Income and Earnings Mobility in U.S. Tax Data

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PRELIMINARY DRAFT

We use a large panel of federal income tax data to investigate intragenerational income mobility in the United States. We have two primary objectives. First, we explore the determinants of two-year changes in individual labor earnings and family incomes, such as job or industry changes, marriage, divorce, and geographic mobility. Second, we evaluate how federal income taxes stabilize or destabilize post-tax income changes relative to before-tax changes. We find a relatively high degree of income mobility, with almost half of workers exhibiting earnings increases or decreases of at least 25 percent, and two-fifths of families experiencing income changes of this magnitude. Considering who experiences mobility, marriage is associated with earnings increases among men, but is associated with modest earnings decreases among women. We also observe that large income gains are most likely among families that add workers – either through marriage or through a second family member entering the workforce.

I. Introduction

Income for individuals and families varies over time. Individuals experience any number of events which increase or decrease their income. Some events, such as promotions, new jobs, starting work, or marriages to other wage earners, result in substantial income gains. Others, such as job losses or divorces, result in significant income declines. Similarly, the persistence of income changes are not uniform, with some income shifts lasting only a short period, and others persisting for years or decades. This income mobility over time means that it is insufficient for researchers to evaluate the cross-sectional distribution of income. Instead, they must also consider income mobility and income dynamics over time. Furthermore, when evaluating public policies such as tax laws, a valuable consideration is the extent to which they mitigate or accentuate income changes for those who achieve upward mobility or suffer downward mobility.

In this paper, we first explore determinants of trends for individual wage earnings, such as wage growth within a job, employment changes within industry, or changing jobs into a new industry. We then aggregate individuals to the family, which we consider to be all individuals who file a tax return together and also refer to as the tax unit.[1] Considering the income mobility of the tax unit, we estimate how life transitions such as marriage, divorce, job changes, or geographic mobility contribute to the observed mobility levels. These distinctions between sources of mobility are important as policymakers consider the appropriate interpretation of mobility patterns. For example, if most upward mobility comes through marriage or new

[1] While this sharing unit is common in the tax literature (see e.g. Piketty and Saez, 2003), it is distinct from the Census Bureau's definition of a family, which consists of at least two individuals who are living together and are related by birth, marriage, or adoption (Lofquist et al. 2012)

entrants into the labor market within a tax unit, this presents a different picture of mobility than if the same level of mobility is observed while coming primarily through wage gains achieved through labor market advancements.

After investigating the factors that influence economic mobility for individuals and families, we shift to considering how taxes and tax credits affect mobility patterns. We evaluate the extent to which the tax code, including progressive income taxes and federal income tax credits, alleviate or accentuate the hardship associated with downward mobility and reduce or accelerate the gains from upward mobility.

Much of the existing income mobility research is based on survey data from the Panel Study of Income Dynamics (PSID) (Acs and Zimmerman, 2008; Bradbury and Katz, 2004; Gittleman and Joyce, 1999).[2] However, these data are limited by relatively small sample sizes (the PSID surveys between 5,000 and 8,000 families) and have the well-known concern that measurement error in survey data may appear as mobility, potentially upwardly biasing mobility estimates (Gardiner and Hills, 1999; Jarvis and Jenkins, 1998; Rendtel, Langeheine, and Berntsen, 1998; Solon, 1992).[3] Top-coding, non-response, and misreporting in the tails of the distribution may distort the values of extreme incomes (Bollinger et al. 2014), which would add further uncertainty to estimates of mobility from survey data.

[2] This literature is closely linked to the related literature considering transitions out of poverty including which groups of individuals are likely to experience only transitory poverty and which groups are likely to persist in poverty for extended periods (Bane and Ellwood, 1986; Gottschalk and Danziger, 2001).

[3] Gittleman and Joyce (1999) acknowledge this problem and address it by averaging 5 years of income, and measuring mobility from one five-year average to the next. This captures mobility trends in *permanent income*, but by design excludes most *transitory income* from the mobility measure since transitory income shocks are filtered out along with measurement error.

Recognizing the issues with survey-based mobility data, we use a panel of tax return data compiled from non-public-use Internal Revenue Service administrative records from 1999 through 2011. Our use of administrative data to consider these questions builds on a recent line of research that established the value of such data for mobility questions. For example, Chetty, Hendren, Kline, and Saez (2014) use linked tax returns to estimate pre-tax income mobility trends across generations; Auten, Gee, and Turner (2013) use a panel of tax returns to investigate the persistence of individuals at the top of the pre-tax income distribution; and Kopczuk, Saez, and Song (2010) use Social Security records to consider pre-tax earnings volatility. Despite the increased prevalence of administrative data in research exploring income mobility, Auten and Gee (2009) is the only previous paper that we are aware of to use administrative tax return data to consider potential causes of intragenerational income mobility,[4] and no previous research has used administrative tax data to consider how taxes interact with mobility. We also add the literature by analyzing W-2 data linked to tax returns. These data allow us to employment-based life transitions for individuals or families, something prior tax-return based research has not considered.

Using these data, we observe that almost half of working US adults experience a change in earnings of at least 25 percent over a two year period. Large swings in individual earnings are strongly correlated with job changes, although there is little difference in the level of mobility experienced by those who change jobs within their industry versus those who transition to a new industry. When considering a broader definition of income and shifting our

[4] We measure a median before-tax income change among filers and non-filers from 2001-2011 (constant 2012 dollars) of 6.8 percent. This is similar to the before-tax income change estimate for filers by Auten and Gee (2009) of 7.8 percent for 1987-1996, and less than their estimate of 22.7 percent change for 1996-2005.

level of analysis to the tax unit, the overall levels of mobility are similar – suggesting that these mobility results are robust to the unit of analysis. Large income gains are most likely among families that add workers – either through marriage or through a second family member entering the workforce. Mobility is not limited to these families, however. Approximately two-fifths of families that maintain the same number of workers still experience upward or downward swings in income of at least 25 percent over two years.

These large income swings are partially offset by changes in tax liabilities for many families, particularly those higher in the income distribution where marginal tax rates are greater. However, families near the lower end of the distribution that experience large income declines often see those losses accentuated by the loss of tax credits such as the EITC. This supports the findings of other Bitler, Hoynes, and Kuka (2014) who observe that while the EITC successfully reduces the incidence of poverty and near-poverty, that support is lost for those who experience a substantial economic hardship.

II. Data: Panel and Income Definitions

Enhanced CWHS Panel

We produce and analyze an enhanced version of the Continuous Work History Sample panel (CWHS) from 1999 to 2011. The sample is drawn by selecting all tax returns whose primary filer's Taxpayer Identification Number (TIN, usually their Social Security Number) has the last four digits matching one of ten combinations, which represents approximately 0.1 percent of all tax returns filed each year.[5] Since the CWHS qualifying TINs are static, and

[5] We refer to these TINs as "CWHS qualifying" TINs.

because TINs are time-invariant for each individual, any individual selected for the CWHS will remain in the panel over time. Individuals drop out of the panel in a given year if they fail to file a tax return, and can exit permanently if they emigrate or die. However, the panel remains representative of the *filing* population over time, as individuals who immigrate to the United States or are born in the United States and have CWHS qualifying TINs will enter the panel when they file tax returns.

We make three significant improvements to the conventional CWHS panel. First, we correct the substantial male bias that has been found in the conventional CWHS data (Dowd and Horowitz, 2011). Selection into the conventional CWHS sample is based on the primary filer's TIN, which means that a single individual with a CWHS qualifying TIN will generally drop out of the panel upon marriage if they are not listed as the primary filer on their joint return. Because the vast majority of married couples list the male as the primary filer this has the effect of oversampling men when following individuals over time. To address this limitation, we retrieve joint tax returns that list CWHS individuals as secondary filers from the *universe* of federal income tax returns: the Internal Revenue Service's Compliance Data Warehouse (CDW). In cases of married couples filing separately, we combine incomes from the two separate returns. This refinement allows us to follow individuals through marriage or divorce and remove the gender bias in the dataset.

The second limitation of the conventional CWHS data is that it is based solely on annual income tax returns (1040, 1040EZ, etc), and individuals drop out of the panel if they fail to file a tax return in a given year. This causes the panel to only be representative of the filing population, as opposed to the population as a whole. We address this limitation by adding

income data for non-filers using information return data from the CDW, as long as the individual filed a tax return at least once between 1999 and 2011.[6] Employers, financial institutions, and government agencies file information returns with the IRS detailing wage income, Social Security income, unemployment income, interest, dividends, and retirement saving distributions of those whom they have employment or financial relationships with. Importantly, this filing occurs regardless of whether the individual files a tax return. These information return data provide partial income information for non-filers, and we use them to construct annual income totals for individuals who fail to file a tax return in a given year and would have otherwise dropped out of the sample.[7] Specifically, we include income from forms W-2, 1099-G, 1099-R, 1099-SSA, 1099-DIV, 1099-INT, and 1099-MISC.[8]

Finally, a limitation of earlier research using the conventional CWHS data is that it only captures data from tax returns, which provides no information about employers or the split of income between spouses. We retrieve all W-2 and 1098-T data from the CDW for individuals (as opposed to tax returns) with one of the 10 CWHS qualifying TIN combinations. With these data we are able to separately observe employment information for each individual, including wages and the Employer Identification Numbers of their employers. This information allows us to measure job changes for individuals, and the industry of their employment. It also allows us to

[6] This restriction that individuals file at least once rarely binds, both because very few people never file a tax return over a 12 year period and because the 2008 Stimulus Tax Rebate incentivized many individuals to file who otherwise would not have filed a return. As a result, when including all individuals in our panel, we obtain population counts that are consistently within 3 percent of the total US population estimated by the Census Bureau.
[7] Our observation counts – inclusive of non-filers – are similar to Heim, Lurie and Pearce (2014). The estimated total number of filers, non-filers, and dependents is also are similar to Census Bureau estimates of the total US population.
[8] This definition of income primarily differs from the definition constructed using tax return data in that it misses self-employment income not reported on form 1099-MISC.

create a 0.1 percent sample of tax filers for all years of our sample, rather than just the years after 2005 when the CWHS sample was expanded.

Income Definitions

We construct separate definitions of income depending on the unit of observation. We define individual earnings as wages, salaries, and self-employment income. Since self-employment income is reported at the tax-unit level in the data, and is not separated by individual, in cases of a married couple we assume that self-employment earnings are split evenly between the husband and wife.[9] When considering tax-unit income, we use size-adjusted cash income, excluding capital gains.[10] This includes wages and salaries, taxable and tax-exempt interest, dividends, alimony, net business income, taxable and tax-exempt IRA distributions, pensions, Social Security benefits, rental income, farm income, unemployment compensation, and other income (line 21 of form 1040). We then deduct alimony payments and the deductible half of the self-employment tax. As changes in capital gains realizations are far removed from a traditional Haig-Simons definition of income and may reflect the timing of realizations rather than more persistent mobility patterns (Armour, Burkhauser, and Larrimore, 2014), they are excluded from our analysis. Also excluded from income are non-taxable cash and in-kind transfers, which are generally not collected on tax forms. This income definition is

[9] Self-employment income for individuals only includes what is reported on Schedule C of the Form 1040 (if the individual is a filer), whereas self-employment income for the tax unit includes both Schedule C income and Schedule E income.

[10] We adjust for tax-unit size by dividing income by the square-root of the number of filers and dependents claimed. This size-adjustment is common in income distributional research (see e.g. Gottschalk and Smeeding 1997, Atkinson and Brandolini 2001, Burkhauser et al. 2011, and Larrimore, Burkhauser, and Armour, Forthcoming) and is also used by the Organisation for Economic Co-operation and Development (OECD) in its official measures of income inequality and poverty (d'Ercole and Förster 2012). It closely matches the adjustments for household size implied by the Census Bureau poverty thresholds (Ruggles 1990).

similar to that used by Auten and Gee (2009) and Auten, Gee, and Turner (2013). We include Social Security benefits and unemployment benefits—which are reported on income tax returns and information returns— in our definition of income. Since these sources represent over 80 percent of cash transfer income (Larrimore, Burkhauser, and Armour, Forthcoming), this income definition is also close to the pre-tax cash income definition that is used by Gittleman and Joyce (1999) and is common in the income inequality literature.[11]

Tax liabilities are net of tax credits, including the earned income credit and child credits. Many tax credits are refundable, and as a result tax liabilities can be positive or negative. Post-tax income is calculated as pre-tax income minus net tax liabilities. Tax liabilities are, however, limited to federal income taxes and exclude state and local tax payments and payroll taxes.

Similar to most previous studies on income mobility, we restrict the sample in order to limit income mobility due to initial entrance into the labor force. We drop observations with primary filers under 25 years of age in the first year of each three year observation period. We also remove observations with missing income in the initial or final year, or no income in both the initial and final years. While some researchers also impose an upper age limit—including Gittleman and Joyce (1999) who exclude individuals over age 64 and Sawhill and Condon (1992) who exclude those over age 54—we do not impose an upper bound as we are also interested in mobility around retirement. These is sample restrictions are similar to Auten and Gee (2009), but are more restrictive than U.S. Department of the Treasury (1992), which did not have an age restriction and observed substantially greater levels of upward mobility.

[11] A noted exception are the annual inequality indices produced by Piketty and Saez (2003, and annual updates) using public use tax return data. Piketty and Saez exclude Social Security benefits and unemployment insurance compensation from their definition of income.

III. Individual Earnings Mobility

Overview of individual earnings mobility patterns

We begin our analysis by examining changes in labor earnings by individuals over time. One trend is particularly clear: a large fraction of the population experiences substantial earnings mobility over relatively short time horizons. Table 1 summarizes mobility patterns for men (Panel A) and women (Panel B) over the course of two years, restricting the sample to individuals with at least $1,000 of earnings in the initial year. Each cell in the table displays the percentage of people in a given income quintile in year *t* that experienced a given percent change in income two years later (year *t*+2).

Only fifty-six percent of working men in a given year had earnings within 25 percent of their earnings from two years prior. One-fifth had at least 25 percent more earnings and just under one-quarter earned at least 25 percent less (or had no earnings at all).[12] This volatility occurs at all earnings levels, although the frequency of earnings mobility, and particularly upward earnings mobility, is largest for those in the lowest quintile of the distribution. Nearly half of those in the bottom quintile had earnings two years later that were at least 25 percent above their initial earnings level. This roughly halves for the second quintile (23%) and halves again for the third (13%), fourth (10%), and fifth quintiles (12%). Losses in excess of 25% are more likely for those in the second quintile (32%), than the first quintile (26%). Roughly 20% of the third, fourth, and fifth quintiles experienced such large losses.

[12] As described more fully in the description of the data, earnings is defined here to include both wage earnings and self-employment income. When considering just wage earners and excluding self-employment the results are similar – 47 percent of men and 53 percent of women has a shift in earnings of at least 25 percent, and just under a quarter of men and women experienced an increase in income of at least 25 percent.

Patterns are remarkably similar for female earnings mobility. Forty-three percent of women experienced earnings changes of at least 25 percent over the two-year period and twenty-seven percent experienced a change of at least a 50. This compares to forty-four percent and twenty-eight percent for males, respectively. Again similar to males, female earnings mobility is greatest for the lowest quintile of the distribution, but the differences in mobility patterns for those in the third, fourth, and fifth quintiles are small. That being said, the top three quintiles (for both males and females) are still experiencing substantial absolute mobility, with roughly one-third experiencing earnings changes in excess of 25%.

Contributing factors to labor earnings mobility

In this section we investigate which groups experience income mobility, and what factors are most associated with large income movements. We estimate the extent to which major employment events - such as a change of employer or change in industry - and major life events - such as marriage, divorce or changing states - contribute to the mobility patterns observed above.

Table 2 displays the earnings mobility patterns of men and women with certain important employment and individual characteristics. For men and women, changing jobs, changing industries, and moving to a different state are each associated with higher levels of absolute earnings mobility. Sixty-two percent of men who switched jobs experienced an earnings change of at least 25 percent, while only thirty-two percent of all men who stayed in the same job experienced a similar change. Similarly, sixty-five percent of males who switched industries and fifty-nine percent of males who moved across state borders experienced a large absolute change in earnings. Female wage earners exhibit similar patterns, with one exception:

in the event of a state change women are more likely to experience an earnings decline of 25% or more (38%) than men (31%).

Depending on whether an observed job changes results from a job displacement, such as a layoff, or a voluntary job change, one may expect that the move could result in either substantial upward or downward mobility. For example, Farber (2005) observes that displacements result in substantial wage declines, while Topel and Ward (1992) observe that voluntary job changes are an important source of upward wage mobility for young workers. We observe that job changers, state changers, and industry changers were all about as likely to experience substantial upward mobility as they were to experience large downward mobility. Job changers were somewhat more likely to experience substantial upward mobility than downward mobility, although this flips for those who changed states, as state-changers were somewhat more likely to experience substantial downward mobility than upward mobility.

Earnings mobility also varies with family life events, and exhibits greater variation between males and females. Marriage is associated with especially large average and median gains for males (11% and 13%), but comparatively smaller mean and median gains for females (5% and 1%). Earnings volatility associated with marriage was comparable for males as females, as marriage was generally correlated with a greater proportion of large losses (31% and 33%) than large gains (25% and 21%).

Divorce is another story. Males who got divorced one or two years after the initial year fared much worse than females. Fifteen percent of these males had no earnings in the final year, compared to ten percent of females. Similarly, only twenty percent experienced earnings gains in excess of 25%, compared to twenty-six percent of females. Both sexes also increased earnings

in the event that their first child or an additional child entered the family, but the gains were larger for men and exhibited a greater degree of right-skew.

Regression Analyses

We now turn to regression analyses. The summary statistics above tell interesting stories, but regression analysis will allow us to better isolate the correlation between our variables of interest and earnings mobility. In particular, we will attempt to control for life cycle effects using five year age bins, starting centile dummies, and year fixed effects by including year dummies.

We begin by examining which factors are correlated with large income changes. The dependent variables in Table 3 are binary variables, which indicate whether the individual experienced a 25 percent increase or decrease in their labor earnings over the two year period. Our logit regression results are presented as odds ratios, where odds ratios greater than one indicate that the variable is associated with higher odds of experiencing a 25 percent increase or decrease in earnings, while odds ratios less than one indicate that the variable is correlated with lower odds of experiencing such an earnings shift.

The regression results support many of the conclusions drawn from the summary statistics in Table 2, and alter others. After controlling for starting centile, year fixed effects, age, and other characteristics, changing jobs is still associated with higher levels of both upward and downward earnings mobility, although the impact is greater for upward mobility. Changing industry or changing state similarly is associated with greater occurrences of upward and downward mobility, although with a larger probability of moving down in the distribution.

We also observe that even though these regressions focus exclusively on individual earnings, family dynamics matter. For men, being younger, being married at the start of the observation period, getting married, or having children are each associated with an increased probability of experiencing at least a 25 percent increase in earnings and a decreased probability of experiencing at least a 25 percent decrease in earnings. For women the pattern is different. Marriage does not have the same positive impact on the odds of upward mobility. Instead, women who get married during the observation period have a substantial increase in their odds of downward mobility, with no significant impact on their upward mobility.

Our data span 1999 to 2011, and include the dot-com bust, the building of the housing bubble, the resulting Great Recession, and the beginning of the post-recession recovery – which may have had differential impacts on workers based on their industry of employment. In an attempt to discern what this meant for earnings volatility, we include the one-digit NAICS code associated with is the individual's employer in year *t* (we exclude the "retail trade and transportation" code, which serves as our baseline). Several interesting results follow from this exercise.

Men working in agriculture were much less likely than those in retail or other industries to experience large positive or negative shocks *ceteris paribus*. Surprisingly, men in construction and utilities were also somewhat less likely to experience large income shocks, but more likely than agriculture. Women in construction and utilities were actually *more* likely to experience a large income gain. Health and education workers of both sexes were much more likely to experience large positive shocks and much less likely to experience large negative shocks. Finally, those in FIRE and STEM (finance, investment, real estate, science, technology,

engineering, and math) were more likely to experience large positive shocks and less likely to experience large negative shocks.

Although this regression demonstrates how life events affect the likelihood of substantial earnings volatility, we are also interested in how the employment events and individual circumstances considered impact mobility on average. We regress the arc percentage change in earnings on the family and employment events discussed above, controlling for age, year, and initial centile in the income distribution. We use the arc-percent change rather than the percentage change so that gains and losses are treated symmetrically.[13] We then follow Auten and Gee's (2009) approach of transforming earnings into a logistic scale in order to perform a logistic regression. This is done to address issues associated with using linear functions to estimate bounded dependent variables. This transformation scales earnings changes so that the logit input, $\widehat{arcp}$, has a range of (0, 1) and those with no earnings mobility have a dependent variable with a value of zero. Since the arc percent change ranges between negative and positive two, we slightly adjust this transformation in order to avoid a logit input of zero or one:

$$y = logit(\widehat{arcp}) = \ln(\widehat{arcp} / (1 - \widehat{arcp})) \text{ where } \widehat{arcp} = \frac{50 * ArcPercentChange + 101}{202} \quad (1)$$

The results of this regression assessing the impact of factors associated with earnings mobility are presented in Table 4. The first two columns show the results for men; the latter two do so for women. Among both men and women, changing jobs is associated with positive

[13] The arc percent change equal $2*(x_{final} - x_{initial})/(x_{final} + x_{initial})$ (Congressional Budget Office, 2008). Note that arc percentages are bounded by negative and positive two, which result from tax units moving to or from no income (or negative income in our specification). Arc percent changes offer a "symmetric" measure of gains and losses. For example, assume one income doubles from 100 to 200 and another is cut in half from 100 to 50. Whereas percent changes are 100 and -50 percent, arc percentage changes are 67 and -67 arc percent.

average earnings mobility two years later. For men, job changes resulted in a 38 arc-percent increase in earnings over the two year period. For women, the change was slightly smaller, around 30 arc-percent. Recognizing that workers may acquire industry specific capital that allows them to command higher wages at any job within their industry, one may expect upward mobility to be stronger for those who change jobs within industry than those who switch industries (Parent 2000). However, we observe that whether the job change was within the same industry or to a new industry had little impact on the magnitude of this effect. Changing industries had almost no additional impact on the magnitude of male earnings changes, whereas it had a small positive additional impact for women.

We also observe that the industry in which the individual works has surprisingly little impact on their expected level of mobility. The impact on mobility from working in each industry category is typically small relative to the baseline category of working in retail trade. The three exceptions are those who work in mining and oil, public administration, or education and healthcare fields. Both men and women employed in education and healthcare fields have had greater levels of upward wage mobility than those in other industries. This may reflect the human capital development that is necessary in these fields, which result in individuals becoming more skilled and productive as they gain additional experience, therefore commanding higher wages and exhibiting greater upward earnings mobility. In contrast, men working in the mining and oil industry and both men and women working in public administration experienced lower levels of average wage mobility than those working in other industries during this period.

This regression also supports the notion that family dynamics are important for understanding the average individual level earnings mobility, as was the case for large earnings swings. Among men, getting married is associated with an earnings increase, while women who get married between the initial and final year demonstrate a small earnings decline. Additionally, although men who are married at the start of the observation period exhibit greater earnings growth than their single counterparts, there is no similar increase in mobility for married women. Perhaps counter-intuitively, the presence of children in the tax unit, and having additional children, are both associated with higher levels of upward earnings mobility for men and women. While the regression controls for age, this may partially reflect that men and women who have children are likely to be in their peak years of earnings growth. But it also could partially indicate that the need to support children acts as an income effect, and increases effort exerted in the labor market.

A final aspect of family dynamics that appears in the regression is the different effects for men and women moving to new states. Unmarried men who move to a different state experience small increases in earnings, while married men experience a small decrease. Women moving to new states, on the other hand, experience negative earnings growth regardless of whether they were initially married or not, and the effect is substantial for married women. This sex and marital status difference in earnings mobility may suggest that long distance moves among married couples are more likely to favor the husband's employment over the wife's, resulting in lower earnings growth for women.

IV. Tax Unit Income Mobility

Overview of income mobility patterns

The statistics presented in the previous section suggest family composition decisions strongly influence individual earnings. As a result, it may be that individual *earnings* mobility is larger than family *income* mobility, to the extent that spouses act as a stabilizing influence on family income. In a two-earner family, for example, if one individual loses their job or exits the labor force while the other remains employed, the income mobility for the tax unit will be less than that experienced by a single individual. Additionally, work decisions are influenced by other sources of income flowing into the family, as is the case of an individual who retires but begins receiving Social Security income (which offsets the earnings loss).

In this section, we shift our unit of analyses from individuals to families. We change the definition of income as well, using total size-adjusted pre-tax income of individuals who file a tax return together ("tax unit" income). Our size adjustment involves dividing income by the square-root of the number of individuals in the family, and is meant to account for economies of scale in income earning and consumption.

Table 5 replicates Table 1, but does so for the total size-adjusted income of each tax unit. Even when considering the income of tax units rather than individual labor earnings, there remains a substantial level of income mobility. Fifty-eight percent of tax units have incomes within 25 percent of their starting income level, while forty-two percent had income changes of at least 25 percent. When comparing family income mobility rates to those for male and female labor earnings from Table 1, in many respects they are quite similar, although there is some evidence that the frequency of severe income declines are lower than the frequency of severe labor earnings declines. While sixteen percent of men and fourteen percent of women saw their

labor earnings fall by at least 50 percent, or fall to zero, only seven percent of tax units had their incomes fall this much.

Examining levels of income mobility through the distribution rather than at the population as a whole, low and moderate income families are much more likely to exhibit upward mobility than high income families. Forty-three percent of those in the bottom quintile and twenty-seven percent of those in the second quintile have earnings growth of at least 25 percent over the course of two years. Upper income tax units, on the other hand, show the greatest propensity for substantial income declines. Both the degree of mobility and the inverse relationship to one's starting point in the distribution are broadly consistent with the findings of Auten and Gee (2009). Our results emphasize the extent to which substantial mobility occurs even over short time horizons.

A substantial portion of this mobility, however, is transitory mobility and does not persist into subsequent years. Table 6 shows the fraction of tax units in each quintile who, conditional on having an income shift of at least 25 percent or 50 percent over two years, maintain an income that is 25 or 50 percent above their initial level for a subsequent two years. Only around one-third of tax units whose income falls by 25 percent or more after two years remain at their lower income level after an additional two years, and less than forty percent of those whose income rises by 25 percent maintain that increase. However, we observe that the persistence of income gains is greater for those starting lower in the income distribution, while the persistence of income losses is greater for those starting higher in the distribution.

Table 7 displays the percentage of families with small or large changes in income that also experienced various economic or family composition shocks. It is important to consider the

extent to which those who achieve substantial gains in income are doing so based on advancement in the labor market versus the addition of new workers in the family joining the labor market. To the extent that mobility comes from new entrants, this may suggest that the improvement in financial well-being reflects the reduction in home-production or leisure, thus offsetting the true magnitude of the gains. Looking only at tax units where the number of workers is unchanged, twenty-three percent experienced increases in their income of at least 25 percentage points. This is the same level of upward mobility that was observed for the population as a whole. Thus, while tax units who add a second worker are substantially more likely to be upwardly mobile (fifty percent of whom increased their income by at least a 25 percent), the addition of workers to the labor market is not the primary driver of the income mobility observed in Table 5. Similarly, even in cases where all individuals in the tax unit remain employed by the same employer, twenty-two percent experience income gains of at least 25 percentage points. However, as one may expect, the level of volatility is greater for those who do experience major life events. State-changers, job-changers, and industry-changers all experience larger positive and negative shocks than those who stayed in their current jobs.

Tables 8 and 9 display regression results for tax unit income changes analogous to the individual earnings regressions in Table 3 and Table 4, respectively. Table 8 displays the odds ratios from two logistic regressions on binary variables indicating whether or not a family experienced an income gain or loss in excess of 25 percent. The odds-ratios associated with the five year age bins (based on the primary-filer's year of birth) mostly tell a story consistent with standard notions of life cycle income patterns. Younger families are more likely to experience large, positive income shocks, while older families are more likely to experience large income

losses. We also observe that once controlling for age, starting income, and other factors, married tax units exhibit greater rates of upward mobility and lower rates of downward mobility than single tax units.

A job change for one or more family members is associated with large positive and negative shocks, but the logistic regression suggests a different relationship between changing jobs and tax unit income than that which between changing jobs and individual earnings. Similar to the individual earnings regressions, tax units with job-changers are more likely to have either a 25 percent increase or decrease in total income. But, unlike individual earnings, the increase in odds of a 25 percent income decline exceeds that for a 25 percent income increase.

Table 9 mimics the logistic regression specification in Table 4, where the arc-percent change in family income is the dependent variable. Once again, in contrast to individual earnings regressions, job changes were associated with a small (3 arc-percent) decline in family income. Similarly, moving to a different state was associated with a small (4 arc-percent) decline in family income. This may suggest that income gains by one spouse from a new job are partially counterbalanced by the employment and hours decisions of others in the tax unit.

Since job changes are not a significant driver of upward mobility, who is most upwardly mobile? Those who got married or had a member of the family start working were the most likely to exhibit large income gains. Getting married was associated with a 25 arc-percent increase in their family incomes. This is despite the fact that incomes are size-adjusted, which partially counterbalances the income gains to reflect the fact that there are more individuals in the family who share the income. Similarly, having a family member start work was associated with a 9 arc-percent increase in family income. Thus, although there is substantial earnings

volatility among tax units that do not experience a change in family or employment circumstances, the fastest way to move up the income ladder is clearly through marriage and/or going from a single earner family to a two earner family.

V. Stabilizing Effects of Federal Income Taxes

While researchers considering cross-sectional income inequality increasingly recognize the importance of taxes and transfers for mitigating income inequality (see e.g. Burkhauser, Larrimore, and Simon 2012), the stabilizing impact of taxes has often been overlooked in previous research on income mobility. The progressive tax rate schedule, as well as the EITC, child tax credit, and AMT, all impact the economic resources available to individuals for consumption. However, they also alter the magnitude of income swings as individuals pass through qualifying income levels for different tax programs.

In this section we measure the stabilizing and destabilizing effect of federal income taxes based on the extent to which they offset pre-tax income mobility. These stabilization effects result from progressivity of effective marginal tax rates, whether from progressive rate schedules, the Alternative Minimum Tax (AMT), phase outs or limitation of credits and other benefits (EITC, child and child care credits, savings and education credits, and IRA contributions),[14] or standard deductions and exemptions, which effectively create a large zero rate tax bracket. Given that almost two thirds of large income swings over two years prove to be transitory, any stabilizing impacts can help to mitigate short-term changes. However, some elements of the tax code can also create destabilizing effects and accentuate income changes,

[14] The Pease limitation on itemized deductions and the personal exemption phaseout (PEP) were not policy in 2011 and so are not considered in this study, although these progressive tax features were reinstated after 2012.

such as the phase-in ranges of the EITC and the refundable portion of the child credit, where increases in income decrease tax liabilities.

We measure the stabilizing and destabilizing effects of federal income taxes by the percent of stabilization (*PercentStabilization)* between pre- and post-tax income changes, where *ΔIncome* equals final minus initial income:

$$Stabilization = \Delta Income_{Pre\text{-}Tax} - \Delta Income_{Post\text{-}Tax} \quad (1)$$

$$PercentStabilization = Stabilization / \Delta Income_{Pre\text{-}Tax} \quad (2)$$

The percent stabilization is closely tied to effective marginal tax rates, as tax units in higher marginal tax brackets will experience greater levels of income stabilization: as their pre-tax income declines, the associated decline in tax liabilities is dependent on the effective marginal tax bracket. In general, the higher one's marginal tax bracket, the less their post-tax income will increase from positive pre-tax income mobility. However, this basic relationship does not always hold.

The direction of the income change is important when considering the extent to which tax policy affects income stabilization. The stabilizing impact of taxes is a positive feature for tax units experiencing a negative income shock, as the decline in liabilities offsets income losses and cushions the decline. However, the reverse is true for positive income shocks, when destabilizing effects are preferred (from the perspective of a family receiving a positive income shock) as they accentuate any increases in income.

Estimating Stabilization effects throughout the distribution

In the four panels of Figure 1, we measure the stabilizing effects of federal taxes for tax units experiencing large income gains or losses at each starting point in the income distribution.

As expected, the percent of income changes offset by tax changes increases for those with higher initial incomes. This is likely due to progressive tax rates, the AMT, and various phase-outs of tax credits and deductions that increase effective marginal tax rates. For example, tax units in the 2nd decile of the income distribution (p10-p20) experiencing a moderate pre-tax income gain (25-50 percent) have a median stabilization from taxes of 10 percent. However, a similar pre-tax income shock to a tax unit in the top decile is offset (reduced) by approximately one-quarter.

A key asymmetry appears among tax units near the bottom of the income distribution, particularly when looking at the 25th and 75th percentiles of stabilization rather than the median. Among tax units starting in the bottom decile, those with losses in excess of 50 percent of their initial pre-tax income are likely to experience tax destabilization; that is, their losses are accentuated by changes to their tax liabilities and credits (top left panel of Figure 1). The median tax unit in this range has a very slight accentuation of their pre-tax income loss when incorporating taxes, while 25 percent have their losses accentuated by taxes by a magnitude of at least 20 percent. This is because tax units in the phase-in range of the EITC that receive large, negative income shocks often lose their earned income and/or refundable child tax credits, exacerbating their market income decline.

In contrast, those who have income gains over 50 percent of their initial pre-tax income are likely to experience relatively modest stabilization from the tax code (Top Right of Figure 1) and their post-tax income will increase by somewhat less than their pre-tax income. Unlike tax units in this range who have income losses, large gains among these individuals often increase their incomes to the point that the EITC begins phasing out, thus limiting the tax benefits. From a practical standpoint, this asymmetric relationship presents a challenge for these tax units. If

they suffer a negative income shock, the destabilizing effects of the tax system magnify their income decline. However, if they increase their market income, the stabilizing nature of the EITC phase-out attenuates their post-tax income growth.

For moderate income gains and losses of between 25 and 50 percent, (bottom two panels of Figure 1), this asymmetry is less apparent. The loss of tax credits, such as the EITC, still causes a majority of families with falling incomes to experience an even larger decline in post-tax income, but many family's losses are partially offset by the tax system. Twenty-five percent of tax units with losses in this range had at least 9 percent of the losses offset by declining tax liabilities or increased tax credits. Additionally, among low-income tax units experiencing income growth between 25 and 50 percent, we now see that changes in their liabilities and increases in their credits accentuate the gains, for a majority of tax units, with those between the 1st and 5th percentiles of the distribution being particularly likely to have post-tax income growth that exceeds their pre-tax growth.

Estimating Stabilization Effects by parental status

Recognizing that much of the deviation from the stabilization generated from the progressive rate schedule is related to credits offered to low and moderate income families with children, such as the EITC the Child Tax Credit, in the panels of Figure 2 we separately consider the stabilizing impact of taxes for mobility among families with and without children. The top four panels consider individuals who are childless in both observation years while the bottom four panels consider individuals who are parents in both observation years. We exclude from this analysis those individuals who added children or whose children age out of their family.

Among childless individuals, taxes almost always stabilize incomes regardless of one's point in the income distribution – and this is true both for income gains and income losses. This is consistent with what one would expect given the progressive income tax schedule. However, among parents, we clearly observe that changes in tax liabilities accentuate both moderate and large income losses for those in the bottom quintile of the income distribution. This matches the findings of Bitler, Hoynes, and Kuka (2014) that the while the EITC may be successful at encouraging work, given that it was not designed as a safety net it can actually accentuate income losses. Considering income gains, parents who start in the bottom 5 percent of the distribution that experience a moderate income gain do have those gains accentuated by the tax code. However, this tax-bonus for income gains dissipates by the second vigintile and by the second decile taxes return to offsetting any moderate large income gains. As was observed for all tax units, the ability for taxes to accentuate large income gains is more modest than its accentuation of large income losses for low income families, and the impact dissipates completely by the 2nd vigintile.

VI. Conclusion

While distributional research is often conducted with a focus on single-year income data, using a large panel of tax return data, we observe that many individuals experience substantial changes in their income from one year to the next. Almost one half of working adults experience a 25 percent change in their earnings over a two year period and almost as many families experience a shift of this magnitude in their family income.

Large swings in individual earnings are strongly correlated with job changes, although there is little difference in the level of mobility experienced by those who change jobs within

their industry versus those who transition to a new industry. There is some difference in earnings stability by industry, as men working in agriculture are the least likely to have a 25 percent change in their earnings over a two year period while men working in mining are the most likely to experience such an earnings swing. However, those working in education and healthcare clearly exhibited the greatest rate of average upward mobility.

When considering income more broadly, and focusing on tax units (as opposed to individuals), large income gains are most likely among those that add workers – either through marriage or through a second family member entering the workforce. However, approximately a quarter of families that maintain the same number of workers still experienced at least a 25 percent increase in income. But downward mobility for those with no change in workers was also quite prevalent, with 15 percent of tax units who had no change in workers experiencing a 25 percent income decline.

For tax units near the bottom of the income distribution, income declines are often exacerbated by the loss of tax credits such as the EITC. A quarter of tax units who started in the bottom decile and experienced a 50 percent drop in their pre-tax income had their losses accentuated by the tax code resulting in post-tax losses that were at least 20 percent larger than pre-tax losses. This suggests that while the EITC and other programs in the tax code may be successful at encouraging work among low income families, when such families experience economic hardships the loss of these credits can exacerbate an income decline.

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Table 1: Individual Earnings Mobility by Initial Earnings (2-year mobility, t to t+2, t=1999-2009)

Panel A: Male wage mobility

Initial Wage Quintile	No earnings	Decline >50%	Decline 25%-50%	Decline <25%	Increase <25%	Increase 25%-50%	Increase >50%	%Change In		Change In		Initial Wage	
								Mean Wages	Median Wages	Mean Wages	Median Wages	Mean Wages	Median Wages
<$1,000	---	---	---	---	---	---	---	---	---	$38,800	$25,200	$100	$0
Lowest	8%	10%	8%	13%	12%	7%	41%	68%	22%	$7,200	$2,400	$10,500	$10,800
Second	10%	13%	9%	22%	24%	10%	13%	-3%	-3%	-$800	-$800	$25,900	$25,900
Middle	5%	10%	8%	30%	34%	8%	5%	-6%	-2%	-$2,600	-$800	$41,500	$41,400
Fourth	4%	8%	7%	34%	37%	7%	3%	-6%	-2%	-$3,700	-$1,200	$61,100	$60,400
Highest	3%	9%	9%	34%	34%	7%	5%	-7%	-4%	-$11,000	-$4,000	$149,800	$104,300
All Males	**6%**	**10%**	**8%**	**27%**	**29%**	**8%**	**12%**	-1%	-3%	-$800	-$1,100	$57,300	$41,400

Panel B: Female wage mobility

Initial Wage Quintile	No earnings	Decline >50%	Decline 25%-50%	Decline <25%	Increase <25%	Increase 25%-50%	Increase >50%	% Change In		Change In		Initial Wage	
								Mean Wages	Median Wages	Mean Wages	Median Wages	Mean Wages	Median Wages
<$1,000	---	---	---	---	---	---	---	---	---	$28,200	$20,200	$100	$0
Lowest	5%	8%	7%	13%	13%	8%	46%	79%	35%	$6,500	$3,000	$8,200	$8,600
Second	9%	12%	9%	22%	25%	10%	13%	-2%	-3%	-$300	-$500	$18,700	$18,700
Middle	6%	10%	8%	28%	34%	8%	6%	-7%	-2%	-$2,000	-$500	$29,700	$29,600
Fourth	4%	8%	7%	32%	39%	6%	3%	-6%	-1%	-$2,800	-$600	$43,700	$43,200
Highest	4%	8%	8%	33%	38%	6%	3%	-8%	-3%	-$7,400	-$1,800	$89,100	$71,500
All Females	**5%**	**9%**	**8%**	**26%**	**31%**	**8%**	**13%**	-1%	-2%	-$300	-$600	$29,600	$29,000

Notes: Real earnings changes. All dollar amounts adjusted to 2013 values using the CPI-U-RS. Earnings are W-2 wages and Sch. C income (divided by two if married filing jointly), bottom-coded at zero. The initial income less than $1,000 group is taken from the bottom quintile. Individuals excluded if no earnings in the initial and final years, or three-year average wages are less than $5,000, or died during the three-year period, or 25 years old or younger in the initial year of each three-year period.

Table 2: Individual Earnings Mobility by Employment and Individual Characteristics

Panel A: Male earnings mobility

								%Change In		Change In		Initial Earnings		
	No earnings	Decline >50%	Decline 25%-50%	Decline <25%	Increase <25%	Increase 25%-50%	Increase >50%	Mean Wages	Median Wages	Mean Wages	Median Wages	Mean Wages	Median Wages	Fraction of Males
Stay in Job	---	8%	7%	33%	35%	8%	10%	1%	0%	$900	$0	$65,100	$47,700	69%
Job Change	---	18%	12%	19%	19%	9%	24%	-2%	-3%	-$800	-$900	$47,100	$32,900	22%
Industry Change	---	21%	11%	17%	17%	8%	25%	-5%	-5%	-$2,100	-$1,500	$43,800	$30,000	20%
Move to different state	4%	17%	10%	18%	22%	9%	19%	2%	-3%	$900	-$1,400	$59,300	$40,200	4%
Unemp. insur: initial yr	8%	16%	9%	16%	17%	10%	23%	0%	3%	$0	$800	$33,700	$27,200	8%
Unemp. insur: second yr	12%	22%	12%	18%	15%	7%	13%	-26%	-26%	-$10,400	-$8,600	$40,000	$32,500	9%
Unemp. insur: final yr	8%	26%	16%	21%	13%	5%	10%	-29%	-32%	-$12,000	-$11,000	$41,900	$34,500	9%
Single, stays single	8%	16%	8%	23%	24%	7%	15%	-1%	-2%	-$200	-$600	$39,000	$30,500	34%
Married, stays married	4%	11%	8%	29%	31%	7%	10%	-2%	-3%	-$1,600	-$1,500	$69,400	$50,100	57%
Marriage	4%	20%	7%	21%	24%	9%	16%	13%	11%	$5,900	$3,900	$45,200	$35,200	5%
Divorce	15%	15%	8%	22%	21%	7%	13%	-4%	-14%	-$2,300	-$5,300	$55,700	$37,800	4%
Added first dependent	3%	10%	7%	24%	28%	10%	18%	9%	4%	$4,500	$1,500	$49,200	$36,500	2%
Added additional deps.	3%	11%	8%	25%	28%	9%	16%	6%	6%	$2,800	$2,200	$49,300	$35,700	1%

Panel B: Female earnings mobility

								% Change In		Change In		Initial Earnings		
	No earnings	Decline >50%	Decline 25%-50%	Decline <25%	Increase <25%	Increase 25%-50%	Increase >50%	Mean Wages	Median Wages	Mean Wages	Median Wages	Mean Wages	Median Wages	Fraction of Females
Stay in Job	---	7%	7%	30%	37%	8%	10%	1%	1%	$600	$300	$41,600	$33,500	71%
Job Change	---	18%	11%	18%	19%	9%	25%	1%	0%	$400	$0	$32,000	$24,000	21%
Industry Change	---	20%	11%	17%	17%	9%	27%	-1%	-2%	-$400	-$400	$30,200	$22,000	19%
Move to different state	6%	20%	12%	17%	19%	8%	18%	-4%	-13%	-$1,400	-$3,600	$38,000	$28,800	4%
Unemp. insur: initial yr	7%	15%	9%	15%	17%	10%	27%	5%	8%	$1,100	$1,500	$23,900	$19,000	6%
Unemp. insur: second yr	13%	23%	12%	17%	14%	7%	13%	-29%	-31%	-$8,500	-$7,400	$29,500	$23,800	7%
Unemp. insur: final yr	9%	27%	16%	19%	12%	5%	10%	-32%	-37%	-$9,800	-$9,400	$30,700	$25,200	7%
Single, stays single	5%	12%	8%	25%	30%	7%	13%	0%	-1%	-$100	-$400	$34,900	$28,100	41%
Married, stays married	5%	12%	8%	26%	30%	7%	13%	-1%	-3%	-$600	-$800	$40,000	$31,100	51%
Marriage	6%	19%	8%	21%	25%	7%	14%	5%	1%	$1,800	$400	$36,000	$30,100	4%
Divorce	10%	14%	7%	20%	24%	8%	18%	-3%	-1%	-$1,000	-$400	$34,900	$26,200	4%
Added first dependent	4%	12%	9%	22%	24%	9%	20%	3%	1%	$1,000	$100	$28,800	$22,800	2%
Added additional deps.	3%	12%	9%	23%	25%	9%	19%	7%	6%	$1,700	$1,400	$26,600	$21,800	1%

Notes: Real earnings changes. All dollar amounts adjusted to 2013 values using the CPI-U-RS. Earnings are W-2 wages and Sch. C income (divided by two if married filing jointly), bottom-coded at zero. Individuals excluded if no earnings in the initial and final years, or three-year average wages are less than $5,000, or died during the three-year period, or 25 years old or younger in the initial year of each three-year period.

Table 3: Regression Results for the Odds of a 25 Percent Increase or Decrease in Individual Earnings

	Men		Women	
	Decrease 25%	Increase 25%	Decrease 25%	Increase 25%
Variables	Odds Ratio	Odds Ratio	Odds Ratio	Odds Ratio
Age 25-29	0.94**	1.67**	1.33**	1.49**
Age 30-34	0.96*	1.51**	1.28**	1.38**
Age 35-39	0.97	1.25**	1.12**	1.27**
Age 40-44	0.98	1.12**	1.03	1.14**
Age 50-54	1.14**	0.89**	1.16**	0.87**
Age 55-59	1.52**	0.75**	1.56**	0.69**
Age 60-64	3.08**	0.51**	3.00**	0.46**
Age 65-69	3.17**	0.46**	3.29**	0.39**
Age >69	3.02**	0.35**	3.38**	0.32**
Student initial yr	0.77**	1.60**	0.79**	1.72**
Job Change	1.10**	1.66**	1.20**	1.63**
Change of job & Industry	1.71**	1.13**	1.61**	1.15**
Unemp. insur: initial yr	0.63**	2.41**	0.61**	2.46**
Unemp. insur: second yr	2.15**	0.60**	2.35**	0.57**
Unemp. insur: final yr	2.85**	0.49**	3.52**	0.42**
Move to different state	1.27**	1.26**	1.60**	1.16**
Diff state & married init yr	1.22**	1.17**	1.47**	0.77**
Married initial year	0.68**	1.30**	1.10**	1.09**
Marriage	0.80**	1.45**	1.45**	1.05
Divorce	2.15**	0.78**	1.25**	1.17**
Dependents initial yr	0.98	0.96*	1	0.96*
Added first dependent	0.71**	1.29**	0.98	1
Added additional deps.	0.80**	1.21**	0.86**	1.13*
Agriculture	0.84**	0.83**	1.01	0.91
Mining and Oil	1.17**	1.14**	0.99	1.21**
Utilities and Construction	0.92**	0.95*	0.91**	1.10**
FIRE & STEM	0.96**	1.23**	0.95**	1.29**
Education & Health	0.75**	1.16**	0.87**	1.19**
Entert., Accom. & Food	0.99	0.90**	1.05*	0.93**
Other Services	0.95*	1.01	0.99	1.05*
Public Admin	1.04	1	0.99	1.28*
Self-Employed	2.06**	1.11**	2.20**	1.12**
Control for starting centile	Yes	Yes	Yes	Yes
Control for initial year	Yes	Yes	Yes	Yes
Observations used	663,323	663,323	593,002	593,002
Fraction Decr./Incr. 25%	27%	24%	25%	24%

Notes: Dependent variables are two-year decrease or increase of at least 25 percent of individual earnings, where non-positive to positive changes in earnings are considered increases of at least 25 percent. Odds ratios of logistic regressions shown. Two-year earnings mobility, t to t+2, where t=1999-2009. Observations removed if less than 25 years old in the initial year. Earnings are W-2 wages and Sch. C income (divided by two if married filing jointly), bottom-coded at zero. Intercept, year dummies, and initial year centile dummies not shown. Number of children in 1999 and 2000 set to 2001 number due to missing data. Retail and Transportation industry code is excluded group and age 45-49 is excluded age group. Fraction with increases or decreases of at least 25% differ from Table 1 due to inclusion of individuals whose starting wages are under $1,000, who were considered separately in Table 1.
* denotes significant at 1% level. ** denotes significant at 0.1% level.
Source: Enhanced CWHS and authors' calculations.

Table 4: Regression Results for Individual Earnings Mobility from Life Events

	Men		Women	
Variables	Coefficient	Arc% Effect	Coefficient	Arc% Effect
Age 25-29	0.07**	7%	-0.10**	-10%
Age 30-34	0.03**	3%	-0.09**	-9%
Age 35-39	0.01	1%	-0.03**	-3%
Age 40-44	0.01	1%	-0.01	-1%
Age 50-54	-0.06**	-6%	-0.07**	-7%
Age 55-59	-0.23**	-23%	-0.22**	-22%
Age 60-64	-0.67**	-65%	-0.62**	-61%
Age 65-69	-0.75**	-73%	-0.76**	-73%
Age >69	-0.68**	-66%	-0.77**	-75%
Student initial yr	0.17**	17%	0.17**	17%
Job Change	0.38**	38%	0.29**	30%
Change of job & Industry	0	0%	0.02*	2%
Unemp. insur: initial yr	0.28**	28%	0.30**	30%
Unemp. insur: second yr	-0.67**	-65%	-0.77**	-74%
Unemp. insur: final yr	-0.29**	-29%	-0.43**	-43%
Move to different state	0.05**	5%	-0.08**	-8%
Diff state & married init yr	-0.15**	-15%	-0.33**	-33%
Married initial year	0.25**	25%	0.00	0%
Marriage	0.18**	18%	-0.14**	-14%
Divorce	-0.62**	-61%	-0.23**	-23%
Dependents initial yr	0.01	1%	0.03**	3%
Added first dependent	0.22**	22%	0.11**	11%
Added additional deps.	0.18**	18%	0.16**	16%
Agriculture	0.04*	4%	-0.01	-1%
Mining and Oil	-0.06**	-6%	0.03*	3%
Utilities and Construction	0.02*	2%	0.04**	4%
FIRE & STEM	0.01	1%	0.03**	3%
Education & Health	0.14**	14%	0.10**	10%
Entert., Accom. & Food	0.02	2%	0.00	0%
Other Services	0.02*	2%	0.03*	3%
Public Admin	-0.10*	-10%	-0.09*	-9%
Self-Employed	-0.11**	-11%	-0.21**	-21%
Control for starting centile	Yes	Yes	Yes	Yes
R-square	0.295		0.299	
Root MSE	1.490		1.438	
Mean of dependent variable	-0.125		-0.092	
Observations	659,563		590,273	

Notes: Dependent variables are two-year arc percent changes in individual earnings with logistic transformation, as described in the text. Two-year earnings mobility, t to t+2, where t=1999-2009. The column labeled "Arc% Eff." shows the arc percentage point effect calculated using (((EXP(b)/(1+EXP(b)))*202)–101)*0.02, where b is the coefficient. Observations removed if less than 25 years old in the initial year. Earnings are W-2 wages and Sch. C income (divided by two if married filing jointly), bottom-coded at zero. Intercept, year dummies, and initial year centile dummies not shown. Number of children in 1999 and 2000 set to 2001 number due to missing data. Retail and Transportation industry code is excluded industry group and age 45-49 is excluded age group.
* denotes significant at 1% level. ** denotes significant at 0.1% level.
Source: Enhanced CWHS and authors' calculations.

Table 5: Income Mobility in Tax Unit Income by Initial Income

Initial Income Quintile	Decline >50%	Decline 25%-50%	Decline <25%	Increase <25%	Increase 25%-50%	Increase >50%	%Change In		Change In		Initial Income	
							Mean Wages	Median Wages	Mean Size-adj. Income	Median Size-adj. Income	Mean Size-adj. Income	Median Size-adj. Income
<$1,000	---	---	---	---	---	---	---	---	$58,900	$24,200	-$7,600	$0
Lowest	4%	7%	23%	23%	9%	34%	60%	20%	$6,200	$2,100	$10,300	$10,600
Second	7%	10%	28%	27%	11%	16%	16%	3%	$3,400	$700	$21,800	$21,700
Middle	7%	11%	30%	32%	11%	9%	8%	1%	$2,700	$400	$35,500	$35,500
Fourth	6%	10%	34%	34%	9%	7%	4%	0%	$2,100	-$100	$53,200	$52,500
Highest	11%	14%	32%	28%	8%	7%	-8%	-5%	-$11,400	-$4,600	$147,100	$92,000
All	**7%**	**10%**	**29%**	**29%**	**9%**	**14%**	2%	1%	$900	$500	$53,500	$35,500

Notes: Two-year income mobility, t to t+2, where t=1999-2009. Real income changes shown. All dollar amounts adjusted to 2013 values using the CPI-U-RS. Tax unit incomes are size adjusted by dividing income by the square root of the number of people in the tax unit. Initial income less than $1,000 group taken from bottom quintile and positive to non-positive positive changes in earnings are considered decreases of at least 50 percent. Tax units excluded if no income in initial and final years, or three-year average incomes are less than $5,000, or died during the three-year period, or primary is 25 years old or younger in the initial year of each three-year period. *Source*: Enhanced CWHS panel and authors' calculations.

Table 6: Persistence of Tax Unit Income Gains and Losses

	Percent with Initial Shock by Initial Income Group *(from t to t+2)*					Percent with Persistent Shock Conditional on Initial Shock *(from t+2 to t+4)*				
	Lowest Quintile	Second Quintile	Middle Quintile	Fourth Quintile	Highest Quintile	Lowest Quintile	Second Quintile	Middle Quintile	Fourth Quintile	Highest Quintile
Decline >50%	4%	7%	7%	6%	11%	16%	22%	26%	30%	40%
Increase >50%	35%	17%	9%	7%	7%	45%	39%	32%	26%	22%
Decline >25%	10%	17%	17%	16%	25%	24%	31%	34%	36%	43%
Increase >25%	44%	28%	20%	16%	15%	46%	42%	38%	34%	30%

Notes: Initial shock is t to t+2 and persistent shock is t+2 to t+4, where t=1999-2007. All dollar amounts adjusted to 2013 values using the CPI-U-RS. Tax unit incomes are size adjusted by dividing income by the square root of the number of people in the tax unit. Tax units excluded if no income in initial and final years, or three-year average incomes are less than $5,000, or died during the three-year period, or primary is 25 years old or younger in the initial year of each three-year period. Quintiles set and then tax units with initial incomes below $1,000 are dropped.
Source: Enhanced CWHS panel and authors' calculations.

Table 7: Tax Unit Income Volatility by Employment and Family Characteristics

							%Change In		Change In		Initial Income		
	Decline >50%	Decline 25%-50%	Decline <25%	Increase <25%	Increase 25%-50%	Increase >50%	Mean Income	Median Income	Mean Income	Median Income	Mean Income	Median Income	Fraction of tax units
All Stay in Job	4%	9%	30%	35%	10%	11%	5%	3%	$2,600	$1,200	$55,600	$42,200	44%
Any Changes Job	11%	14%	22%	21%	11%	20%	2%	2%	$700	$500	$41,000	$29,200	14%
Primary Changes Industry	13%	14%	20%	19%	11%	24%	2%	3%	$800	$600	$33,800	$23,500	10%
State Change	13%	13%	22%	20%	11%	21%	9%	1%	$5,400	$400	$57,300	$36,900	4%
Unemp. insur: initial yr	12%	14%	23%	21%	11%	19%	-3%	0%	-$900	$0	$35,600	$26,400	6%
Unemp. insur: second yr	16%	18%	24%	18%	9%	14%	-12%	-14%	-$4,500	-$4,100	$37,800	$29,000	6%
Unemp. insur: final yr	14%	19%	26%	18%	8%	14%	-7%	-14%	-$2,800	-$4,100	$37,900	$29,300	7%
No Change in # of Workers	6%	9%	31%	31%	10%	13%	3%	2%	$1,600	$900	$54,000	$36,300	87%
Add worker	7%	8%	15%	20%	13%	37%	26%	35%	$10,800	$7,800	$40,900	$22,500	5%
Drop worker	26%	22%	23%	13%	6%	10%	-24%	-29%	-$12,900	-$9,600	$54,100	$32,900	6%
Single, stays single	8%	10%	30%	28%	9%	15%	2%	2%	$900	$500	$39,000	$26,400	52%
Married, stays married	6%	10%	30%	31%	10%	12%	1%	0%	$700	$200	$72,300	$47,600	42%
Marriage	11%	14%	18%	17%	12%	29%	9%	17%	$4,400	$5,600	$50,400	$33,400	3%
Divorce	16%	15%	19%	17%	11%	21%	5%	-7%	$2,100	-$2,200	$46,000	$31,500	3%
Added first dependent	16%	32%	27%	10%	5%	10%	-22%	-24%	-$11,900	-$9,700	$55,100	$40,000	4%
Added additional deps.	11%	25%	34%	14%	6%	10%	-15%	-18%	-$7,200	-$6,000	$48,200	$34,100	7%

Notes: Two-year income mobility, t to t+2, where t=1999-2009. *Real income changes shown. All dollar amounts adjusted to 2013 values using the CPI-U-RS. Tax unit incomes are size adjusted by dividing income by the square root of the number of people in the tax unit. Tax units excluded if no income in initial and final years, or three-year average incomes are less than $5,000, or died during the three-year period, or primary is 25 years old or younger in the initial year of each three-year period. P*ositive to non-positive positive changes in earnings are considered decreases of at least 50 percent
Source: Enhanced CWHS panel and authors' calculations.

Table 8: Regression Results for the Odds of a 25 Percent Increase or Decrease in Tax Unit Income

	Decrease 25%	Increase 25%
Variables	Odds Ratio	Odds Ratio
Age 25-29	1.02	1.41**
Age 30-34	1.03*	1.19**
Age 35-39	1.02	1.09**
Age 40-44	1.00	1.04**
Age 50-54	1.01	0.97*
Age 55-59	1.14**	0.97
Age 60-64	1.34**	1.17**
Age 65-69	1.29**	1.10**
Age >69	1.12**	0.93**
Either filer student initial yr	0.81**	1.49**
Either filer changes jobs	1.57**	1.35**
Unemp. insur: initial yr	1.00	1.36**
Unemp. insur: second yr	1.57**	0.71**
Unemp. insur: final yr	1.53**	0.81**
Either filer retired initial yr	0.81**	0.60**
Either filer retires	2.01**	1.17**
Add one worker	0.87**	2.31**
Drop one worker	5.16**	0.45**
Move to different state	1.47**	1.28**
Diff state & Married init yr	1.03	1.01
Married initial year	0.67**	1.32**
Marriage	0.68**	3.80**
Divorce	3.44**	0.94**
Children: 1st yr	1.08**	0.75**
Added first child	4.96**	0.37**
Added additional children	0.69**	3.85**
Female primary	1.03**	0.96**
CZ Avg. Wage Change	0.97**	1.03**
CZ Unemp. Rate Change	1.05**	0.97**
Control for starting centile	Yes	Yes
Observations used	1,325,727	1,325,727
Fraction Decr./Incr. 25%	18%	18%

Notes: Dependent variables are two-year decrease or increase of at least 25 percent of size-adjusted tax unit income, where non-positive to positive changes in earnings are considered increases of at least 25 percent. Odds ratios of logistic regressions shown. Two-year income mobility, t to t+2, where t=1999-2009. Observations removed if primary less than 25 years old in the initial year. Income definition described in text. Intercept, year dummies, and initial year centile dummies not shown. Ages are based on the primary tax filer, and ages 45-49 are the excluded age group. Fraction with increases or decreases of at least 25% differ from Table 5 due to inclusion of individuals whose starting income is under $1,000, who were considered separately in Table 5.
* denotes significant at 1% level. ** denotes significant at 0.1% level.
Source: Enhanced CWHS and authors' calculations.

Table 9: Regression Results for Tax Unit Income Mobility from Life Events

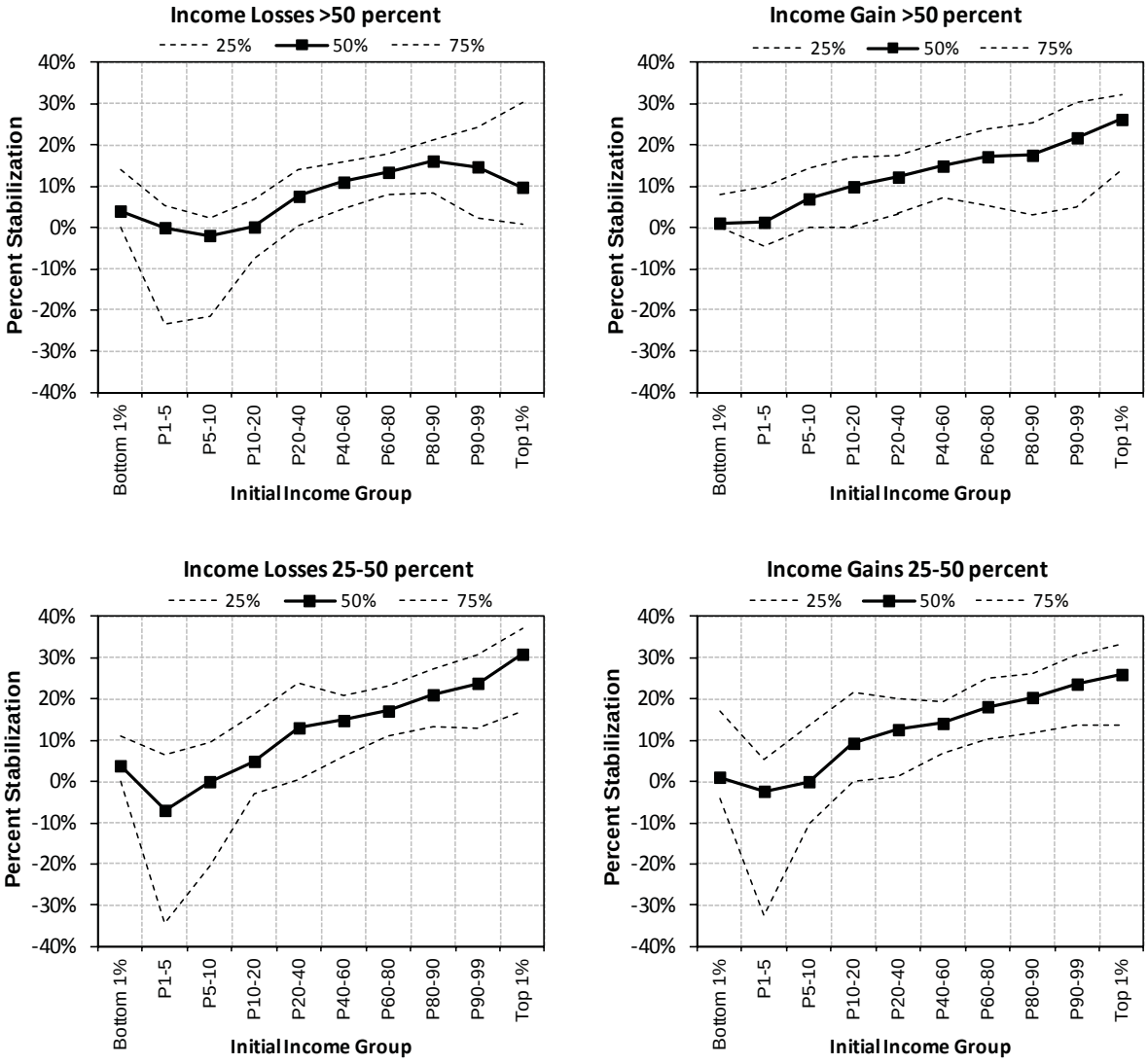
Variables	Coefficient	Arc%. Eff.
Age 25-29	0.02**	3%
Age 30-34	0.01*	1%
Age 35-39	0.00	0%
Age 40-44	0.00	0%
Age 50-54	0.00	0%
Age 55-59	-0.01**	-1%
Age 60-64	-0.01**	-1%
Age 65-69	-0.01*	-1%
Age >69	0.00	0%
Either filer student initial yr	0.09**	9%
Either filer changes jobs	-0.03**	-3%
Unemp. insur: initial yr	0.02**	2%
Unemp. insur: second yr	-0.11**	-11%
Unemp. insur: final yr	-0.05**	-5%
Either filer retired initial yr	-0.04**	-4%
Either filer retires	-0.09**	-9%
Add one worker	0.09**	9%
Drop one worker	-0.47**	-47%
Move to different state	-0.04**	-4%
Diff state & Married init yr	0.00	0%
Married initial year	0.11**	12%
Marriage	0.25**	25%
Divorce	-0.19**	-19%
Children: 1st yr	-0.05**	-5%
Added first child	-0.27**	-27%
Added additional children	0.15**	15%
Female primary	-0.01**	-1%
CZ Avg. Wage Change	-0.01**	-1%
CZ Unemp. Rate Change	-0.02**	-2%
Control for starting centile	Yes	Yes
R-square	0.320	
Root MSE	0.635	
Mean of dep variable	0.020	
Observations used	1,325,727	

Notes: Dependent variables are two-year arc percent changes in tax unit incomes with logistic transformation, as described in the text. Two-year income mobility, t to t+2, where t=1999-2009. The column labeled "Arc% Eff." shows the arc percentage point effect calculated using (((EXP(b)/(1+EXP(b)))*202)–101)*0.02, where b is the coefficient. Income definition described in text. Observations removed if less than 25 years old in the initial year. Intercept, year dummies, and initial year centile dummies not shown. Ages are based on the primary tax filer, and ages 45-49 are the excluded age group.

* denotes significant at 1% level. ** denotes significant at 0.1% level.

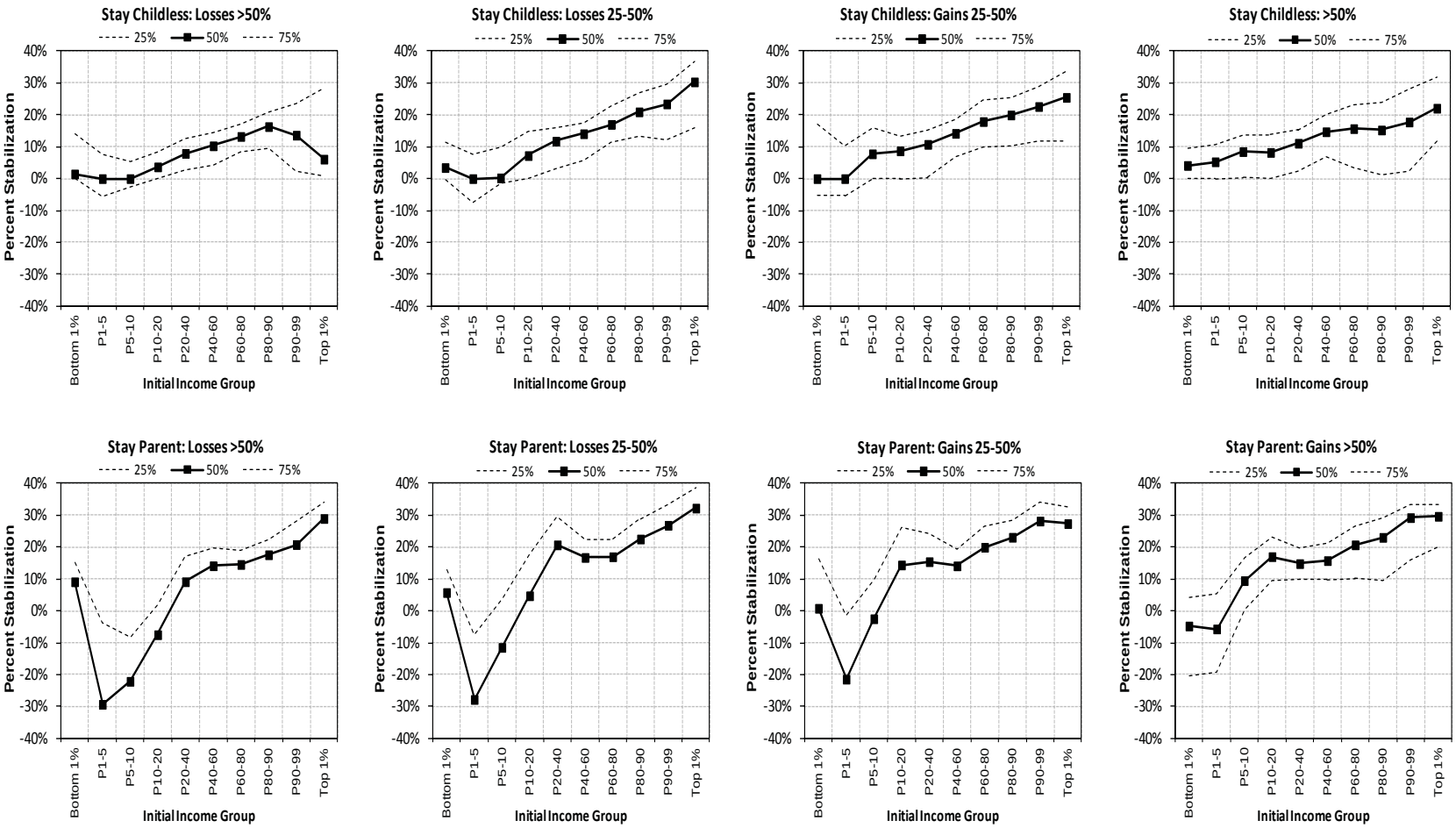
Source: Enhanced CWHS and authors' calculations.

Figure 1: Stabilization of Income from Federal Income Taxes



Source: Enhanced CWHS panel and authors' calculations.

Figure 2: Stabilizing Effect of Federal Income Taxes by Parental Status



Source: Enhanced CWHS panel and authors' calculations.