1995-2007	0.759	0.544
Recession	0.156	0.186
Age	43.347	41.425
Female	0.419	0.427
Married	0.702	0.732
Married status change	0.022	0.022
White, non-Hispanic	0.755	0.806
Black	0.116	0.076
Hispanic	0.079	0.077
Other race	0.049	0.041
Didn't complete High School	0.095	0.113
High school only	0.348	0.334
Some college	0.263	0.249
College degree or more	0.294	0.305
Increase education attainment	0.061	0.045
Paid hourly	0.530	0.502
Paid hourly status change	0.268	0.130
Manufacturing	0.196	0.223
Accommodation and Food & Drink	0.031	0.028
Administration and Waste Management	0.024	0.019

Table 10a: Variable Means by Earnings Allocation Status

	Allocated	Unallocated
Agriculture, Forestry and Fishing	0.008	0.012
Arts & Recreation	0.011	0.010
Construction	0.057	0.054
Education	0.095	0.116
FIRE & Leasing	0.076	0.063
Health & Social Services	0.109	0.101
Information	0.026	0.025
Mining	0.009	0.011
Organizations & Households	0.016	0.016
Personal & Services	0.018	0.015
Professional Services	0.047	0.042
Public Administration	0.076	0.074
Retail	0.087	0.083
Transportation & Warehousing	0.056	0.048
Utilities	0.019	0.019
Wholesale	0.040	0.041
Industry change	0.217	0.168

Table 10b: Complete Regression Results for Tables 10-12
(Omitting Observations with Allocated Earnings)

	Dependent Variables		
Explanatory Variables	**|Δ(log earnings)|**	**|Δ(earnings)| > 25%**	**|Δ(earnings)| > 50%**
Time trend	-0.000112*** *2.94E-05*	-0.000110** *5.56E-05*	-2.61E-05 *3.54E-05*
2nd Quarter	-0.00144 *0.00093*	-0.0021 *0.00177*	-0.00119 *0.00113*
3rd Quarter	0.00044 *0.00095*	0.00286 *0.00179*	-0.00068 *0.00114*
4th Quarter	0.00427*** *0.00096*	0.00662*** *0.00182*	0.00263** *0.00116*
In 1985_1987	0.00450*** *0.00129*	0.0119*** *0.00244*	0.00908*** *0.00156*
In 1995_2007	0.0222*** *0.00248*	0.0356*** *0.00469*	0.0178*** *0.00299*
Recession	0.000136 *0.00094*	0.000826 *0.00178*	0.00062 *0.00113*
Age	-0.0309*** *0.00939*	-0.0516*** *0.0178*	-0.0308*** *0.0113*
Age^2	0.00105*** *0.00034*	0.00167*** *0.00064*	0.00105** *0.00041*
Age^3	-1.60e-05*** *5.27E-06*	-2.44e-05** *9.99E-06*	-1.58e-05** *6.37E-06*
Age^4	9.02e-08*** *3.01E-08*	1.34e-07** *5.70E-08*	8.86e-08** *3.64E-08*
Female	-0.0185*** *0.00074*	-0.0324*** *0.00139*	-0.0130*** *0.00089*
Married	0.00267*** *0.00077*	0.00444*** *0.00146*	0.000938 *0.00093*
Married status change	0.0279*** *0.00224*	0.0421*** *0.00423*	0.0255*** *0.0027*
Black	0.0315*** *0.00127*	0.0566*** *0.0024*	0.0247*** *0.00153*
Hispanic	0.0183*** *0.00129*	0.0364*** *0.00245*	0.0120*** *0.00156*
Other race	0.0150*** *0.00168*	0.0203*** *0.00317*	0.0107*** *0.00202*
High school only	-0.00338*** *0.00118*	-0.00468** *0.00224*	-0.00065 *0.00143*
Some college	-0.00277** *0.00128*	-0.00571** *0.00242*	0.00126 *0.00154*
College degree or more	-0.00639*** *0.00137*	-0.0120*** *0.00259*	-0.00151 *0.00165*
Increase education attainment	0.0289*** *0.0021*	0.0409*** *0.00397*	0.0330*** *0.00253*
Paid hourly	-0.0279*** *0.00076*	-0.0453*** *0.00145*	-0.0248*** *0.00092*

Table 10b: Complete Regression Results for Tables 10-12
(Omitting Observations with Allocated Earnings)

	Dependent Variables		
Explanatory Variables	**|Δ(log earnings)|**	**|Δ(earnings)| > 25%**	**|Δ(earnings)| > 50%**
Paid hourly status change	0.0710***	0.123***	0.0569***
	0.00099	*0.00187*	*0.00119*
Accommodation and Food & Drink	0.0409***	0.0648***	0.0394***
	0.00209	*0.00396*	*0.00252*
Administration and Waste Management	0.0118***	0.0208***	0.0130***
	0.00251	*0.00476*	*0.00303*
Agriculture, Forestry and Fishing	0.00163	0.000563	0.00593
	0.0031	*0.00588*	*0.00375*
Arts & Recreation	0.0129***	0.0246***	0.0168***
	0.00343	*0.0065*	*0.00414*
Construction	0.0133***	0.0247***	0.00788***
	0.00159	*0.00301*	*0.00192*
Education	0.0251***	0.0483***	0.0199***
	0.00131	*0.00249*	*0.00159*
FIRE & Leasing	0.0165***	0.0215***	0.0181***
	0.00154	*0.00292*	*0.00186*
Health & Social Services	0.00405***	0.00563**	0.00805***
	0.00132	*0.00249*	*0.00159*
Information	-0.0024	-0.00792*	0.00154
	0.00222	*0.00421*	*0.00268*
Mining	0.0296***	0.0444***	0.0217***
	0.0032	*0.00606*	*0.00386*
Organizations & Households	0.00942***	0.0120**	0.0132***
	0.0027	*0.00512*	*0.00326*
Personal & Services	0.0205***	0.0353***	0.0165***
	0.00279	*0.00528*	*0.00337*
Professional Services	-0.00844***	-0.0170***	-0.00425*
	0.00181	*0.00343*	*0.00219*
Public Administration	-0.0125***	-0.0241***	-0.00495***
	0.00143	*0.00271*	*0.00173*
Retail	0.0141***	0.0230***	0.0166***
	0.00135	*0.00256*	*0.00163*
Transportation & Warehousing	0.0208***	0.0320***	0.0179***
	0.00166	*0.00315*	*0.00201*
Utilities	-0.00667***	-0.00942**	-0.00158
	0.00248	*0.00469*	*0.00299*
Wholesale	0.000668	0.0037	0.000505
	0.00179	*0.0034*	*0.00217*
Industry change	0.0477***	0.0784***	0.0426***
	0.00091	*0.00173*	*0.0011*
Constant	0.499***	0.797***	0.395***
	0.0951	*0.18*	*0.115*
Observations	430,278	430,278	430,278
R-squared	0.033	0.027	0.017

Standard errors in *italics* under coefficient estimates. *** p<0.01, ** p<0.05, * p<0.1

Table 10c: Regression Analysis of Earnings Volatility Using CPS
(Including Observations with Allocated Earnings)

	Dependent Variables		
	|Δ(log earnings)|	**|Δ(earnings)| > 25%**	**|Δ(earnings)| > 50%**
Time trend	0.000473***	0.000568***	0.000462***
	(3.24e-05)	(4.95e-05)	(3.85e-05)
2nd Quarter	0.00630***	0.00977***	0.00713***
	(0.00108)	(0.00164)	(0.00128)
3rd Quarter	0.00697***	0.0116***	0.00629***
	(0.00108)	(0.00166)	(0.00129)
4th Quarter	0.0107***	0.0155***	0.00877***
	(0.00111)	(0.00169)	(0.00132)
In 1985_1987	-0.0144***	-0.0167***	-0.00777***
	(0.00158)	(0.00241)	(0.00187)
In 1995_2007	0.0275***	0.0421***	0.0276***
	(0.00278)	(0.00424)	(0.00331)
Recession	0.00348***	0.00629***	0.00417***
	(0.00108)	(0.00166)	(0.00129)
Age	-0.0822***	-0.0876***	-0.0624***
	(0.0108)	(0.0164)	(0.0128)
Age^2/100	0.296***	0.302***	0.223***
	(0.0386)	(0.0589)	(0.0459)
Age^3/1000	-0.0456***	-0.0447***	-0.0340***
	(0.00599)	(0.00916)	(0.00713)
Age^4/10000	0.00258***	0.00244***	0.00190***
	(0.000341)	(0.000521)	(0.000406)
Female	-0.0314***	-0.0419***	-0.0275***
	(0.000841)	(0.00128)	(0.00100)
Married	-0.00756***	-0.00830***	-0.00801***
	(0.000871)	(0.00133)	(0.00104)
Married status change	0.0212***	0.0284***	0.0209***
	(0.00256)	(0.00392)	(0.00305)
Black	0.0527***	0.0797***	0.0469***
	(0.00134)	(0.00205)	(0.00160)
Hispanic	0.0160***	0.0305***	0.0109***
	(0.00147)	(0.00225)	(0.00175)
Other race	0.0236***	0.0317***	0.0203***
	(0.00185)	(0.00283)	(0.00220)
High school only	0.00545***	0.00930***	0.00704***
	(0.00138)	(0.00210)	(0.00164)
Some college	0.00285*	0.00313	0.00603***
	(0.00148)	(0.00226)	(0.00176)
College degree or more	0.0103***	0.00397*	0.0153***
	(0.00157)	(0.00240)	(0.00187)

Table 10c: Regression Analysis of Earnings Volatility Using CPS
(Including Observations with Allocated Earnings)

	Dependent Variables		
	|Δ(log earnings)|	**|Δ(earnings)| > 25%**	**|Δ(earnings)| > 50%**
Increase education attainment	0.0318***	0.0399***	0.0408***
	(0.00228)	(0.00349)	(0.00272)
Accommodation and Food &Drink	0.0484***	0.0598***	0.0485***
	(0.00237)	(0.00362)	(0.00282)
Administration and Waste Management	0.0135***	0.0177***	0.0129***
	(0.00276)	(0.00422)	(0.00329)
Agriculture, Forestry and Fishing	-0.000989	-0.0157***	0.00492
	(0.00374)	(0.00571)	(0.00445)
Arts & Recreation	0.0244***	0.0310***	0.0277***
	(0.00383)	(0.00585)	(0.00456)
Construction	0.0142***	0.0227***	0.0119***
	(0.00181)	(0.00277)	(0.00215)
Education	0.0106***	0.0260***	0.00940***
	(0.00153)	(0.00234)	(0.00182)
FIRE & Leasing	0.0313***	0.0359***	0.0320***
	(0.00172)	(0.00262)	(0.00204)
Health & Social Services	0.0102***	0.0118***	0.0143***
	(0.00150)	(0.00230)	(0.00179)
Information	0.00412	-0.000244	0.00723**
	(0.00252)	(0.00386)	(0.00300)
Mining	0.0212***	0.0301***	0.0141***
	(0.00379)	(0.00580)	(0.00451)
Organizations & Households	0.0297***	0.0221***	0.0312***
	(0.00310)	(0.00474)	(0.00369)
Personal & Services	0.0298***	0.0434***	0.0302***
	(0.00309)	(0.00473)	(0.00368)
Professional Services	-0.00404**	-0.00932***	0.00158
	(0.00204)	(0.00312)	(0.00243)
Public Administration	-0.0150***	-0.0244***	-0.00753***
	(0.00163)	(0.00249)	(0.00194)
Retail	0.0261***	0.0307***	0.0293***
	(0.00154)	(0.00236)	(0.00184)
Transportation & Warehousing	0.0238***	0.0301***	0.0219***
	(0.00186)	(0.00285)	(0.00222)
Utilities	-0.00508*	-0.00541	-0.00197
	(0.00285)	(0.00435)	(0.00339)
Wholesale	0.00815***	0.0106***	0.00847***
	(0.00206)	(0.00315)	(0.00245)
Industry change	0.0485***	0.0727***	0.0438***
	(0.00100)	(0.00153)	(0.00119)
Paid hourly	-0.0344***	-0.0416***	-0.0256***
	(0.000860)	(0.00131)	(0.00102)

Table 10c: Regression Analysis of Earnings Volatility Using CPS
(Including Observations with Allocated Earnings)

	Dependent Variables		
	|Δ(log earnings)|	**|Δ(earnings)| > 25%**	**|Δ(earnings)| > 50%**
Paid hourly status change	0.0992***	0.142***	0.0903***
	(0.000993)	(0.00152)	(0.00118)
Constant	1.012***	1.172***	0.707***
	(0.109)	(0.167)	(0.130)
Observations	673469	673469	673469
R-squared	0.046	0.037	0.028

Standard errors in parentheses under coefficient estimates. *** p<0.01, ** p<0.05, * p<0.1

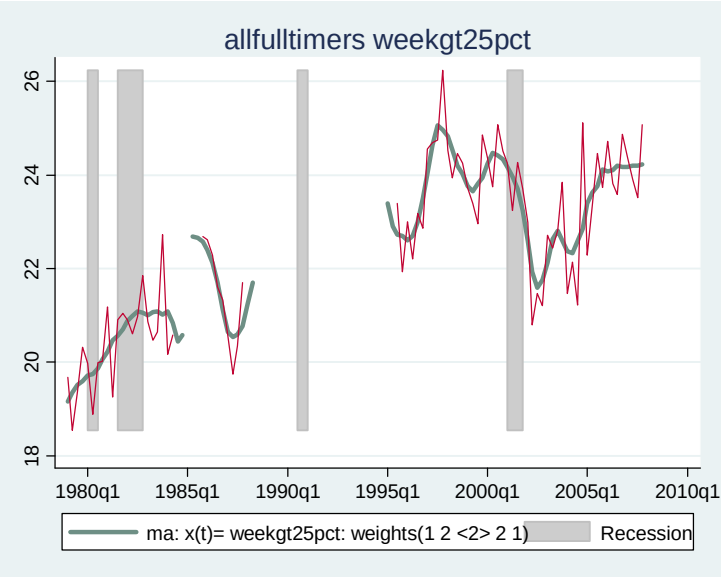
Table 10d: Marginal Age Effects									
	|Δlog(earnings)|			|Δ(earnings)| > 25%			|Δ(earnings)| > 50%		
Age	**dy/dx**	**s.e.**	**p-value**	**dy/dx**	**s.e.**	**p-value**	**dy/dx**	**s.e.**	**p-value**
25	-0.0026	0.0005	0.0000	-0.0054	0.0010	0.0000	-0.0025	0.0006	0.0000
30	-0.0011	0.0001	0.0000	-0.0028	0.0003	0.0000	-0.0011	0.0002	0.0000
35	-0.0005	0.0001	0.0000	-0.0014	0.0002	0.0000	-0.0004	0.0001	0.0030
40	-0.0003	0.0001	0.0010	-0.0008	0.0002	0.0000	-0.0002	0.0001	0.1100
45	-0.0004	0.0001	0.0000	-0.0008	0.0001	0.0000	-0.0002	0.0001	0.0130
50	-0.0004	0.0001	0.0000	-0.0007	0.0002	0.0000	-0.0003	0.0001	0.0480
55	-0.0001	0.0001	0.2600	-0.0004	0.0002	0.0780	0.0000	0.0001	0.9130
60	0.0007	0.0003	0.0210	0.0007	0.0006	0.2210	0.0008	0.0004	0.0350
65	0.0024	0.0009	0.0050	0.0030	0.0016	0.0680	0.0024	0.0010	0.0200

dy/dx = effect on dependent variable of increasing age by one year.
s.e. = standard error

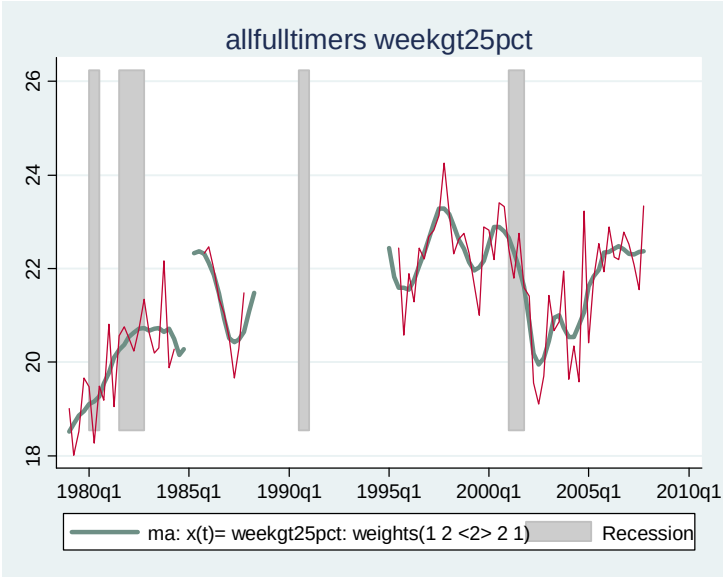
Figure 1

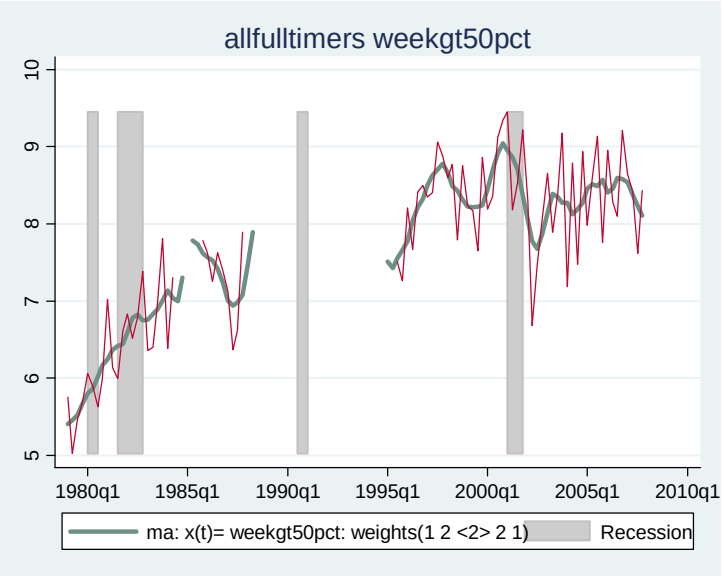
Impact of Top-Coding Inflation Adjustments on Estimated Long-Term Trends in Income Volatility

No Top-Coding Adjustment



Weekly Earnings Top-Coded at $1454 ($2000)





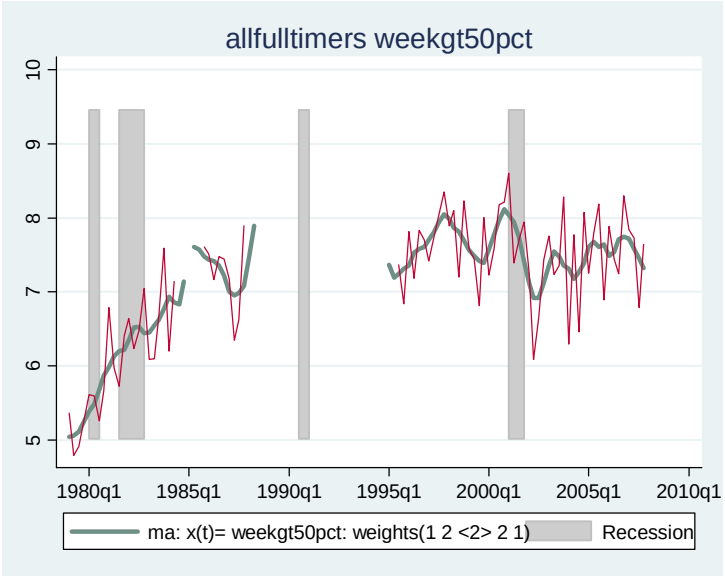
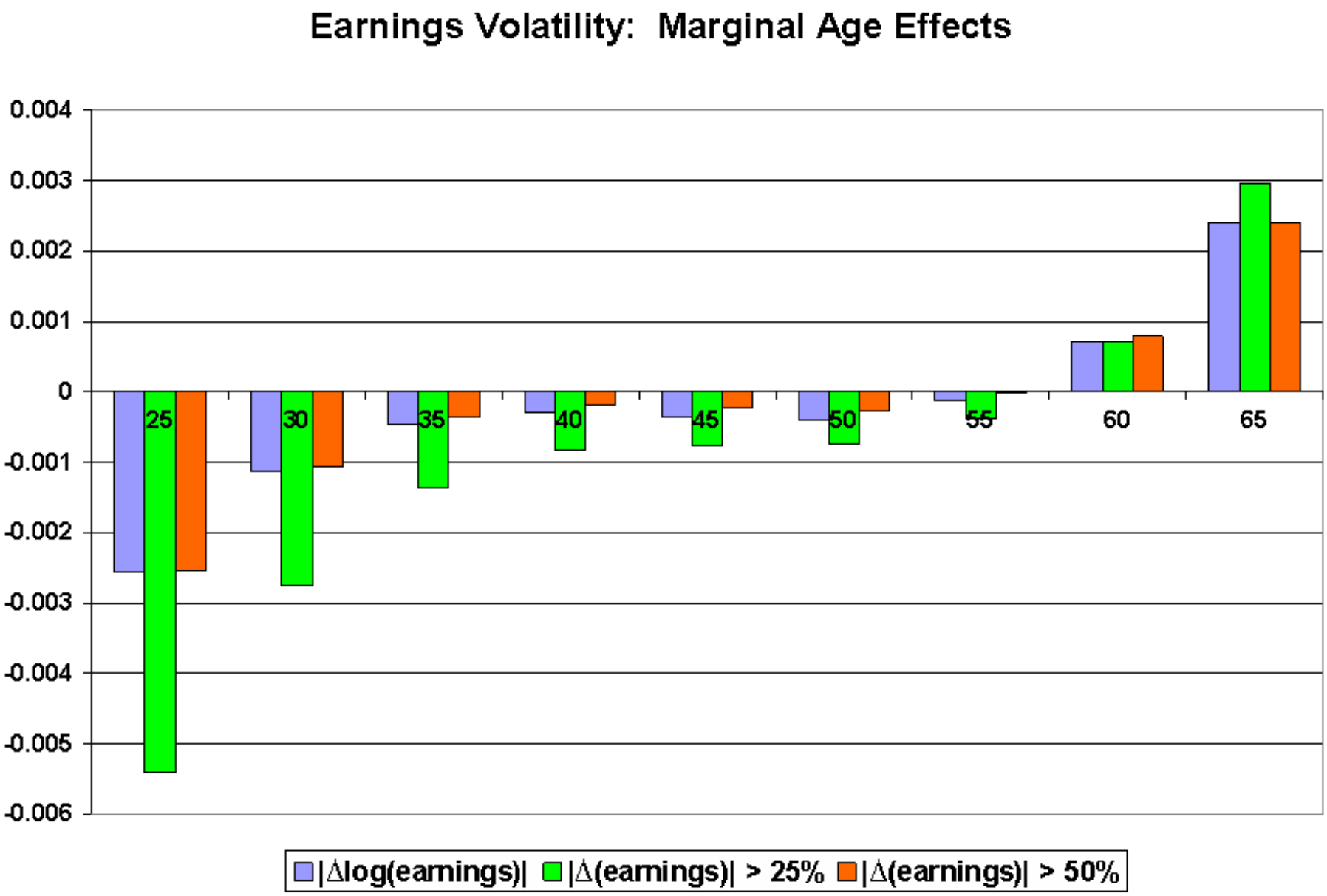


Figure 2


Earnings Volatility: Marginal Age Effects
0.004
0.003
0.002
0.001
0
-0.001
-0.002
-0.003
-0.004
-0.005
-0.006
25
30
35
40
45
50
55
60
65
|Δlog(earnings)|
|Δ(earnings)| > 25%
|Δ(earnings)| > 50%