# Income and Earnings Mobility in U.S. Tax Data

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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 pre-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 tax units experiencing income changes of this magnitude. Male and female labor income mobility patterns are remarkably similar, though marriage is associated with earnings gains among men, but is associated with modest earnings declines 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.

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## I. Introduction

Individual and family income varies over time. This variation is often correlated with major life events. Some events – promotions, new jobs, or marrying another wage earner – are associated with substantial income gains. Others – such as job losses or divorces – are associated income declines. In this paper, we analyze the likelihood and expected magnitude of intragenerational income mobility, and estimate the correlation between various life events and observed mobility patterns.

Decomposing mobility patterns is important as policymakers consider the appropriate interpretation of mobility patterns. For example, if most upward mobility comes through marriage or new entrants into the labor market within a family, this presents a different picture of mobility than if the same level of mobility is observed through wage gains achieved from labor market advancements. Tracking individuals and families over time can offer additional context to the inequality discussions which often focus on single year cross-sections. 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 experiencing upward or downward mobility.

The majority 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).[1] 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

[1] 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).

Berntsen, 1998; Solon, 1992).[2] Top-coding, non-response, and misreporting in the tails of the distribution may also distort extreme incomes (Bollinger et al. 2014), which adds further uncertainty to estimates of mobility from survey data.

Recognizing the issues with survey-based mobility data, in this paper we use a panel of tax return data compiled from restricted access Internal Revenue Service (IRS) administrative records from 1999 through 2011. Using this data, we first explore determinants of trends for individual wage earnings, such as wage growth within a job, employment changes within an industry, or changing jobs into a new industry. Next, we examine variation in family income, where we proxy for families using tax units: those individuals appearing on the same tax return.[3] We estimate how life transitions such as marriage, divorce, job changes, or geographic mobility contribute to the observed mobility levels of tax units. Finally, we explore how federal taxes and tax credits affect mobility patterns – either by alleviating or accentuating the hardship from downward mobility or by reducing or accelerating the gains from upward mobility.

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 (see, e.g. Chetty, Hendren, Kline, and Saez, 2014; Auten, Gee, and Turner, 2013; and Kopczuk, Saez, and Song, 2010). But 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, and no previous research has used administrative tax data to consider how taxes interact with mobility. We also

[2] 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.
[3] 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)

add to the literature by analyzing W-2 data linked to tax returns. These data allow us to estimate employment-based life transitions for individuals or families, something prior tax-return based research has not considered.

We observe that almost half of working adults experience a change in earnings of at least 25 percent over a two year period, which is in-line with findings by the Congressional Budget Office (2008) using Social Security Administration and Survey of Income and Program Participation (SIPP) data. 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. We also observe that marriage has a positive impact on individual labor earnings mobility for men, while it has a negative impact on individual labor earnings mobility for women.

When considering a broader definition of total tax unit income, the overall levels of mobility are similar – suggesting that the 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, although mobility is not limited to these families. 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 Earned Income Tax Credit (EITC). This supports the findings of 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

*Individual Panel*

We draw a 0.1 percent random sample of individuals from the IRS Statistics of Income (SOI) Databank, which is an individual level panel containing every person with a taxpayer identification number who was born before 2012 and had not died by 1996. For each individual, the SOI Databank includes data originating from Form 1040 (marital status, number of dependents, and Schedule C income), Form W-2 (wages and employer identifiers), Form 1099-G (unemployment insurance), and the Death Master File (sex and year of birth). We also merge data from Form 1098-T (university student status). This panel is an individual level sample, which we use when analyzing individual labor earnings mobility.

*Tax Unit Panel (Enhanced CWHS)*

To analyze tax unit incomes, we produce and analyze an enhanced version of the IRS Continuous Work History Sample panel (CWHS) from 1999 to 2011. The conventional CWHS panel is commonly used by researchers using tax return data. It includes all tax returns whose primary filer's Taxpayer Identification Number (TIN) has the last four digits matching one of ten combinations, which represents approximately 0.1 percent of all tax returns filed each year.

Because TINs are time-invariant for each individual, any individual with a CWHS qualifying TIN tends to remain in the panel over time. Individuals drop out of the panel in a given year if they fail to file a tax return or are listed second on a joint return, and can exit permanently if they emigrate or die. However, each annual cross-section of the conventional CWHS panel remains representative of the filing population, as new taxpayers with CWHS qualifying TINs enter the panel when they file tax returns.

While the conventional CWHS data is a valuable resource for tracking individuals over time, we make three significant improvements to address known limitations of the data. First, we correct the substantial male bias that has been found in the panel (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, men are over-sampled when following individuals over time. To address this limitation, we retrieve joint tax returns that list CWHS qualifying TINs as secondary filers from the *universe* of federal income tax returns using the IRS Compliance Data Warehouse (CDW).[4] 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.[5] Employers, financial institutions, and government agencies file information returns with the IRS detailing wage income (Form W-2), Social Security income (Form SSA-1099), unemployment income (Form 1099-G), interest (Form 1099-

[4] Including these additional returns leads to an oversampling of joint filers. To correct for this, we randomly drop about 5 percent of CWHS qualifying TINs such that the fraction of joint filers in our sample approximates that from the actual population.
[5] The restriction that individuals file at least once rarely binds, both because few people never file a tax return over a 12 year period and because the 2008 Stimulus Tax Rebate incentivized filing for those who otherwise would not have filed a return. The number of tax returns are consistent with those reported by the IRS, and our observation counts – inclusive of non-filers – are similar to Heim, Lurie and Pearce (2014) which are also similar to Census population counts for the adult population. Further details on these comparisons are available upon request from the authors.

INT), dividends (Form 1099-DIV), retirement saving distributions (Form 1099-R), and miscellaneous income (Form 1099-MISC). 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.

Finally, a limitation of earlier research using the conventional CWHS data is that it only captures information reported directly on tax returns, which provides no information about employers or the split of wage income between spouses. However, by linking tax records in the CWHS to other tax forms, like the Form W-2, we are able to separately observe employment information for each individual, including wages, job changes, and industry of employment.

*Income Definitions*

Both individual labor earnings and the total income of the tax unit are considered in this analysis. Individual labor earnings are defined here as wages and salaries from Form W-2, and self-employment income from Schedule C of Form 1040).[6] Tax-unit income is size-adjusted total cash income, excluding capital gains.[7] This includes wages and salaries, taxable and tax-exempt interest, dividends, alimony, net business income, gross IRA distributions, gross pensions, gross Social Security benefits, rental income, farm income, unemployment compensation, and other income reported on line 21 of Form 1040. We then remove alimony payments, capital gains, and the deductible half of the self-employment tax. Although non-reported cash and in-kind transfers are excluded, this definition includes Social Security and unemployment income, which are two

[6] Self-employment income is reported at the tax-unit level in the CDW data, and is not separated by individual. We assume that self-employment earnings are split evenly between spouses for jointly filed returns. Self-employment income for individuals only includes what is reported on Schedule C on the Form 1040, whereas self-employment income for the tax unit includes both Schedule C income and Schedule E income.

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

of the largest transfer programs and represent over 80 percent of cash transfer income (Larrimore, Burkhauser, and Armour, 2015). This income definition is similar to that used by Auten and Gee (2009) and by Auten, Gee, and Turner (2013).

Tax liabilities are net of tax credits. The earned income and child credits are refundable, and as a result tax liabilities can be positive or negative. Post-tax income is calculated as pre-tax income (including capital gains) minus net tax liabilities.[8] Tax liabilities are limited to federal income taxes and exclude state and local tax payments as well as payroll taxes.

*Sample Restrictions*

Similar to most previous studies on income mobility, we restrict the sample in order to avoid including mobility from 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 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.

## III. Individual Earnings Mobility

*Overview of individual earnings mobility patterns*

We begin our analysis by examining changes in individual labor earnings over time. One trend is particularly clear: a large fraction of the population experiences substantial earnings

[8] Although we prefer to exclude capital gains since many gains represent the timing of realizations rather than persistent income (see Armour, Burkhauser, and Larrimore, 2014), capital gains are included here since these gains impact reported tax liabilities.

mobility in 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*).

**[INSERT TABLE 1 ABOUT HERE]**

Only fifty-six percent of working men have earnings within 25 percent of their earnings from two years prior. One-fifth have at least 25 percent more earnings and just under one-quarter earned at least 25 percent less (or have no earnings at all).[9] This volatility occurs at all earnings levels, although the frequency of substantial mobility, and particularly upward mobility, is largest for those starting at the bottom of the distribution. Nearly half of those in the bottom earnings quintile have at least a 25 percent increase in their earnings, whereas only 10 to 13 percent of those in the upper three quintiles have this level of upward earnings mobility.

These patterns are remarkably similar among women. Forty-three percent of women experience earnings changes of at least 25 percent over the two-year period and twenty-seven percent experience a change of at least a 50 percent. Additionally, similar to that seen for men, female earnings mobility is greatest for the lowest quintile of the distribution. Nevertheless, the top three quintiles are still experiencing substantial absolute mobility, with roughly one-third experiencing earnings changes in excess of 25%.

*Contributing factors to labor earnings mobility*

To assess what factors are most associated with large earnings movements, Table 2

[9] 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.

displays the earnings mobility patterns of men and women by employment and individual characteristics. For both genders, changing jobs, changing industries, and moving to a different state are each associated with higher levels of absolute earnings mobility. Sixty-four percent of men switching jobs experience an earnings change of at least 25 percent, while only thirty-three percent of all men remaining in the same job experience a similar change. Similarly, sixty-six percent of men switching industries experience a large absolute change in earnings. Female wage earners exhibit similar patterns.

**[INSERT TABLE 2 ABOUT HERE]**

The evidence on the impact of job changes on income mobility is mixed, and hinges critically on whether an observed job change results from a displacement or a voluntary job change. 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 do not separately observe voluntary or involuntarily changes in the data. Similarly, we do not find a clearly dominant direction for large earnings swings among those who change jobs, although both job changer and industry changers are slightly more likely to experience substantial upward than downward mobility.

Earnings mobility also varies with family life events, and exhibits greater variation between males and females. Perhaps unsurprisingly, both men and women who move across state lines are likely to experience a large earnings change. But, in what may be reflective of who is leading the move, in the event of a move to a new state women are more likely to experience a large downward swing in their earnings (38 percent of whom have at least a 25 percent earnings decline) than men are (32 percent).

We also find evidence suggesting marriage improves the earnings trajectory of male

workers more than female workers. Marriage is associated with large median gains in male earnings (11%), but approximately no change in female earnings (1%). Similarly, men who get divorced one or two years after the initial year fare worse than women. Thirty-eight percent of these men have a 25 percent drop in earnings, whereas only 31 percent of women who get divorced have an earnings decline of this magnitude.

*Regression Analyses*

A limitation of the comparisons above is that they cannot separate the relationship between multiple variables of interest. In this section we use regression analysis to control for covariates, including life cycle effects (using five year age bins), starting centile in the income distribution, and the year of observation (using year dummies).

Table 3 considers which factors are correlated with large income changes, with binary dependent variables that indicate whether the individual experienced a 25 percent increase or decrease in their labor earnings over the two year period. The 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 a reduced likelihood of experiencing such an earnings shift.

**[INSERT TABLE 3 ABOUT HERE]**

The regression results support many of the conclusions drawn from the summary statistics in Table 2. After controlling for individual level characteristics, changing jobs is still associated with higher levels of earnings mobility, with a more pronounced increase in the odds of upward mobility. Changing industry is similarly associated with greater occurrences of mobility, although with a larger increase in the probability of moving down in the distribution.

We also observe that even though these regressions focus exclusively on individual

earnings, family dynamics matter, and again, marriage has a differential impact on men and women. 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, on the other hand, 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 substantial upward mobility.

Recognizing that one's industry of occupation may impact mobility patterns, we include in these regressions the one-digit NAICS code associated of the individual's employer in year *t* ("retail trade and transportation" code is the excluded baseline category). Men working in agriculture are much less likely than those in retail or other industries to experience large earnings shocks *ceteris paribus*, as are men working in construction or utilities. In contrast, health and education workers and FIRE and STEM (finance, investment, real estate, science, technology, engineering, and math) workers of both genders were disproportionately likely to experience large earnings gains and much less likely to experience large earnings declines.

In order to further assess how the employment events and individual circumstances considered impact average earnings changes, 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.[10] We then follow Auten and Gee's

[10] The arc percent change equal $2*(x_{final} - x_{initial})/(x_{final} + x_{initial})$. 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.

(2009) approach of transforming earnings into a logistic scale in order to perform a logistic regression. This approach addresses 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), rather than a range of (-2, 2) and those with no earnings mobility have a dependent variable with a value of one half. We also slightly adjust their 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 for men (columns 1 and 2) and women (columns 3 and 4) are presented in Table 4. Among both genders, changing jobs is associated with positive earnings growth – although the effect is somewhat larger for men (38 arc-percent) than for women (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 greater levels of upward mobility 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 earnings growth, with almost no additional impact from industry changes for men and a small positive effect for women.

**[INSERT TABLE 4 ABOUT HERE]**

As was seen in the earlier regression for large earnings changes, working in education and healthcare fields exhibited the greatest positive impact on upward wage mobility for both genders. 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 less average wage growth (or larger declines) than those working in other industries during this period.

As was seen in Table 3 for large earnings swings, the results of this regression demonstrate the importance of family dynamics for individual earnings mobility. Men who get married, on average, experience earnings growth, while women who get married 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. Moving to new states, on the other hand, has a negative impact on the earnings trajectory of women 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 slower 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 further explore the mobility of family resources by shifting the unit of analyses from individuals to families and considering the size-adjusted income mobility of the tax unit (individuals who file a tax return together) rather than individual earnings mobility.

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, with forty-two percent of tax units experiencing an income change of at least 25 percent over the course of two years. When comparing family income mobility to the individual earnings mobility from Table 1, it appears that families do offer a level of stability, since severe income declines are less frequent than 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 saw their incomes fall this much.

**[INSERT TABLE 5 ABOUT HERE]**

Examining levels of income mobility at various starting income levels, 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 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 below or 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.

**[INSERT TABLE 6 ABOUT HERE]**

Table 7 displays how the frequency of large earnings changes differs based on family characteristics. This is important, since to the extent that mobility comes from changes in the number of workers it 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. 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), twenty-three percent of tax units with no change in the number of workers experienced substantial upward mobility. This matches the level

of upward mobility for the general population, indicating that 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.

**[INSERT TABLE 7 ABOUT HERE]**

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 (of the primary-filer) 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.

**[INSERT TABLE 8 ABOUT HERE]**

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 observed for 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.

**[INSERT TABLE 9 ABOUT HERE]**

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 dual 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 are closely tied to effective marginal tax rates, which are impacted by tax 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), and standard deductions and exemptions. 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, 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 with higher marginal tax rates will experience greater levels of income stabilization. This marginal tax rate is impacted both by the individual's tax bracket and the phase-in and phase-out of credits and exemptions described above.

The direction of the income change is important when considering the practical effect of income stabilization from taxes. The stabilizing impact of taxes is a positive feature for tax units experiencing a negative income shock, as the decline in tax liabilities offsets income losses and cushions the decline. However, the reverse is true for positive income shocks, as the increase in

tax liabilities offsets income gains.

*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 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 second 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 25 percent.

**[INSERT FIGURE 1 ABOUT HERE]**

A key asymmetry appears among tax units near the bottom of the income distribution, particularly when looking at the 25$^{th}$ and 75$^{th}$ 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 slight accentuation of their pre-tax income loss when incorporating taxes, while 25 percent have at least one-fifth of their losses accentuated by taxes. This is because tax units in the phase-in range of the EITC that experience large, negative income shocks often lose their earned income and/or refundable child tax credits, thus exacerbating their market income decline.

In contrast, tax units in the bottom decile whose pre-tax income increases by at least 50 percent are likely to experience relatively modest stabilization from the tax code (top right of

Figure 1) and their post-tax income will increase by less than their pre-tax income. Unlike tax units in this range who have income losses, large gains 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 taxes magnify the income decline. However, if their market income rises, 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.

*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.

**[INSERT FIGURE 2 ABOUT HERE]**

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, and the significantly smaller EITC for childless families. However, among parents, changes in tax liabilities accentuate both moderate and large income losses for those in the bottom quintile of the income distribution. This is consistent with the findings of Bitler, Hoynes, and Kuka (2014):

the EITC may be successful at encouraging work, but 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 (p5-p10) and by the second decile taxes return to offsetting most moderate large income gains.

## VI. Conclusion

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. However, incomes quickly return towards their original level, with only about a third of family incomes persisting at these new levels after a subsequent two years.

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 and women working in education, healthcare, FIRE, or STEM industries are the most likely to experience 25 percent earnings growth over a two year period. There also are differences in the relationship between individual earnings and family status by gender, with marriage having a positive impact on earnings mobility for men but not for women.

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 one-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 approximately one-seventh of tax units who had no change in the number of 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. One-quarter of tax units who started in the bottom decile that 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 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 final earnings | Decline >50% | Decline 25%-50% | Decline <25% | Increase <25% | Increase 25%-50% | Increase >50% | % Change In Mean Wages | % Change In Median Wages | $ Change In Mean Wages | $ Change In Median Wages | Initial Wage Mean Wages | Initial Wage 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 final earnings | Decline >50% | Decline 25%-50% | Decline <25% | Increase <25% | Increase 25%-50% | Increase >50% | % Change In Mean Wages | % Change In Median Wages | $ Change In Mean Wages | $ Change In Median Wages | Initial Wage Mean Wages | Initial Wage 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*: All dollar amounts adjusted to 2013 values using the CPI-U-RS. Earnings are W-2 wages and Schedule C income (divided by two if married filing jointly), bottom-coded at zero. The initial income less than $1,000 group is removed from the bottom quintile. Individuals are excluded if they have no earnings in the initial and final years, three-year average earnings less than $5,000, die during the three-year period, or are 25 years old or younger in the initial year of each three-year period. The initial earnings less than $1,000 group, about 4 percent of men and women, is removed from the bottom quintile.

## Table 2: Individual Earnings Mobility by Employment and Individual Characteristics

*Panel A: Male earnings mobility*

| | | | | | | | | % Change In | | Initial Earnings | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No final earnings | Decline >50% | Decline 25%-50% | Decline <25% | Increase <25% | Increase 25%-50% | Increase >50% | Mean Earnings | Median Earnings | Mean | Median | Fraction of Males |
| Stay in Job | --- | 8% | 8% | 32% | 35% | 8% | 10% | 2% | 0% | $64,900 | $47,400 | 69% |
| Job Change | --- | 19% | 12% | 19% | 18% | 9% | 24% | -3% | -4% | $45,600 | $31,800 | 22% |
| Industry Change | --- | 21% | 11% | 17% | 17% | 8% | 25% | -5% | -5% | $43,800 | $30,000 | 20% |
| Move to different state | 4% | 17% | 10% | 18% | 22% | 9% | 19% | 2% | -3% | $59,300 | $40,200 | 4% |
| Unemp. insur: initial yr | 8% | 16% | 9% | 16% | 17% | 10% | 23% | 0% | 3% | $33,700 | $27,200 | 8% |
| Unemp. insur: second yr | 12% | 22% | 12% | 18% | 15% | 7% | 13% | -26% | -26% | $40,000 | $32,500 | 9% |
| Unemp. insur: final yr | 8% | 26% | 16% | 21% | 13% | 5% | 10% | -29% | -32% | $41,900 | $34,500 | 9% |
| Single, stays single | 8% | 16% | 8% | 23% | 24% | 7% | 15% | -1% | -2% | $39,000 | $30,500 | 34% |
| Married, stays married | 4% | 11% | 8% | 29% | 31% | 7% | 10% | -2% | -3% | $69,400 | $50,100 | 57% |
| Marriage | 4% | 20% | 7% | 21% | 24% | 9% | 16% | 13% | 11% | $45,200 | $35,200 | 5% |
| Divorce | 15% | 15% | 8% | 22% | 21% | 7% | 13% | -4% | -14% | $55,700 | $37,800 | 4% |
| Added first dependent | 3% | 10% | 7% | 24% | 28% | 10% | 18% | 9% | 4% | $49,200 | $36,500 | 2% |
| Added additional deps. | 3% | 11% | 8% | 25% | 28% | 9% | 16% | 6% | 6% | $49,300 | $35,700 | 1% |

*Panel B: Female earnings mobility*

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

*Notes*: All dollar amounts adjusted to 2013 values using the CPI-U-RS. Earnings are W-2 wages and Schedule C income (divided by two if married filing jointly), bottom-coded at zero. Individuals are excluded if they have no earnings in the initial and final years, three-year average earnings less than $5,000, die during the three-year period, or are 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* | 1.00 | 0.96* |
| Added first dependent | 0.71** | 1.29** | 0.98 | 1.00 |
| 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 binary variables indicating a 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 from logistic regressions are reported. Income mobility is measured from *t* to *t+2*, where t=1999-2009. Observations are removed if the individual is 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 are not shown. Number of children in 1999 and 2000 set to 2001 number due to missing data. Retail and Transportation industry code is the excluded industry group and age 45-49 is excluded age group. The 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 | 0.00 | 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. Income mobility is measured from *t* to *t+2*, where t=1999-2009. The column labeled "Arc% Eff." displays the arc percentage point effect calculated using (((EXP(b)/(1+EXP(b)))*202)–101)*0.02, where b is the coefficient. Observations are removed if the individual is 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 are not shown. Number of children in 1999 and 2000 set to 2001 number due to missing data. Retail and Transportation industry code is the excluded industry group and age 45-49 is the 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 Mean Income | %Change In Median Income | Initial Size-adjusted Income Mean | Initial Size-adjusted Income Median |
|---|---|---|---|---|---|---|---|---|---|---|
| <$1,000 | --- | --- | --- | --- | --- | --- | --- | --- | -$7,600 | $0 |
| Lowest | 4% | 7% | 23% | 23% | 9% | 34% | 60% | 20% | $10,300 | $10,600 |
| Second | 7% | 10% | 28% | 27% | 11% | 16% | 16% | 3% | $21,800 | $21,700 |
| Middle | 7% | 11% | 30% | 32% | 11% | 9% | 8% | 1% | $35,500 | $35,500 |
| Fourth | 6% | 10% | 34% | 34% | 9% | 7% | 4% | 0% | $53,200 | $52,500 |
| Highest | 11% | 14% | 32% | 28% | 8% | 7% | -8% | -5% | $147,100 | $92,000 |
| **All** | **7%** | **10%** | **29%** | **29%** | **9%** | **14%** | 2% | 1% | $53,500 | $35,500 |

*Notes:* Income mobility is measured from *t* to *t+2*, where t=1999-2009. 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 with initial income less than $1,000 are removed from the bottom quintile and positive to non-positive positive changes in earnings are considered decreases of at least 50 percent. Tax units are excluded if they have no income in the initial and final years, three-year average incomes less than $5,000, the primary dies during the three-year period, or the 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 shocks are measured from t to t+2, and persistent shocks are t+2 to t+4, where t=1999-2007. All dollar amounts are 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 are excluded if they have no income in the initial and final years, three-year average incomes less than $5,000, the primary dies during the three-year period, or the primary is 25 years old or younger in the initial year of each three-year period. Quintiles are set before 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**

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

*Notes:* Income mobility is measured from *t* to *t+2*, where t=1999-2009. All dollar amounts are 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 are excluded if they have no income in the initial and final years, three-year average incomes less than $5,000, the primary dies during the three-year period, or the primary is 25 years old or younger in the initial year of each three-year period. Positive 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 decreases or increases 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 are shown. Income mobility is measured from *t* to *t+2*, where t=1999-2009. Observations are removed if primary less than 25 years old in the initial year. The income definition is 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. The 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**

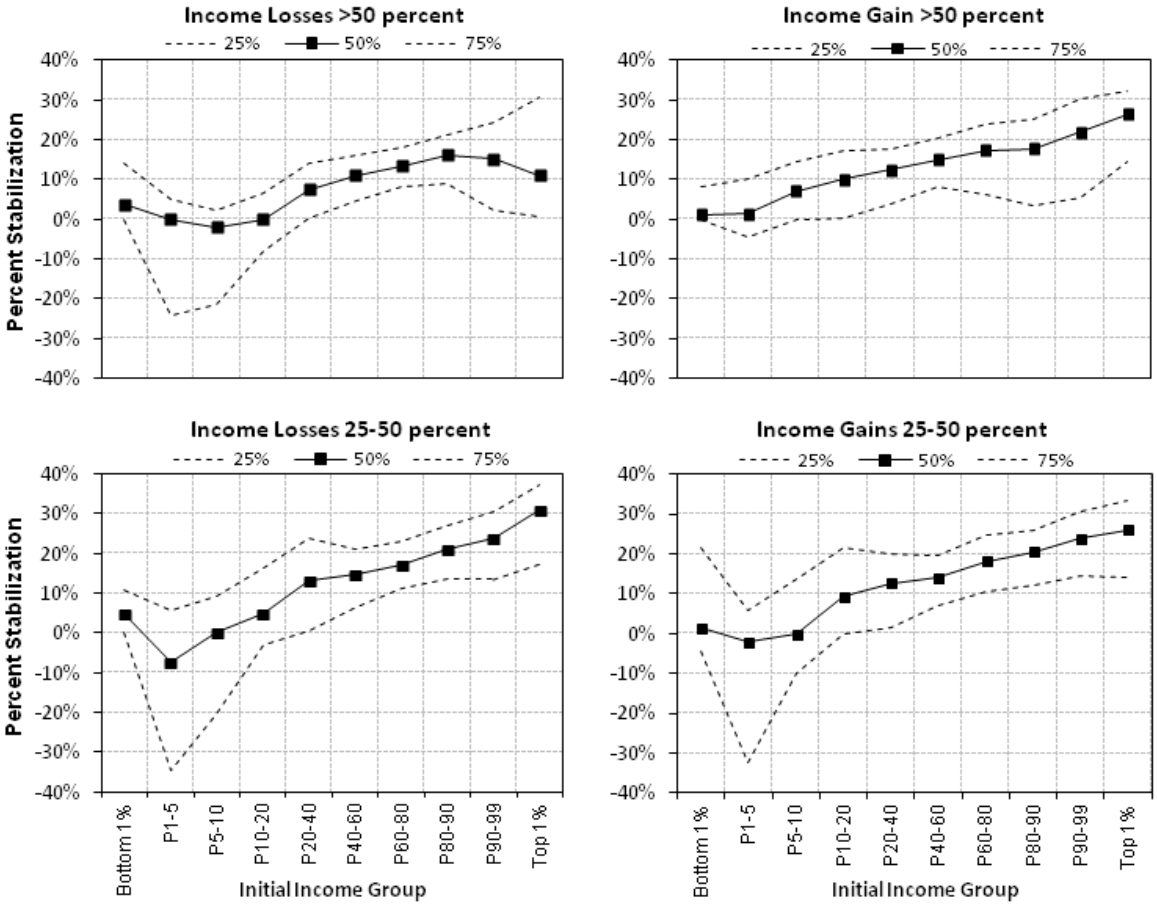
| Variables | Coefficient | Arc%. Eff. |
|---|---|---|
| Age 25-29 | 0.02** | 3% |
| Age 30-34 | 0.01* | 1% |
| Age 35-39 | 0.00 | 0% |
| Age 40-44 | 0.00 | 0% |
| Age 50-54 | 0.00 | 0% |
| Age 55-59 | -0.01** | -1% |
| Age 60-64 | -0.01** | -1% |
| Age 65-69 | -0.01* | -1% |
| Age >69 | 0.00 | 0% |
| 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. Income mobility is measured from *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. The income definition is described in text. Observations are removed if less than 25 years old in the initial year. Intercept, year dummies, and initial year centile dummies are 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.

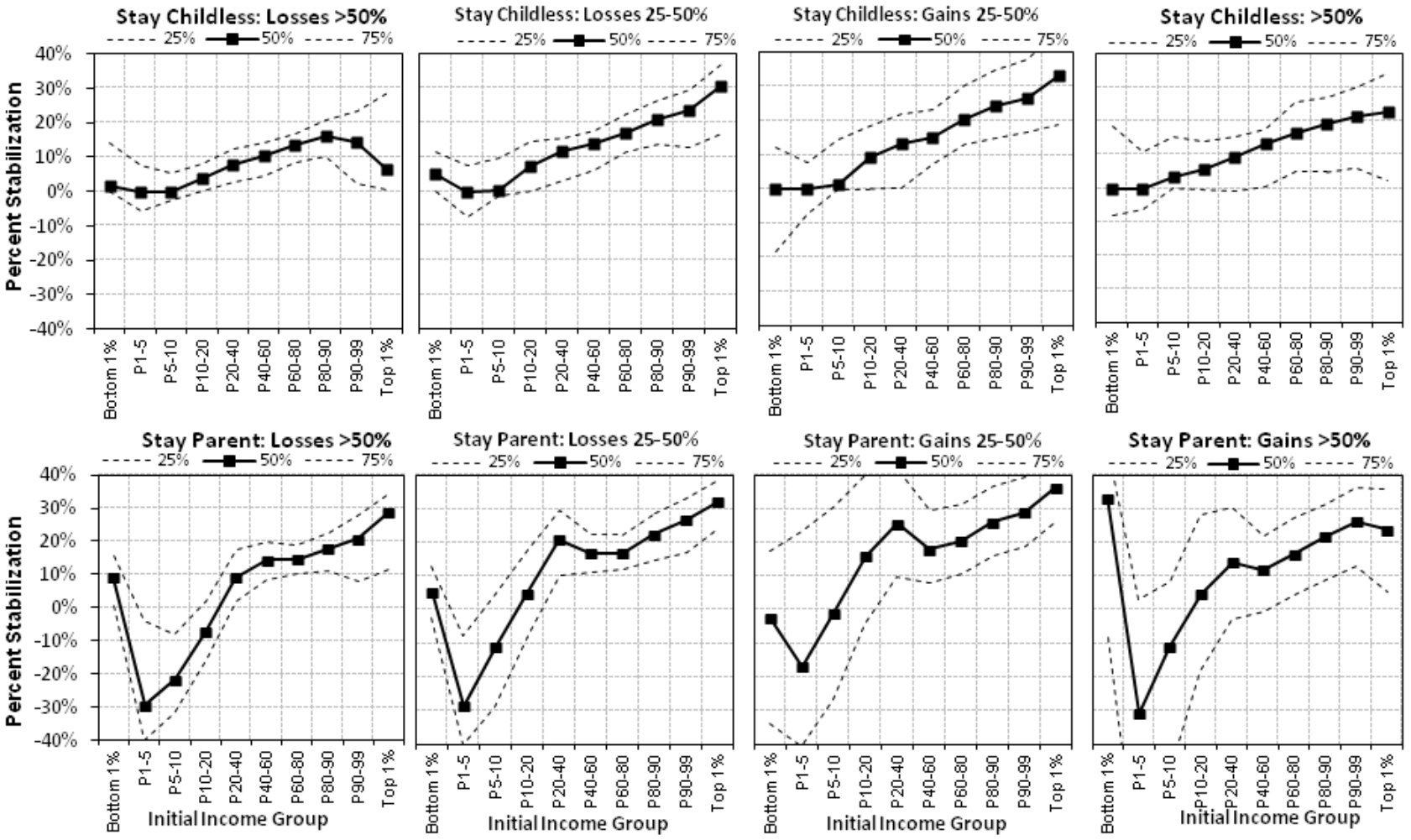
*Source*: Enhanced CWHS and authors' calculations.

**Figure 1: Stabilization of Income from Federal Income Taxes**




Note: Percent stabilization is the difference between pre- and post-tax income changes divided by pre-tax income changes. Income gains and losses are two-year pre-tax income changes: *t* to *t+2*, where t=1999-2009. Incomes include capital gains and post-tax income subtracts net federal income tax liabilities
*Source*: Enhanced CWHS panel and authors' calculations.

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




*Notes:* See Note to Figure 1
*Source*: Enhanced CWHS panel and authors' calculations.