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RECENT MARGINAL LABOR INCOME TAX RATE CHANGES BY SKILL AND  
MARITAL STATUS

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**ABSTRACT**

This paper calculates monthly time series for the overall safety net's statutory marginal labor income tax rate as a function of skill and marital status. Marginal tax rates increased significantly for all groups between 2007 and 2009, and dramatically so for unmarried household heads. The relationship between incentive changes and skill varies by marital status. Unemployment insurance and related expansions contribute to the patterns by skill while food stamp expansions contribute to the patterns by marital status. Remarkably, group changes in hours worked per capita line up with the statutory measures of incentive changes.

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The economy experienced an unusually deep and prolonged contraction, especially in its labor markets. Employment and hours worked fell during 2008 and 2009 for many demographic groups, but disproportionately so among less skilled people, and among the unmarried. As of 2012, labor market activity still remained far below pre-recession levels. Over the same time frame, many facets of fiscal policy were changed, especially policies related to the distribution of safety net program benefits.

Fiscal policymakers were of course watching the economy closely, and major safety net legislation was certainly a reaction to economic conditions. But unless behavior is completely unresponsive to tax and benefit formulas, we cannot have a full understanding of the relationship between fiscal policy and the economy without quantifying marginal tax rates, their changes over time, and their differences across demographic groups. The purpose of this paper is to help examine the labor market impacts of recent changes in safety net programs by measuring time series of implicit marginal labor income tax rates for the safety net as a whole and recognizing that marginal tax rates and their changes vary by demographic group. In this regard, the paper is a longitudinal version of prior studies appearing in *Tax Policy and the Economy* that showed how implicit marginal income tax rates vary with household income and other characteristics under a single year's tax and benefit rules.<sup>1</sup>

Analysis of implicit marginal tax rates and their differences across groups might seem to be a specialized topic of poverty research, and only relevant for macroeconomic analysis to the extent that the economy is populated by poor people. However, this paper explains how people from the middle and above-middle parts of the skill distribution can become eligible overnight for safety net programs such as unemployment insurance and now SNAP (formerly known as food stamps) merely by becoming unemployed for a period of time. Thus, even skilled people have their incentives to seek and retain work determined in part by safety net program rules. This paper shows that wide swaths of the skill distribution saw their marginal tax rates increase by more than five percentage points in less than two years.

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<sup>1</sup> See Liebman (1998) and Kotlikoff and Rapson (2007).

I consider the entire safety net, as well as payroll and income taxes, but give most of my attention to three programs spending the largest amounts on non-elderly households, and with significant legislative changes: unemployment insurance, SNAP (formerly known as food stamps), and Medicaid.<sup>2</sup> I focus on the non-elderly population because the elderly have access to a different set of safety net programs and have a different (and weaker) relationship with the labor market.

My marginal tax rate concept is a comparison of the total amount of subsidies net of taxes received if and when a person were not working to the total amount received (or paid) if and when the same person were working full time, expressed as a fraction of the amount produced when working full time. This measure is a marginal tax rate on the decision margin of working full time or not at all during a specific time interval. In this regard, my tax rate concept is reminiscent of the implicit tax rates used by Gruber and Wise (1999) and collaborators in their “tax force” measures of the retirement incentives created by public pension and disability programs around the world.<sup>3</sup>

The relationship between subsidies received when not working and the amount that could be earned when working full time varies by demographic group. A number of subsidies are set as specific dollar amounts (such as the SNAP maximum benefit, or the maximum unemployment insurance benefit), or as a specific bundle of services (as with Medicaid) regardless of how much the beneficiary might earn if he worked full time. Unemployment insurance benefits below the maximum are, on the other hand, specified as a proportion of the amounts earned in prior employment.

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<sup>2</sup> Because subsidy program participation is voluntary, a subsidy cannot have a large effect on incentives or behavior unless it redistributes a significant amount of resources. A tax program, on the other hand, can in principle create large marginal tax rates without redistributing much revenue.

<sup>3</sup> My tax rate is equivalent to a weighted average of (one minus) the local slopes of a worker’s budget constraint (in a graph of disposable income versus earnings from work), where the weights are the size of the income interval over which each local slope applies, because my tax rate is one minus the slope of the straight line connecting the no work point of the budget set to the full-time work point. In this regard, some might say that my tax rate measures “extensive margin” incentives, which are a weighted average of “intensive margin” incentives. However, readers should recognize that the concepts of intensive and extensive margins have a time dimension, which varies across studies and safety net programs. For example, the decision whether to work in the month of August is an extensive margin decision from the point of view of a program that monitors beneficiaries’ labor income on a monthly basis, but an intensive margin decision from the point of view of a program such as the Earned Income Tax Credit that monitors income on a calendar year basis (unless not working in all of the other eleven months of that year).

Subsidies received by both employed and non-employed people also depend on the income of others in the household, and therefore can vary significantly by marital status. Finally, subsidy rules have changed over time as new legislation was passed, and calendar time triggered new provisions in old legislation. This paper therefore calculates marginal tax rates as a function of earnings potential, marital status, and calendar time.

The paper begins with its conceptual framework for measuring work incentives implicit in the composite of programs known as the safety net, with emphasis on isolating groups-specific changes over time that come from changes in safety net program rules rather than changes in the behavior of the population served under a fixed set of rules. I then identify the changes in safety net eligibility and benefit rules that were significant for the non-elderly population. The paper concludes with marginal tax rate series that combine the program-by-program results of earlier sections and a first indication of how changes in these rates were correlated with labor market behavior.

One point of view is that the labor market is slack during a recession, that as a consequence labor supply has nothing to do with labor market outcomes, and that household marginal tax rate calculations are of no help in understanding how people behave during recessions. Even if this conception of slack markets were accurate, marginal tax rate changes are relevant because they tell us where the labor market is headed after it is no longer slack and supply incentives start to matter again. More important, both theory and evidence might support the opposite point of view: that subsidies for the unemployed and the poor matter as much or more during a period of significant labor market distortions, in part because those subsidies loom large relative to low offer wages.<sup>4</sup> The conclusion of this paper also presents a puzzle for the theory that labor supply has recently been irrelevant: that 2007-10 changes in work hours per capita correlate so closely across demographic groups with statutory changes in the incentives to work.

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<sup>4</sup> Mulligan (2012) reviews evidence on the cyclicity of labor market and production effects of marginal changes in labor supply and demand. He finds that labor supply and labor demand shifts had essentially the same marginal effects on employment in 2008 and 2009 as they did in prior years.

# A Framework for Relating the Entire Safety Net to the Reward for Working

## An Index Number Approach

Consider for a moment a specific homogeneous demographic group  $g$  whose members' labor supply decision consists only of the decision of whether to work full time during, say, a month  $t$ , or not to work at all. The financial reward to working during that interval depends on, among other things, the probability that each member would be eligible for, and willing to participate in, the various safety net programs if and when he were not working, and the value of benefits that would be received from each program when participating and not working. Because both the probability and the value depend on program rules that change over time, my approach begins by forming two time series for each safety net program  $j$  and demographic group  $g$ : a statutory eligibility index series  $\{E_{gjt}\}$  and a statutory benefit-per-participant index series  $\{B_{gjt}\}$ . The indices change only at dates  $t$  when new program rules ("statutes") go into effect. A time series for demographic group  $g$ 's overall statutory safety net generosity  $\{b_{gt}\}$  is obtained by aggregating the product of the two indices across programs using a set of time-invariant participation weights  $\omega_{gj}$ .

$$b_{gt} \equiv \sum_j \omega_{gj} E_{gjt} B_{gjt} \quad (1)$$

where  $g$  indexes demographic groups,  $j$  indexes safety net programs, and  $t$  indexes calendar time.

In principle, the formula (1) can include any number of subsidy and tax programs with any number of rule changes over time.<sup>5</sup> This paper considers only unemployment insurance and related programs, SNAP, and the payroll tax, plus time-invariant eligibility and benefit indices for Medicaid, the personal income tax, for all other anti-poverty programs combined, and for debt discharges. The time period considered is January 2007, before the recession began, to December 2011.

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<sup>5</sup> Over long time periods and with sufficient data, chained participation weights may yield more accurate results than fixed weights.

Each program's eligibility index  $\{E_{gjt}\}$  is normalized to one for each group in fiscal year 2010. Each eligibility index change reflects the typical size of the population eligible under relaxed eligibility rules relative to the size of the population eligible under the stricter rules. For example, a change in program  $j$ 's eligibility index from 1.0 to 0.9 between September and October 2010 means that ten percent of those who were eligible for program  $j$  under the September program rules were no longer eligible under October rules, solely because of changes in program rules.

The participation weights  $\{\omega_{gj}\}$  quantify program  $j$  participation under fiscal year 2010 rules among the members of group  $g$  who are not working. The weights can be less than one because some of the group members are ineligible even when not working, as with people who become unemployed by quitting their job and thereby are ineligible for unemployment insurance benefits. The weights can also be less than one because eligible people fail to take up the program, or value program benefits at less than their cost. For this reason, my index number approach (1) can be used for labor market analysis without assuming that non-employed people take advantage of all programs, or even all programs for which they are eligible. This is an important difference between my methodology and that of Kotlifoff and Rapson (2007) that considers all of the available benefits, even if the benefits are not taken up or valued.<sup>6</sup>

In practice, demographic groups are not homogeneous. For example, some of the unemployed quit their jobs, and others were laid off. I interpret the product  $\omega_{gj}E_{gjt}$  as average program  $j$  participation among non-employed members of group  $g$  under month  $t$  program rules. Also note that the participation weight  $\omega_{gj}$  is constant over time, so that changes over time in group  $g$ 's composition have no effect on its overall statutory safety net generosity index. Only program rule changes cause the index to change over time, which is why I refer to it as a "statutory index."

The benefit index  $B_{gjt}$  measures the average dollar amount received from program  $j$  by non-employed members of demographic group  $g$  who participate in the program, minus what they would receive from the program if they were working full time. The overall level of the

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<sup>6</sup> Mulligan (2012) examines a related index number approach, but without heterogeneity by skill or marital status, and concludes that it may somewhat understate marginal tax rate changes after 2007 as a result of treating program take-up as a fixed parameter rather than an evolving choice reflecting changing program benefits and restrictions.

index is related to program spending per beneficiary (more on this below), but its variation over time and across demographic groups depends on program rules, especially eligibility and benefit rules for persons who would be working full time. Each benefit index, and all other dollar amounts in this paper, are adjusted for inflation using the implicit price index for personal consumption expenditures and expressed in fiscal year 2010 dollars, hereafter “constant dollars,” unless otherwise noted.

## Demographic Groupings

This paper partitions household heads and spouses aged 25 to 64 into ten groups: five married and five unmarried. Holding marital status constant, the five groups differ in terms of their estimated “earnings potential”: what each person would earn when working full time.<sup>7</sup> The middle group in each marital status category has weekly earnings potential of \$727 plus fringes, which is what the median employed non-elderly household head and spouse earned in constant dollars during the 2007 Current Population Survey reference weeks. The other groups have weekly earnings potential of \$487, \$595, \$888, and \$1025, which differ from the middle group’s potential by -0.4, -0.2, 0.2, and 0.4 log points, respectively.<sup>8</sup>

The calculations in this paper could in principle be made for any amount of earnings potential, and at more than five points in the distribution. I choose these five points because they systematically cover a fairly wide range of earnings and because they facilitate matching the ten groups to specific demographic characteristics so that labor market behavior and especially program participation can be estimated separately for the ten groups.

In order to match earnings potential amounts with specific demographic characteristics, I used the full-time employed household heads and spouses aged 26-64 respondents to Current Population Surveys to regress 2005-2007 log hourly earnings on indicator variables for white; state of residence; month of year; the interaction of an age quartic with educational attainment and sex; the interaction of educational attainment, sex, and presence of children under eighteen; and all interacted with married (spouse present). Hourly earnings are projected to all

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<sup>7</sup> Full-time employment is measured in the Current Population Survey as persons working 35 or more hours per week.

<sup>8</sup> Below I relate the five earnings amounts to the cross-sectional distributions of measured and potential earnings.

respondents aged 25-64 who are household head or spouse – even those who are not employed full time or are present in later Current Population Surveys. By sorting on projected hourly earnings within year and weighting by the CPS weight, I assigned each demographic group to a potential earnings quintile. It turns out that the average log projected hourly earnings are spaced about the same as cited above: 0.2 log points from group to group.<sup>9</sup> More important, below I use this classification of the demographic groups to estimate UI program participation at the five points in the earnings potential distribution cited above. As a sensitivity analysis, I also present results that hold the UI participation weights constant across demographic groups and thereby do not rely on the regression projections.

## Safety Net Rule Changes 2007-2011

### Benefit Rule Changes

I model the pre-event UI benefit as 44 percent of potential earnings up to a cap of \$400 per week.<sup>10</sup> The monthly benefit amount is shown in the top row of Table 1 for each of the five potential earnings levels considered. Only the highest of the five levels hits the benefit cap, which is \$1,733 on a monthly basis.

In order to identify significant changes in UI benefit and eligibility rules, I reviewed the U.S. Labor Department's *Chronology of Federal Unemployment Compensation Laws* (2011). It, and the sources therein, cited eight significant UI benefit rule changes between January 2007 and December 2011. The first three events come from the American Reinvestment and Recovery Act (hereafter, ARRA), for which I take April 2009 as the start date. The federal additional

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<sup>9</sup> In 2007, 28 percent of working non-elderly household heads and spouses had actual log measured weekly earnings 0.4 below the median. 38 percent were 0.2 below the median. 38 (27) percent were 0.2 (0.4) above the median, respectively. Only 9 percent (of those age 25-64 – the sample for which I measure completed schooling and thereby potential earnings) had potential earnings 0.4 below the same median. 26 percent had potential earnings 0.2 below the median. 33 (17) percent had potential earnings 0.2 (0.4) above the median, respectively. Admittedly, actual and potential earnings are imperfectly measured at the individual level – potential earnings likely vary within demographic groups but cannot with my measures – but these statistics show that weekly earnings amounts of \$487, \$595, \$727, \$888, and \$1025 cover much of the potential earnings distribution. All CPS-ADF calculations are weighted by the March Supplement weight.

<sup>10</sup> Appendix Table 3 of Council of Economic Advisers (2011) reports an average replacement rate of 46 percent for September 2010, but this includes federal additional compensation (my 44 percent refers to the base replacement rate before adding federal additional compensation).

compensation program added a \$25 weekly bonus (109 constant dollars on a monthly basis) to unemployment insurance benefits. The ARRA also exempted the first \$2,400 of unemployment benefits received by an unemployed person from 2009 federal income tax (United States Department of Labor 2011). Because the provision serves to reduce that person's personal income tax, I estimate it to be worth about \$57 per month for each of the nine months April 2009 through December 2009.<sup>11</sup>

For laid-off workers who wanted to remain on their former employer's health plan, the ARRA offered to pay 65 percent of the cost. For a \$13,027 annual family health insurance premium (Crimmel 2010), that subsidy is worth \$706 per month. However, I estimate that the number of people receiving the benefit when it was available was only one-fifth the number of people receiving unemployment benefits, so the effect of the COBRA provision on the index is only \$143 per month (see Mulligan (2012)).<sup>12</sup>

The remainder of the UI benefit events relates to expirations of the ARRA provisions. Two of the provisions were grandfathered: that is, continuing unemployed persons would continue benefits under each provision, but new unemployed persons were not able to participate. In those cases, I stepped down the benefit index by half when the grandfathering begins and by the other half when the program ends entirely.<sup>13</sup>

Figure 1 shows the UI benefit index time series for each of the five levels of potential earnings. The vertical axis measures the index as a ratio to potential earnings, as it appears in the marginal tax rate formula (more on this below). Before and after the ARRA, four of the five groups had a benefit index equal to 44 percent of their potential earnings because they were receiving only the base benefit and it was below the cap. The highest potential earnings group has its base benefit at the cap, and therefore has a replacement rate less than 44 percent. Benefit

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<sup>11</sup> The average federal income tax rate on a marginal dollar earned in 2009 was 21 percent for wage income (National Bureau of Economic Research 2010).  $\$57 \text{ per month} = 0.21 * 2400 * 1.001/9$ , where the 1.001 is the conversion from March 2010 (a typical month to receive tax year 2009 tax refunds) prices to fiscal year 2010 prices.

<sup>12</sup> COBRA refers to the Consolidated Omnibus Reconciliation Act, which is the statute under which laid-off employees have the option to continue on their former employer's health insurance plan. Because I use the same participation weight for all of the unemployment insurance and related provisions, the contribution of the ARRA's COBRA subsidy to the UI benefit index must be adjusted for differential participation in UI and the COBRA subsidy. Equivalently, the COBRA subsidy could be included in the model (1) as a separate program with its own participation weight.

<sup>13</sup> In the case of UI-FAC, the benefit is nominal so the initial inflation-adjusted step down is a bit more than half.

indices are greater during the ARRA by dollar amounts that are the same for all five groups, and therefore lesser fractions of potential earnings for higher potential groups. The fact that UI and other programs tended to add constant dollar benefits is the primary reason why safety net marginal tax rates tend to increase more percentage points for low skill groups.

The Department of Agriculture's food stamp program, now known as Supplemental Nutrition Assistance (SNAP), provides funds to low-income households for the purpose of buying food. SNAP benefits are potentially available to households earning less than 130 percent of the prior year poverty line, which is adjusted every fiscal year according to the rate of inflation. For example, 130 percent of the prior year poverty line was, on a monthly basis, \$1,430 for a household of two in fiscal year 2007, and \$1,578 in fiscal year 2010. A household with assets below the allowable ceiling (if there is a ceiling for assets – see below) and satisfying other eligibility criteria has its monthly benefit calculated as the program's maximum benefit for its household size minus 30 percent of its net income, where net income is money income minus deductions for shelter and other items. For this reason, essentially every participating household's benefit is linked to the program's maximum benefit.

For a non-employed married person, the household benefit depends on the spouse's income.<sup>14</sup> Using the Department of Agriculture's SNAP quality-control files, I find that the average household with a married head and an unemployed head or spouse was receiving 75 percent of the maximum SNAP benefit.<sup>15</sup> The maximum benefit varies by household size, so I average those maximum benefits at a point in time using as weights each size's representation among program participants, with representation measured in fiscal years 2007 and 2010 and then averaged. The \$236 shown in Table 1's second row is 75 percent of the average maximum benefit in September 2007 (the last month before the first SNAP benefit event), converted to constant dollars.<sup>16</sup>

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<sup>14</sup> In principle, the household benefit depends on the income earned by children, but I treat children's income as zero.

<sup>15</sup> From the fiscal year 2007 and 2010 SNAP quality control files, I selected SNAP households with both head and spouse present, age 18-64, and SNAP eligible (or non-citizen with SNAP eligible children) and at least one of them unemployed. The average SNAP benefit as a percentage of the maximum benefit for household size was, weighted with the household weight for full year tabulations, 75.3 and 74.3 in the two fiscal years, respectively. The median percentages were 81.9 and 80.1, respectively.

<sup>16</sup> Recall that, by definition, the benefit index applies to persons who participate in the program when not employed. The program's participation weight (more on this below) reflects the likelihood of participation in the program when

I assume that participating unmarried household heads obtain the maximum SNAP benefit for their household when not working. Whether they obtain a benefit when working full time depends on the amount they would earn. The middle and above-median potential earnings amounts put essentially all households above 130 percent of federal poverty guidelines, regardless of household size. In these cases, the entire maximum SNAP benefit is lost as a consequence of working full time rather than not working at all. For September 2007, this is the \$314 amount shown in the final two entries of Table 1's third row.

The two below-median potential earnings amounts are small enough relative to the maximum benefit that larger households would still obtain a SNAP benefit if the unmarried household head were working full time, in which case the benefit lost from working full time is about 30 percent of potential earnings rather than the full maximum benefit.<sup>17</sup> The corresponding entries in Table 1's third row are a weighted average of 30 percent of potential earnings and the maximum benefit, with weights based on the propensity of full-time employed household heads and spouses in 2007 with earnings near to the potential shown in Table 1 to have a maximum SNAP benefit corresponding to their household size that is less than 30 percent of their earnings.

I identified significant changes in SNAP benefit rules by reviewing various editions of the USDA's *Characteristics of Food Stamp Households* and *Characteristics of Supplemental Nutrition Assistance Program Households*. The three major SNAP benefit events were all maximum benefit increases. Their inflation-unadjusted amounts are shown in the bottom panel of Table 1. In addition, the inflation-adjusted SNAP benefit changes every month with inflation, because the maximum benefit is not adjusted for inflation in between benefit events.

Figure 2 shows the SNAP benefit index time series for the various demographic groups. Its vertical axis is measured in constant dollars per month in order to simplify the presentation of the ten groups. The five married groups have the same benefit index because all of them receive zero SNAP benefit when working full time, and all receive the same amount below the SNAP

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not employed, which is especially low for married persons because their spouse will likely put household income above federal poverty guidelines on their own.

<sup>17</sup> My calculation uses a 30 percent benefit reduction rate, but the actual rate varies around 30 depending on the earnings and shelter deductions, location, and the household's receipt (if any) of unemployment insurance (Hanson and Andrews March 2009).

maximum benefit when either head or spouse is not working. The top three or four unmarried groups have similar benefit indices (to each other) because each is receiving the SNAP maximum benefit when not working and essentially no benefit when working. The unmarried group with the least potential earnings has a lesser benefit index (in constant dollars) because it still receives a significant SNAP benefit when working full time. All of the unmarried groups have their index increase by the same dollar amount at the event dates due to the SNAP maximum benefit changes; married group changes are 75 percent (see above). In between event dates, general inflation or deflation change every index by the same proportion.

The Medicaid programs do not gradually phase out benefits with income,<sup>18</sup> but rather have discrete income eligibility points, below which otherwise eligible persons receive the full benefit and above which no benefits are received. The income eligibility points vary by program (there are different points for children than for adults) and by state, but for simplicity my calculations assume a single income threshold at 130 percent of the federal poverty guideline.<sup>19</sup> As with my SNAP calculations, I assume that married persons put their household income above the threshold by working full time and therefore eliminate all Medicaid participation in their household. If Medicaid eligible when not working (a possibility reflected in the Medicaid participation weight discussed below), a married person therefore foregoes the entire Medicaid benefit as a consequence of working full time, regardless of potential earnings, which I take to be \$358 per month per non-elderly non-disabled participant.<sup>20</sup>

The middle and above-median potential earnings amounts put essentially all households above 130 percent of federal poverty guidelines, regardless of household size. In these cases, the entire maximum Medicaid benefit is lost as a consequence of working full time even if the person is an unmarried household head. Thus, the same \$358 from the married Medicaid row of Table 1 also appears in the right-hand entries of the unmarried Medicaid row.

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<sup>18</sup> Some states charge small Medicaid premiums and copayments as a function of household income (Dague 2011), which are not explicitly incorporated in my calculations.

<sup>19</sup> 130 percent of FPG is the gross income threshold for the SNAP program for participants that are not categorically eligible (that is, qualifying for SNAP under federal rules, rather than state rules). 130 percent of FPG is also approximately where SNAP benefits are fully phased out, even for categorically eligible households (Eslami, Filion and Strayer 2011).

<sup>20</sup> The Medicaid participation rate also reflects the possibility that the household might have more than one Medicaid participant, and that in-kind benefits are worth less than cash benefits.

The two below-median potential earnings amounts are small enough relative to the maximum benefit that larger households would still obtain the full Medicaid benefit if the unmarried household head were working full time, in which case there is no Medicaid benefit lost from working full time. The corresponding entries in Table 1's fifth row are a weighted average of zero and the full Medicaid benefit, with weights based on the propensity (shown in the bottom row of Table 1) of full-time employed household heads and spouses in 2007 with earnings near to the potential shown in Table 1 to have earnings that exceed 130 percent of the federal poverty guideline corresponding to their household size.

The "other means tested government programs" category contributes a real dollar amount to the overall benefit index that is constant over time and across groups, and is taken from Mulligan's (2012) average marginal worker calculation, which is based on the national average amount spent by those programs in 2007 and 2010. It includes the non-elderly parts of SSI, family assistance, general assistance, energy assistance, and other programs. Medicaid and the other means-tested programs did not have significant benefit events between January 2007 and December 2011.

Collections of mortgages and unsecured consumer debts sometimes serve as an implicit tax on borrower incomes, because borrowers with more income are required to repay more (equivalently, borrowers with low incomes are forgiven more). Sometimes the taxes are not all that implicit, as with wage garnishment. Marginal tax rates created by debt collections are likely significant, and increasing after 2007 as the amount of mortgages that were unsecured grew as owner-occupied homes became "underwater," but analysis of them is beyond the scope of this paper. Here I take a constant, and probably conservative, 3 percent of potential earnings based on Mulligan (2012) and refer readers to Herkenhoff and Ohanian (2011) and Herkenhoff and Ohanian (2012) for detailed analysis of the effects of underwater mortgages on the incentives to earn income.

I take payroll taxes as 15.3 percent of earnings (not including fringes) and add an additional ten percentage points for personal income taxes.<sup>21</sup> Recall that the relevant taxes here

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<sup>21</sup> Because I am calculating incentives for individuals, the equilibrium incidence of the tax is irrelevant – i.e., whether it is ultimately borne by employers or employees – because either way it creates a wedge between the supply and demand prices of labor. More important is whether the payroll tax is really a marginal tax rather than a

are the difference between taxes paid when working full-time and taxes paid when not working: the ten percent is net of any income tax owed on safety net benefits received when not working or any safety net benefits received through the income tax system.<sup>22</sup> The only change in payroll and income tax rules I find to be significant for the purpose of quantifying marginal tax rates is the two percentage point cut in the payroll tax effective January 2011, which is shown as the last benefit event in Table 1.

The 2009 American Recovery and Reinvestment Act created or changed three federal individual income tax credits: the Making Work Pay Tax Credit (MWPTC), the Earned Income Tax Credit (EITC), and Additional Child Tax Credit (ACTC). All three of the changes are credited with reducing poverty (Sherman 2011), which by itself suggests that, if anything, they reduced work incentives for household heads and spouses with potential incomes in the range considered in this paper, because those potential income amounts typically exceed the poverty threshold. Mulligan (2012) explains further why these tax credit changes did not significantly reduce marginal tax rates at the median,<sup>23</sup> but more work is needed to determine the size of their effects on marginal tax rates for very low skill groups and to determine the degree to which the credit changes created different marginal tax rate changes for the various groups featured in this paper.

## Eligibility Rule Changes

In order to identify significant changes in UI eligibility, I further reviewed the U.S. Labor Department's *Chronology of Federal Unemployment Compensation Laws* (2011). It, and the sources therein, cited four significant UI eligibility rule changes between January 2007 and

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user fee whose payments confer benefits on the payer (Feldstein and Samwick 1992). Note that the 2011 payroll tax cut did not affect social security benefits, so the entire payroll tax rate change is in fact a marginal tax rate cut (for persons earning under the earnings limit of about \$110,000 per year).

<sup>22</sup> A household head or spouse who is not working during, say, a quarter, typically has worked during some or all of the other three quarters of the year and might therefore qualify for the earned income tax credit despite not working during the quarter.

<sup>23</sup> The MWPTC enhanced the reward for work by married persons only if their spouse earned less than \$12,903 for the *calendar year* and work by unmarried persons during, say, a quarter, only in the unusual case that earnings was less than \$6,450 for the remainder of the calendar year or years containing that quarter. The EITC changes had essentially no effect on the reward for work by unmarried persons with fewer than three children; for the rest of the population the combined EITC and ACTC changes were a mix of positive and negative marginal tax rate changes that were minor and slightly positive from an aggregate point of view.

December 2011, three of which related to the maximum duration of time that benefits could be collected. They are summarized in my Table 2.

Table 2 also displays the expansion factor for each eligibility rule change, which is the ratio of the eligibility index at the date indicated to its value in the previous month. For an eligibility rule change that involves extending the duration of UI benefits from  $A$  weeks to  $B$  weeks, the relative population size is measured by the ratio of the fraction (measured for 2007 and 2010, and then averaged) of unemployed persons aged 25-64 whose spell has not yet surpassed  $B$  weeks to the fraction of unemployed persons aged 25-64 whose spell has not yet surpassed  $A$  weeks. Because I find the distribution of unemployment spells to be similar for the potential earnings quintiles, I use the same UI eligibility index for all of the ten groups.<sup>24</sup>

One significant UI eligibility expansion did not relate to benefit duration. The ARRA, passed in the first quarter of calendar year 2009, expanded eligibility by encouraging states to “modernize” (and relax) their eligibility requirements by processing earnings histories through an “alternative base period”, including persons who quit their job for compelling family reasons, adding twenty-six weeks of eligibility for persons enrolled in training programs, and/or paying benefits for persons who search only for part-time work (United States Department of Labor 2009). The modernization expansion factor of 1.047 is based on the amount of modernization funds allocated by the Act relative to the \$211 billion (inflation-unadjusted) spent on overall UI benefits during the six quarters during which states could obtain the modernization funds.

States help administer the SNAP program and have been changing their eligibility rules, petitioning the federal government to waive some of its eligibility rules, and otherwise making it easier and more attractive for the poor to participate (Eslami, Filion and Strayer 2011, 11). During fiscal years 2007–2011 at least twenty-seven states, plus the District of Columbia, adopted “broad-based categorical eligibility,” which means that states confer automatic SNAP eligibility on all households receiving a specified social service informational brochure. Households that participate in SNAP under this rule still have benefits determined by the same formula (of household size and net income) as the other SNAP beneficiaries. A practical result

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<sup>24</sup> For example, the percentage of 2007 unemployment spells so far lasting less than 27 weeks ranged little across potential earnings quintiles: from 79 to 81 percent. The percentage of 2010 unemployment spells so far lasting less than 27 weeks also ranged little: from 51 to 55 percent.

of broad-based categorical eligibility (BBCE) is therefore that households can receive benefits solely on the basis of their net income, and not on the value of their assets. This not only extends eligibility to households whose assets would have exceeded traditional SNAP limits (and limits that are still present in other anti-poverty programs like Medicaid), but makes it easier for states to admit households into the program because the states without asset limits no longer have the burden of investigating applicant asset holdings. Even SNAP households not participating through BBCE saw the asset test relaxed as the values of individual retirement accounts and education savings accounts were excluded from the test by the 2008 Farm Bill and, between 2006 and 2010, as almost 20 states eliminated their consideration of vehicles (Eslami, Filion and Strayer 2011, 6).

Prior to the recession, able-bodied adults without dependents who were not working or participating in a work program had their receipt of SNAP benefits limited to three months in a three year period (United State Department of Agriculture 2012). Entire states could obtain waivers from the work requirement whenever the Department of Labor indicated that their state was eligible for extended unemployment benefits (United States Department of Agriculture 2009). The ARRA waived all states through October 2010. Since then, almost all states have obtained waivers pursuant to the Department of Labor triggers (United States Department of Agriculture 2011). All together, the state-wide waivers and ARRA changed eligibility requirements in the direction of making SNAP eligibility more inclusive than it would have been if able-bodied adults without dependents were required to work (or have their benefits limited), as they typically were before the recession began.

As with the UI program, I assume that the same SNAP eligibility index time series applies to all demographic groups, and therefore use the series contained in Mulligan's (2012) calculation of a single marginal tax rate series for the "average marginal worker." This assumption does not rule out the possibility that eligibility rule changes alone create marginal tax rate and participation changes that vary by demographic group, because the benefit indices and program participation weights in this paper vary by group.<sup>25</sup>

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<sup>25</sup> Recall that the program participation weights reflect the propensity of the various demographic groups to be eligible for and take up the program.

The SNAP eligibility series increases by a factor of 1.024 in October 2008 due to the waiver of work requirements that continued at least through 2011. Other state and federal eligibility changes combined increased the index by a factor of 1.277 between January 2007 and December 2011, with the time pattern of the increase determined by the population-weighted time pattern of BBCE adoption.<sup>26</sup>

## Aggregating Programs to Obtain Safety Net Marginal Tax Rates

### Program Participation Weights

The benefit amounts shown in Table 1 can be compared across programs only for persons who would be eligible for, and participate in, all programs when not working. A measure of safety net generosity that combines the various program benefits therefore needs a set of weights that reflect program participation, which I call program participation weights and denote as  $\{\omega_{gI}\}$  in equation (1). Because the weights multiply eligibility indices that are normalized to one in fiscal year 2010, they should reflect the fraction of each demographic group that would normally participate in the program under the fiscal year 2010 rules.

Under the fiscal year 2010 UI rules, anyone whose unemployment spell lasted more than 96 weeks is ineligible, so one component of the UI participation weight is the fraction of unemployment spells among people aged 25-64 that so far lasted no more than 96 weeks: 0.96 in 2007 and 0.90 in 2010, or an average of 0.93.<sup>27</sup> This component of the UI program participation weights is the same for all of the ten groups because I do not want the tax rate variation across groups to reflect different unemployment propensities and because, as noted above, I find the distribution of unemployment spells to be similar for the potential earnings quintiles.

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<sup>26</sup> As explained by Mulligan (2012), the SNAP eligibility index change is based on the size of the populations affected by various SNAP eligibility rule changes and on cross-state and cross-group estimates of the relationship between SNAP participation levels and changes and various eligibility criteria. The change in the SNAP eligibility index is significantly less than the change over the same time frame in the propensity of poor people to participate in SNAP.

<sup>27</sup> A number of states had a maximum duration of 99 weeks, others had less. 96 weeks is the cross-state average benefit duration, weighted by the number unemployed in the state, from Farber and Valletta (2011).

Another component of the participation weight is the fraction of group members who receive UI any time during their spell, which I estimate in two parts. First, I take the ratio of the total number of regular UI recipients aged 25-64 (regular UI lasts 26 weeks) to the total number of unemployed aged 25-64 whose spell has not yet surpassed 26 weeks, which is 0.61 in 2007 (adjusted to 0.64 to reflect the modernization of regular program eligibility rules between 2007 and fiscal year 2010) and 0.72 in 2010, or an average of 0.68. Second, I adjust the 0.68 ratio for the various potential earnings quintiles' relative propensity to receive UI during calendar years in which they experience unemployment, which is measured from the Current Population Survey Demographic Supplements (hereafter, CPS-ADF) referring to calendar years 2007 and 2010.<sup>28</sup> Interestingly, the propensity to receive UI when unemployed is highest for the middle quintile (76 percent), and lowest for the lowest potential earnings quintile (55 percent).

Because work hours can change on three margins – movements between employment and unemployment, movements between employment and out of the labor force, and reductions in hours among the employed – the UI participation weight needs a final component for the purpose of quantifying incentives to supply hours because UI benefits are typically not paid to persons out of the labor force or to employed persons with reduced hours. I take this factor to be 0.58, which is the unemployment change share of the decomposition of the 2007-2010 change in per capita hours worked among non-elderly household heads and spouses.<sup>29</sup> The resulting participation weights are multiplied by the UI eligibility index (common to the ten groups) and shown in Figure 3. The lowest potential earnings group has the lowest index in Figure 3 because it has the lowest average UI participation among those unemployed no more than 26 weeks. The median and median plus 0.2 log potential earnings group have the highest index in the figure because they had the highest average UI participation. Each of the indices has its greatest increase in mid-2008, because that is when the duration of UI eligibility was extended from 26 to 52 and thereby impacted the greatest fraction of unemployed people. In contrast, the last increase at the end of 2009 is the smallest, despite the significant press coverage given to the 99 week limit, because only two percent of the unemployed have spells lasting so far more than 72

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<sup>28</sup> The CPS-ADF cannot be used to accurately calculate the level of UI participation because UI benefits are significantly under-reported in those files (Meyer, Mok and Sullivan 2009). I did not find relative UI participation to be significantly different between married and unmarried people, holding potential earnings quintile constant.

<sup>29</sup> That is, 58 percent of the reduction in work hours per capita was due to increased unemployment per capita during the CPS survey reference week. Nine percent was increased out-of-the-labor-force per capita. 33 percent was reduced hours work among the employed. The decomposition's interaction term was negligible (Mulligan 2012).

weeks (the limit before December 2009) and less than 96 weeks. In other words, holding behavior constant, extending benefit duration from 72 to 96 delivers far fewer dollars to the unemployed population than extending it from 26 to 52 and therefore has a far lesser effect on average marginal tax rates.

Because SNAP is based on household income, I estimate SNAP participation weights separately for married and unmarried people, and separately for persons unemployed and out-of-the-labor-force. For each of these four groups (marital status by labor force status), I take the ratio of the average number of group members in a SNAP household during a month of the fiscal year 2010 to the weekly average nationwide total number of group members. The numerators are measured from the USDA's fiscal year 2010 quality control file and the denominators from the CPS-MORG. For each marital status, the results by labor force status are averaged with weights 0.09 on out-of-the-labor-force and 0.91 on unemployed because nine percent of the decline in average hours worked occurred through an increased propensity to be out-of-the-labor-force.<sup>30</sup>

The resulting SNAP participation weights are 0.83 for unmarried people and 0.20 for married people: four times greater for the unmarried.<sup>31</sup> In particular, during the average week of fiscal year 2010, almost every non-elderly unmarried household head unemployed – to be exact, 3.3 million or 85 percent – were in SNAP households!<sup>32</sup> Among non-elderly unmarried household heads, SNAP had become about as common as unemployment insurance as a source of support during unemployment.<sup>33</sup> The SNAP participation weights are multiplied by the SNAP eligibility index (common to the ten groups) and shown in Figure 4.

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<sup>30</sup> In doing so, I give reduced hours the same weight as unemployed, because both create some income for the SNAP participant that would be considered in the SNAP benefit formula. Results turn out to be insensitive to the 0.09 and 0.91 weights used in the average.

<sup>31</sup> Although this result is not surprising for the reasons cited above, I checked it in the 2008 CPS-ADF by regressing reported 2007 SNAP participation on a constant, marital status, and 2007 annual earnings relative to federal poverty guidelines (truncated left and right at 0 and 5, respectively) in the sample of household heads and spouses aged 25-64 in 2007. At the sample mean earnings ratio, the regression's predicted SNAP participation rate was 5 times greater for the unmarried than for the married.

<sup>32</sup> Two thirds of non-elderly unmarried household heads who were out of the labor force were in SNAP households.

<sup>33</sup> The relative dollar amounts of support from the two programs depends on skill level because, holding family composition constant, SNAP benefits are a fixed dollar amount and UI benefits vary with earnings on the prior job. At the median skill level, UI benefit dollars are three or four times SNAP's. For the lowest skill group, UI dollars are about double SNAP dollars.

The figure's unmarried series is much greater than the married series because it is far more common for non-employed unmarried household heads to participate in the program than it is for non-employed married household heads and spouses. This effect on the SNAP program participation weights, and a similar effect on the Medicaid program participation weights, is an important reason why marginal tax rates are greater for unmarried people than for married people at a given level of potential earnings.

Medicaid participation also depends on household income, so I estimate its participation weights separately by marital status. I begin with the ratio of the change in nonelderly Medicaid enrollment (including children) from June 2007 to June 2010 to the 2007–2010 change in the average weekly number of nonelderly heads and spouses who were not employed or underemployed, which is 0.946. I then discount the result by 50 percent to reflect the fact that Medicaid benefits are distributed in-kind, rather than in cash or cash equivalents, because the effect of benefits on the incentive to work depends on their value to the beneficiary rather than their cost to the government. I use the CPS-ADF to estimate the Medicaid participation rates among married unemployed household heads and spouses aged 25-64 relative to unmarried unemployed household heads aged 25-64 in order to form marital-status-specific weights from the aggregate weight of 0.47: 0.63 for the unmarried and 0.35 for the married.

### Marginal Tax Rate Results

I calculate a marginal tax rate series for each group by taking the sum (1) over all programs, and groups of programs, shown in Table 1 and dividing by potential earnings inclusive of fringes, as in equation (2).

$$MTR_{gt} \equiv \frac{b_{gt}}{1.234(\text{potential cash earnings})} = \frac{\sum_j \omega_{gj} E_{gjt} B_{gjt}}{1.234(\text{potential cash earnings})} \quad (2)$$

Potential earnings inclusive of fringes is calculated as the product of potential cash earnings (the monthly amounts \$2,110, \$2,578, etc. shown in Table 1) and the average (for the years 2007 and 2010) ratio of 1.234 of aggregate employee compensation to aggregate cash employee compensation.

Figures 5 and 6 show the results.<sup>34</sup> All ten groups have the same qualitative time pattern: rates increase in 2008 as the unemployment insurance program increases allowable benefit duration, increase again in 2009 with the ARRA, decrease as ARRA provisions expire, and decrease with the payroll tax cut. All of the series end 2011 at a rate that significantly exceeds the rates in place when the recession began.

Marginal tax rates are greater for unmarried people than for married people at the same potential earnings. Holding marital status constant, marginal tax rates are greatest for the second-to-lowest earnings potential group, because that group has the least earnings potential among groups with little or no SNAP and Medicaid eligibility when working full time. The lowest earnings potential group's marginal tax rate is not especially high despite its small denominator because many of its members can participate in Medicaid and SNAP regardless of how much they work.<sup>35</sup>

The left half of Table 3 displays marginal tax rate changes through calendar years 2010 and 2011, taking calendar year 2007 as the base year. Through 2010, marginal tax rate changes ranged from 5.0 percentage points for the highest potential married group to nearly ten percentage points for the second unmarried group in terms of earnings potential. Note that these are percentages of potential earnings plus fringes, and therefore on a larger base than actual cash earnings, as sometimes reported in other marginal tax rate studies.<sup>36</sup> Although the calculation of marginal tax rate series prior to 2007 is beyond the scope of this paper, one suspects that the changes shown in Table 3 are historically unusual because (a) the allowed unemployment

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<sup>34</sup> Because of the number of components in the calculation, many of the results are not particularly sensitive to reasonable changes in any one of the components. Mulligan (2012) presents a detailed sensitivity analysis for the average marginal worker (something like the married and middle-potential income group shown in this paper), and finds that the most important parameter (for the purpose of time series analysis – cross-group comparisons are not examined) is the 58% weight given to hours reductions due to unemployment rather than out-of-the-labor force or hours among employees.

<sup>35</sup> The marginal tax rate's numerator is the difference between the total amount of subsidies net of taxes received if and when a person does not work and the total amount received (or paid) if and when the same person were working full time: the causal effect of (not) working on subsidies net of taxes. The lowest skill group has a relatively small causal effect of working on net subsidies because they receive many of the subsidies even when working full time. See also Yelowitz (1995).

<sup>36</sup> The two percentage point payroll tax cut is only 1.6 percentage points when the base is earnings plus fringes.

insurance duration was historically unusual since 2007, (b) unemployment insurance and related benefits were increased, and (c) SNAP eligibility was expanded so much.<sup>37</sup>

Even with the (temporary) payroll tax cut in place in 2011, marginal tax rates were still significantly elevated above 2007 values. 96 week unemployment benefit duration continued through 2011, and many of the SNAP expansions are indefinite.

Because each marginal tax rate is calculated as a cross-program sum (see equation (1)), each program's contribution to marginal tax rate changes can be calculated as the change in that program's component of the sum. My equation (3) collects those terms in five categories: changes in UI eligibility associated with the duration of benefits, changes in UI eligibility associated with the modernization of the program, changes in UI and related benefits (such as the COBRA subsidy for unemployed people), changes in SNAP eligibility and benefit rules, and all other eligibility and benefit rule changes.<sup>38</sup>

$$\begin{aligned} \Delta MTR_{gt} = & \frac{\omega_{gUI}}{1.234(\text{potential cash earnings})} \bullet \\ & \left\{ (\Delta E_{g,\text{duration},t}) E_{g,\text{modern},t} B_{g,UI,t} + E_{g,\text{duration},t} (\Delta E_{g,\text{modern},t}) B_{g,UI,t} + E_{g,UI,t} \Delta B_{g,UI,t} \right\} \\ & + \frac{\omega_{gSNAP} \Delta (E_{g,SNAP,t} B_{g,SNAP,t})}{1.234(\text{potential cash earnings})} \\ & + \{ \text{payroll tax term and UI interaction terms} \} \end{aligned} \quad (3)$$

where  $\Delta$  denotes the time difference operator (between 2007 and 2010, or between 2007 and 2011). Although the marginal tax rate levels depend on all safety net programs, marginal tax rate changes are calculated merely from programs with changing benefit and eligibility rules. Prior to 2014, these are only UI, SNAP, and the payroll tax, which is why those are the only terms

<sup>37</sup> The primary contribution to the measured tax rates of my assignment to demographic groups of specific amounts of potential earnings is to allow for variation in UI participation weights by potential earnings. As shown in Figure 3, the variation turns out to be minimal except for the lowest potential earnings group. If that group were assumed instead to have the same UI participation weight as the next lowest potential earnings group, then the lowest group's marginal tax rate would be two percentage points more than shown in Figures 5 and 6 in 2007 and three percentage points greater in 2010 and 2011.

<sup>38</sup> The "all other" category includes changes in the payroll tax rate and interactions among the various other change terms.

appearing in equation (3). The first set of curly brackets show terms relating to changes in UI eligibility and benefit rules. For these purposes, the UI eligibility index has been decomposed into the product of two eligibility indices relating to (benefit) “duration” and “modernization.” The final term in the first set of curly brackets quantifies the effect of changing UI benefits conditional on eligibility. The second-to-last row of equation (3) is the combined contribution of changes in SNAP eligibility and benefit rules. The final term relates to the change in the payroll tax rate, which is zero prior to 2011, and interactions between the various UI change terms.

Figures 7 and 8 show the results for changes through 2010 and 2011, respectively. Although the duration of UI insurance benefits is essentially the only marginal tax rate change that received much attention or analysis during the recession (see Elsby, Hobijn and Sahin (2010)), the figures show that other eligibility and benefit rules made significant contributions to marginal tax rate increases. For unmarried people with below median potential earnings, the SNAP program by itself added as much to marginal tax rates as UI duration did. The weekly amount of UI and related benefits also significantly added to marginal tax rates through 2010, but not through 2011 when the additional benefits had expired. About half of the 2007-10 increase in marginal tax rates for married people with potential earnings below median was due to provisions other than UI benefit duration.

The payroll tax cut and extended (and emergency, hereafter “extended”) UI benefits have sometimes been treated by lawmakers as a pair of policies, as in late 2011 and early 2012 when Congress decided to extend both temporary provisions at least until the end of calendar year 2012 (Pear and Steinhauer 2012). The payroll tax cut appears to be at least as expensive (from the Treasury’s perspective) as the extended UI benefits and might thereby be expected to have at least as large an impact on the labor market as UI benefits do. However, Figure 8 shows a much smaller (negative) contribution of the payroll tax cut to marginal tax rate changes than the (positive) contribution of extended UI benefits because UI benefits are, by my estimate, roughly targeted to people on the margin of working or not whereas payroll taxes are paid by all workers. In other words, the combined effect of the payroll tax cut and extended UI benefits is to raise marginal tax rates, even for (some) persons with above-median earning potential.

A number of safety net programs such as Supplemental Security Income and TANF affect marginal tax rate levels, but not marginal tax rate changes, because the programs did not

have significant changes in their eligibility or benefit rules. For the same reason, the exclusion of any program from my marginal tax rate calculations affects only the level of the marginal tax rates and not their changes – as long as that program did not change its eligibility or benefit rules.<sup>39</sup>

Disability insurance (DI) is an interesting example. Federal spending on the program increased substantially during the 2008-9 recession, and during previous recessions (Congressional Budget Office (2012), Duggan and Imberman (2009)). However, if I am correct that the DI program did not significantly change its eligibility or benefit rules since 2007 (see also Autor (2011) and Congressional Budget Office (2012)), then it did not by itself create changes in work incentives and DI spending growth during the recession should not be misunderstood as contributing to rising marginal tax rates. Instead, DI spending growth since 2007 reflects changes in the behavior (and perhaps age) of the population under a fixed set of DI benefit rules. At most, the DI program should be reflected in the level of the marginal tax rates.<sup>40</sup>

## **Conclusions, and a Cross-Group Comparison of Incentives and Labor Market Behavior**

It is recognized, especially in poverty research, that program rules changed for a number of safety net programs in the direction of providing more assistance for the poor, unemployed, and financially distressed.<sup>41</sup> It is also recognized that helping poor people has a cost in terms of incentives. For any one of the program rule changes, the aggregate effect on incentives seems

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<sup>39</sup> Both marginal tax rate levels and changes matter for analysis of labor supply changes. Mulligan (2012) examines the sensitivity of labor supply change results with respect to the level of marginal tax rates, program participation weights, and other components of marginal tax rate series.

<sup>40</sup> My “other means-tested program” category does not capture spending by the federal DI program (largely because so much of the benefits go to elderly or near-elderly people), but does include other government spending on disabled people such as SSI.

<sup>41</sup> For two more examples, see the Pell grant expansion and the replacement of the Hope Scholarship Tax Credit with the American Opportunity Tax Credit cited in this volume (Dynarski, Scott-Clayton and Wiederspan 2013). Both changes required either greater marginal tax rates in the phase-out range or a wider range of incomes to which positive marginal tax rates apply.

small, but the greatest surprises in this paper's results are the large sum total of those incentive changes, even when accounting for imperfect take-up, and how different they are by marital status.

The right half of Table 3 displays changes in the natural log of the after-tax share  $\ln(1-MTR_{gt})$ , which is a way of quantifying the changes in incentives to earn because it is essentially the percentage change in what a worker keeps after taxes and subsidies. The log after-tax share fell sharply between 2007 and 2010 for all of the groups: the financial reward to working was a lot less in 2010 than it was in 2007. The reduction in incentives for unmarried people at or below median earnings potential is astounding. Incentives improved a bit between 2010 and 2011, but remain remarkably less than they were in 2007.

Not too long ago, economists believed that the reward to working affects the amount that people work. They debated the exact magnitude of this effect, but largely agreed that incentive changes of the amounts shown in Table 3 would noticeably depress the quantity of labor. Even readers who believe that supply incentives are temporarily irrelevant while the labor market is “slack” and monetary policy seems ineffective, may still expect that a full labor market recovery would require a full incentives recovery at the same time that it requires “demand” to return to pre-recession levels. In this regard, it may be no puzzle that the labor market has so far recovered only a fraction of its 2008-9 decline: the incentives to work still remain significantly less than they were five years ago.

More work needs to be done to understand the 2007-2010 labor market experiences of different demographic groups. This paper provides one ingredient for that analysis: separate marginal tax rate series by potential income and by marital status. Figure 9 offers a preview of such an analysis by comparing the ten group's incentive changes from Table 3 with estimates of their per capita hours changes (including zeros for persons not working).<sup>42</sup> Unmarried groups are shown as red squares and married groups as black circles, with each point labeled according to its potential earnings. The Figure shows an obvious positive correlation between work hours

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<sup>42</sup> For the purposes of measuring labor market outcomes I classified household heads and spouses aged 25-64 in the CPS-ADF by age, race, education, state of residence, and family composition and imputed potential earnings for each of them as the projected value from a log hourly earnings regression function fit to persons who worked at least 35 hours per week and at least 26 weeks during the year (see the main text for the regressor details). I calculated average hours by year, marital status, and imputed potential earnings quintile and show their changes in Figure 9.

changes and incentive changes. The correlation is positive within marital status, with higher potential groups having lesser hours and incentive changes, but is perhaps unsurprising because less skilled groups are known to have more cyclical work (Solon, Barsky and Parker 1994). However, it is interesting that hours changes vary less across skill groups among married people than they do among unmarried people: a labor supply theory might explain this as a consequence of my finding that incentive changes vary less among married people. In fact, hours changes are essentially the same for the four married skill groups at the same time that marginal tax rate changes are the same for those groups.

Also surprising is that, holding skill constant (as measured by the amount actually earned in 2005-7 by full-time working persons in the various groups), hours changes are so different for unmarried people at or below median earnings potential. For example, per capita work hours fell 9 percent among unmarried household heads with earnings potential of about \$3,100 per month, whereas they fell only 6 percent for married household heads and spouses with the same earnings potential and fell only 6 percent for married household heads and spouses with even less earnings potential. Perhaps dramatic incentive changes are a significant reason why labor market experiences vary so much by skill and marital status and their interaction, and why the labor market is so different after 2007 than it was before.

**Table 1. Safety Net Benefit Events**  
as a function of potential earnings and marital status

		potential monthly earnings				
		<u>2,110</u>	<u>2,578</u>	<u>3,148</u>	<u>3,845</u>	<u>4,697</u>
<b>Pre-Event Net Benefits</b>		<u>real monthly index amount<sup>a</sup></u>				
UI & related <sup>b</sup>		929	1,134	1,385	1,692	1,733
SNAP, married <sup>c</sup>		236	236	236	236	236
SNAP, unmarried <sup>d</sup>		309	313	314	314	314
Medicaid, married <sup>e</sup>		358	358	358	358	358
Medicaid, unmarried <sup>f</sup>		280	333	356	358	358
All other means-tested government programs <sup>g</sup>		234	234	234	234	234
Debt discharges <sup>h</sup>		63	77	94	115	141
Payroll and income taxes foregone <sup>i</sup>		534	652	796	973	1,188
<b>Benefit Events</b>		<u>real monthly index change</u>				
<u>UI &amp; related</u>						
Federal additional compensation starts	Apr-09	109	109	109	109	109
FIT exclusion starts	Apr-09	57	57	57	57	57
COBRA subsidy starts	Apr-09	143	143	143	143	143
FIT exclusion ends	Jan-10	-57	-57	-57	-57	-57
COBRA subsidy grandfathered	Jun-10	-72	-72	-72	-72	-72
Federal additional comp. grandfathered	Jun-10	-55	-55	-55	-55	-55
COBRA subsidy ends	Nov-10	-72	-72	-72	-72	-72
Federal additional compensation ends	Dec-10	-54	-54	-54	-54	-54
<u>SNAP</u>						
fiscal year 2008 COLA (nominal amount)	Oct-07	13	13	13	13	13
Farm Bill (nominal amount)	Oct-08	28	28	28	28	28
ARRA bonus (nominal amount)	Apr-09	45	45	45	45	45
inflation erosion of nominal benefits	monthly			various		
<u>Payroll tax</u>						
2 percentage point FICA cut	Jan-11	-42	-52	-63	-77	-94
potential earnings below 130 percent FPG		21%	6%	0%	0%	0%

<sup>a</sup> benefit indexes can be compared between two programs only for persons who would participate in both of them when not working. Otherwise, comparisons also require participation weights

<sup>b</sup> minimum of 44% percent of potential earnings and \$400 per week

<sup>c</sup> average monthly benefit for households with unemployed head or spouse and married head

<sup>d</sup> minimum of max SNAP benefit and 30 percent of potential earnings. Sept 2007 values shown

<sup>e</sup> average monthly Medicaid benefit for non-elderly non-disabled

<sup>f</sup> zero for those with potential earnings below 130% of FPG, otherwise the same as married

<sup>g</sup> average monthly spending on all other means-tested programs in fiscal year 2010, per non-elderly head or spouse who is under-employed or not employed and not receiving UI

<sup>h</sup> 3.0% of potential income

<sup>i</sup> 25.3% of potential income

**Table 2. Safety Net Eligibility Events**

January 2007 - December 2011

<u>Program</u>	<u>date</u>	<u>expansion factor</u>	<u>description</u>
UI	Jul-08	1.267	eligibility extended from 26 to 52
UI	Dec-08	1.086	eligibility extended from 52 to 72
UI	Apr-09	1.047	eligibility criteria modernized
UI	Dec-09	1.025	eligibility extended from 72 to 96 in the average state
SNAP	various	1.277	BCBE diffusion across states; other relaxation of asset and income tests
SNAP	Oct-08	1.024	ABAWD work requirements dropped or waived state-by-state

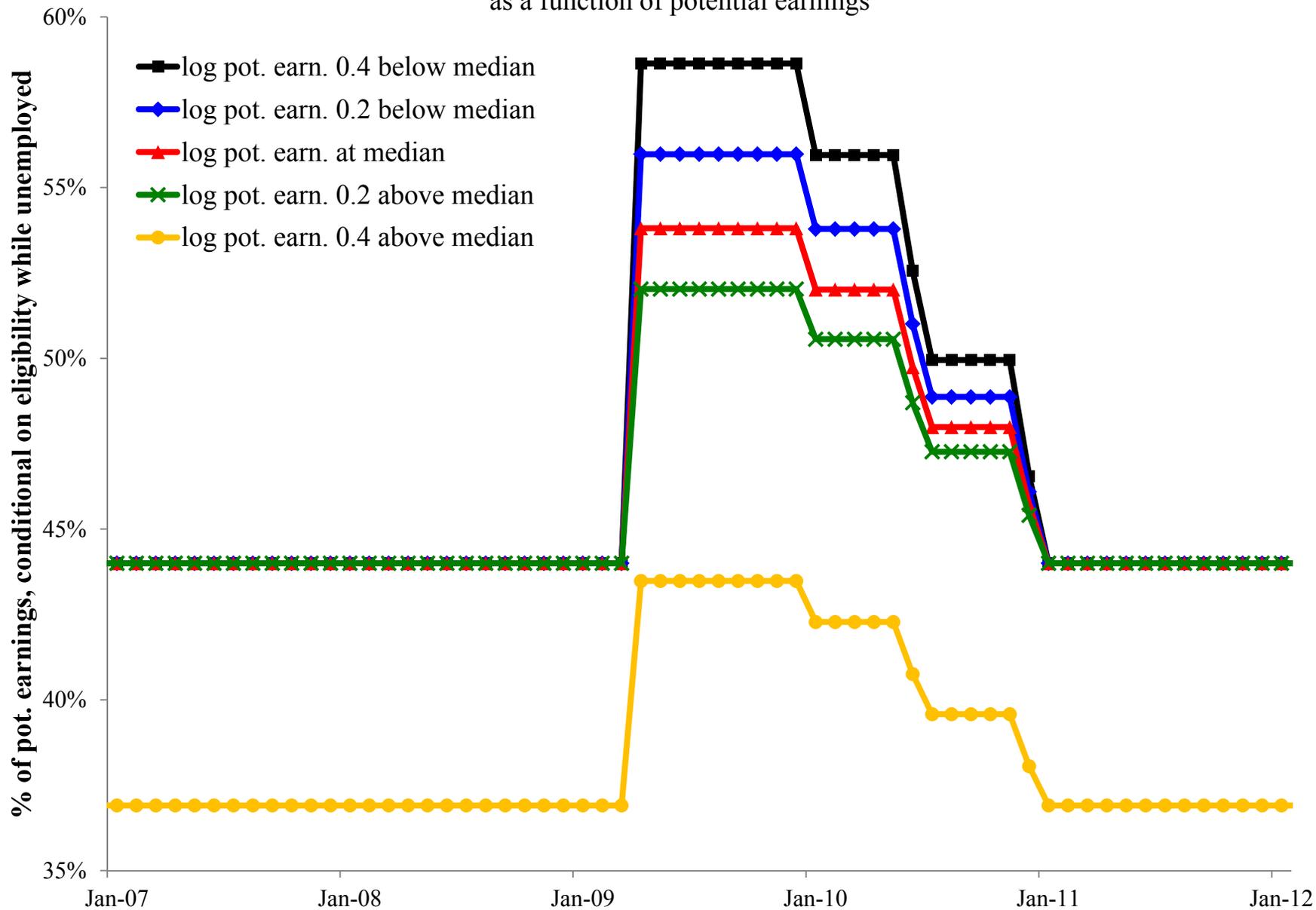
**Table 3. Marginal Tax Rate Changes since 2007**

by potential monthly earnings and marital status

<u>potential earnings</u>	Marginal Tax Rate change, percentage points			Log after-tax share change times 100	
	<u>2007-2010</u>	<u>2007-2011</u>		<u>2007-2010</u>	<u>2007-2011</u>
			Unmarried		
2,110 = 0.4 log points below median	9.7	6.2		-21.0	-12.8
2,578 = 0.2 log points below median	9.9	6.3		-21.4	-13.1
3,148 = median among working heads & spouses	9.5	6.1		-19.7	-12.2
3,845 = 0.2 log points above median	8.6	5.5		-16.6	-10.4
4,697 = 0.4 log points above median	6.6	3.9		-11.5	-6.7
			Married		
2,110 = 0.4 log points below median	6.2	2.6		-11.0	-4.5
2,578 = 0.2 log points below median	7.1	3.4		-12.6	-5.8
3,148 = median among working heads & spouses	7.2	3.7		-12.6	-6.3
3,845 = 0.2 log points above median	6.6	3.5		-11.4	-5.8
4,697 = 0.4 log points above median	5.0	2.3		-8.0	-3.5

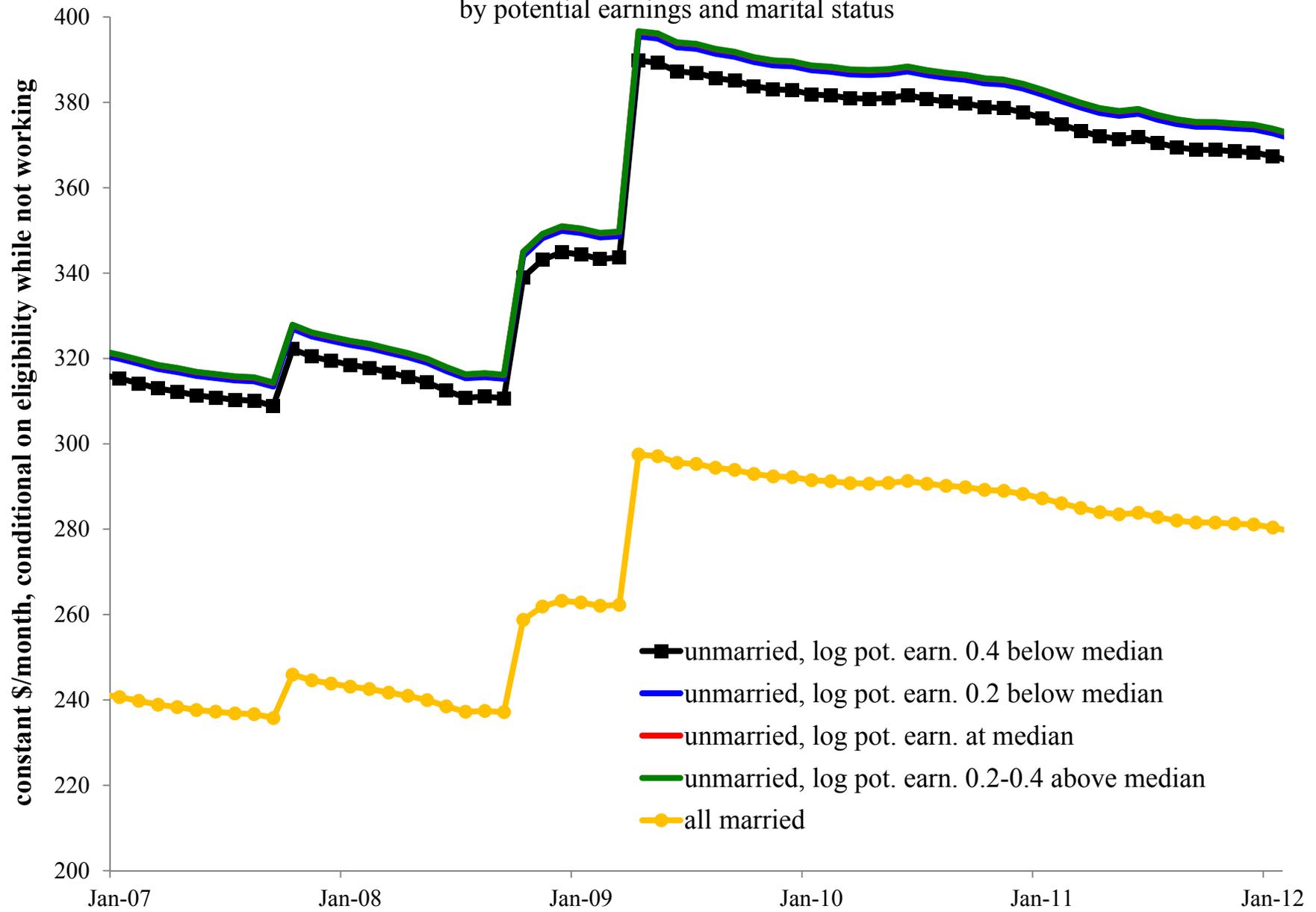
Note: Dollar amounts in fiscal year 2010 dollars and exclude fringe benefits

**Figure 1. UI Benefit Indices**  
as a function of potential earnings

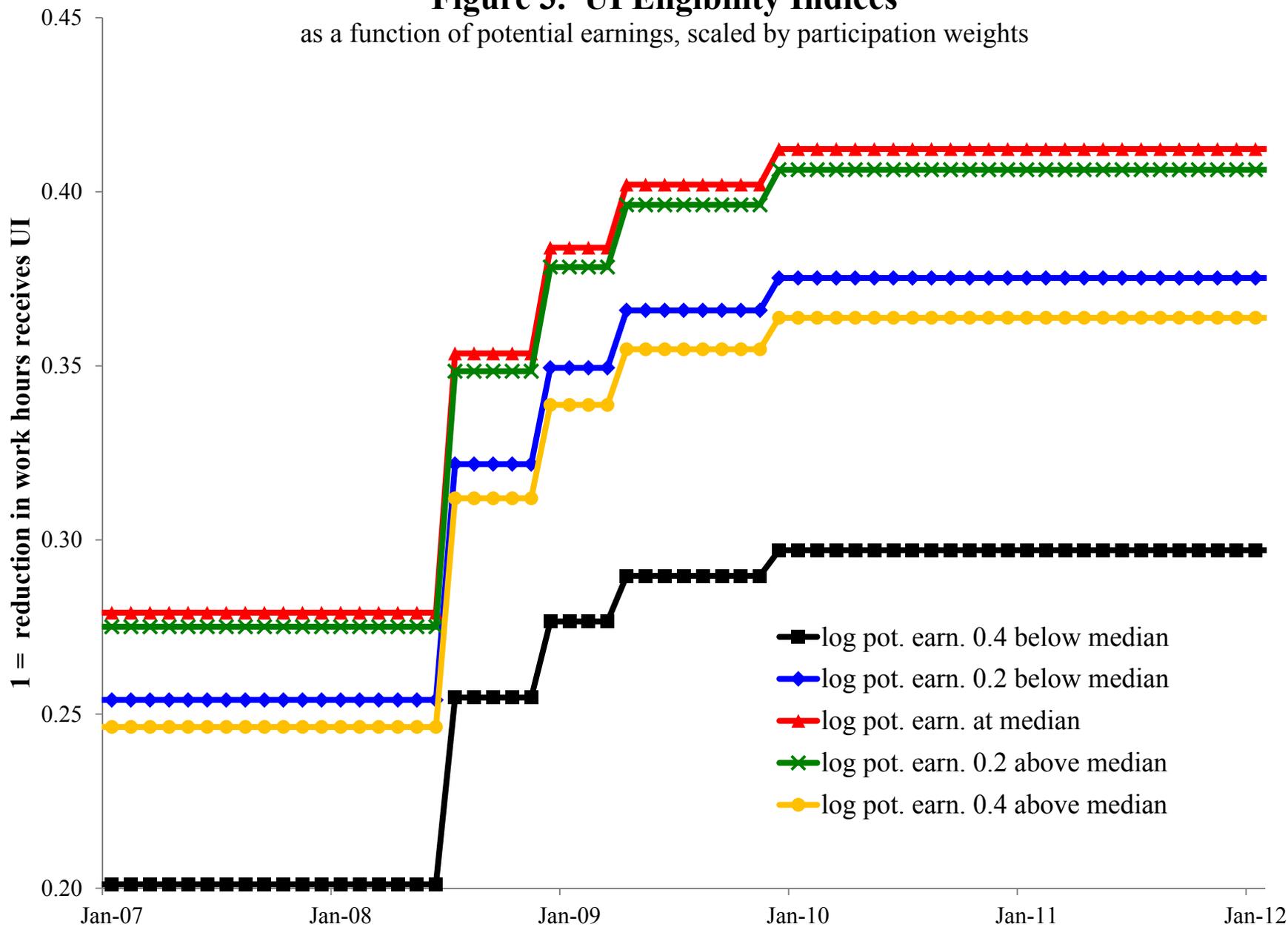


**Figure 2. SNAP Benefit Indices**

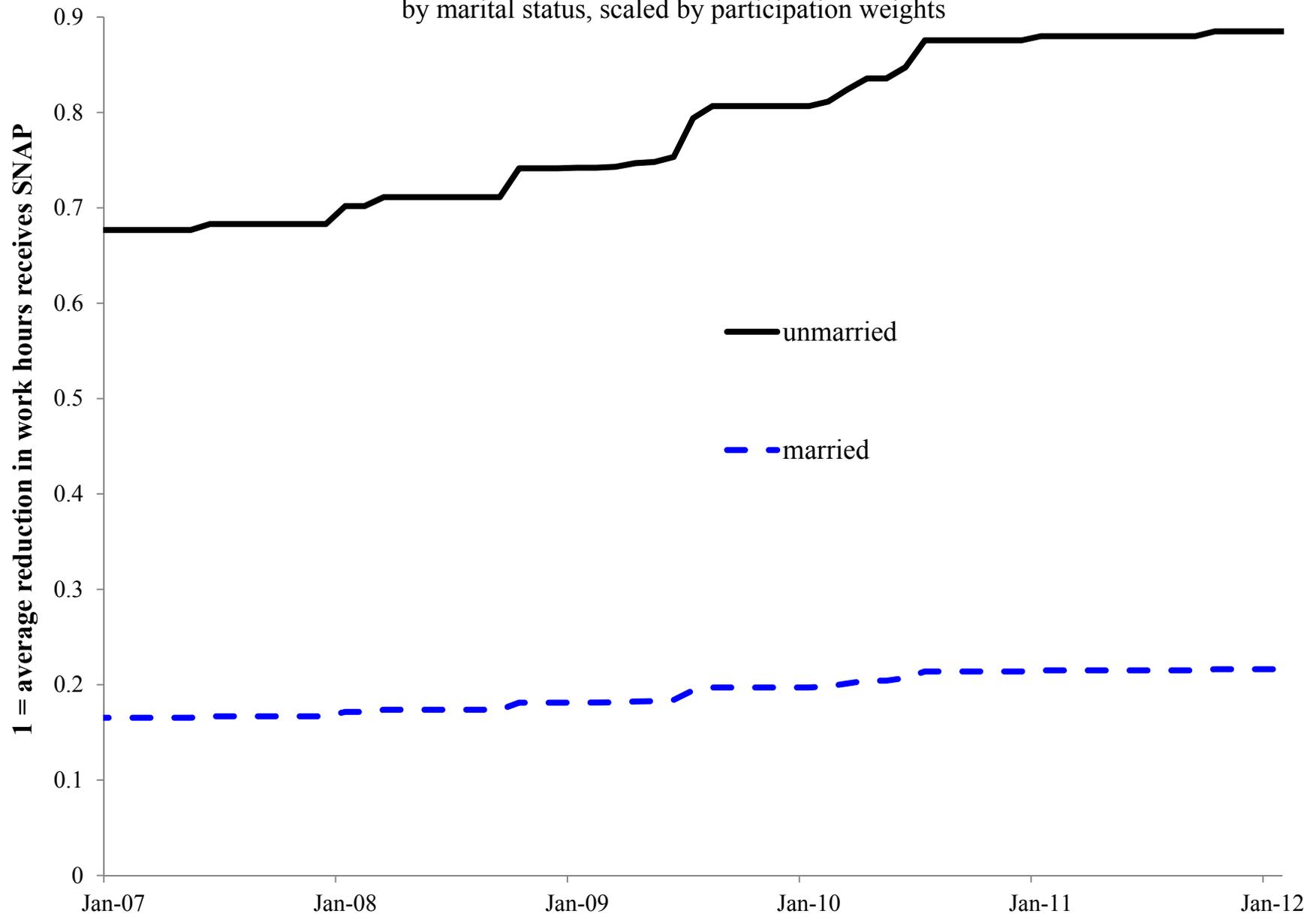
by potential earnings and marital status



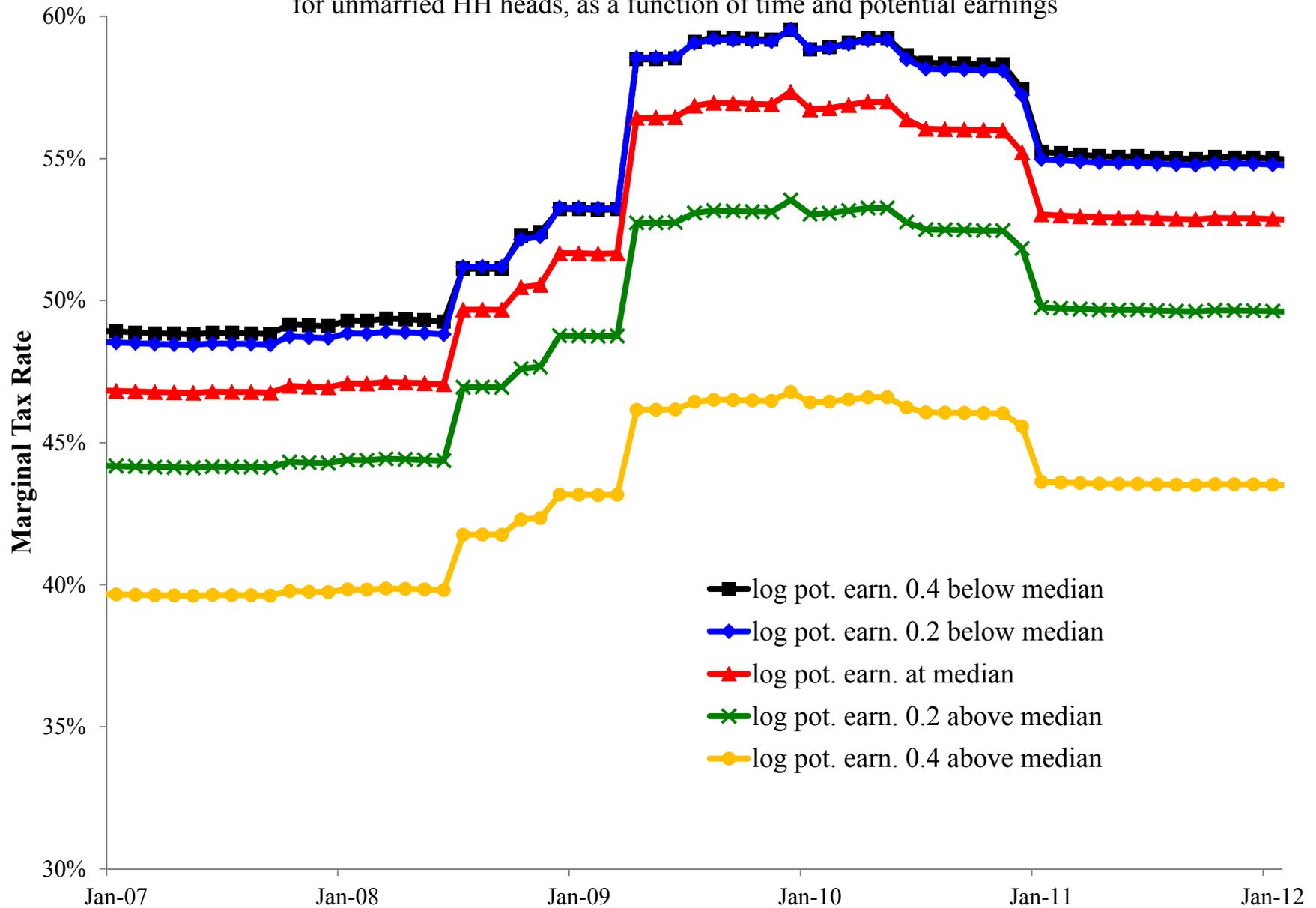
**Figure 3. UI Eligibility Indices**  
as a function of potential earnings, scaled by participation weights



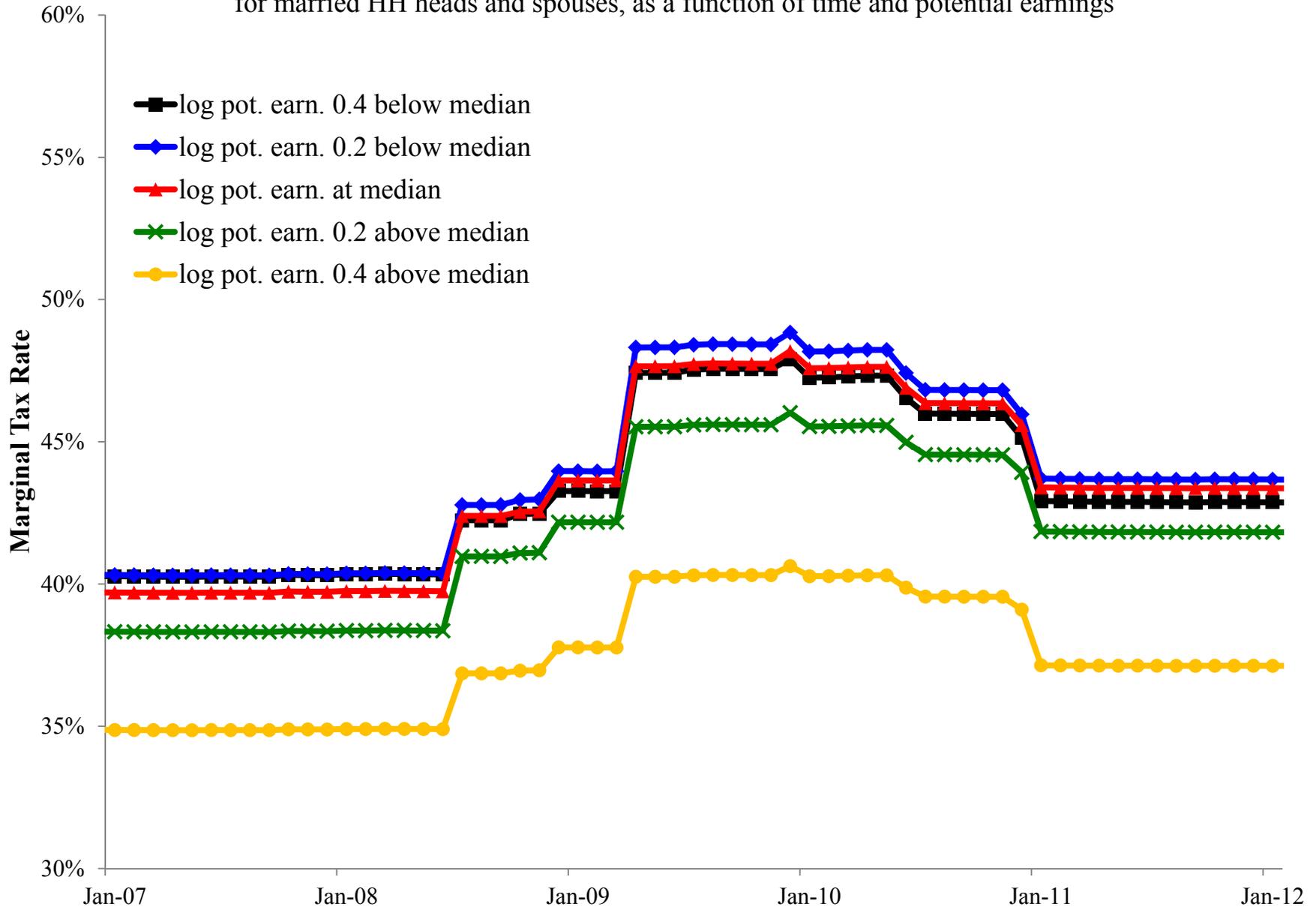
**Figure 4. SNAP Eligibility Indices**  
by marital status, scaled by participation weights



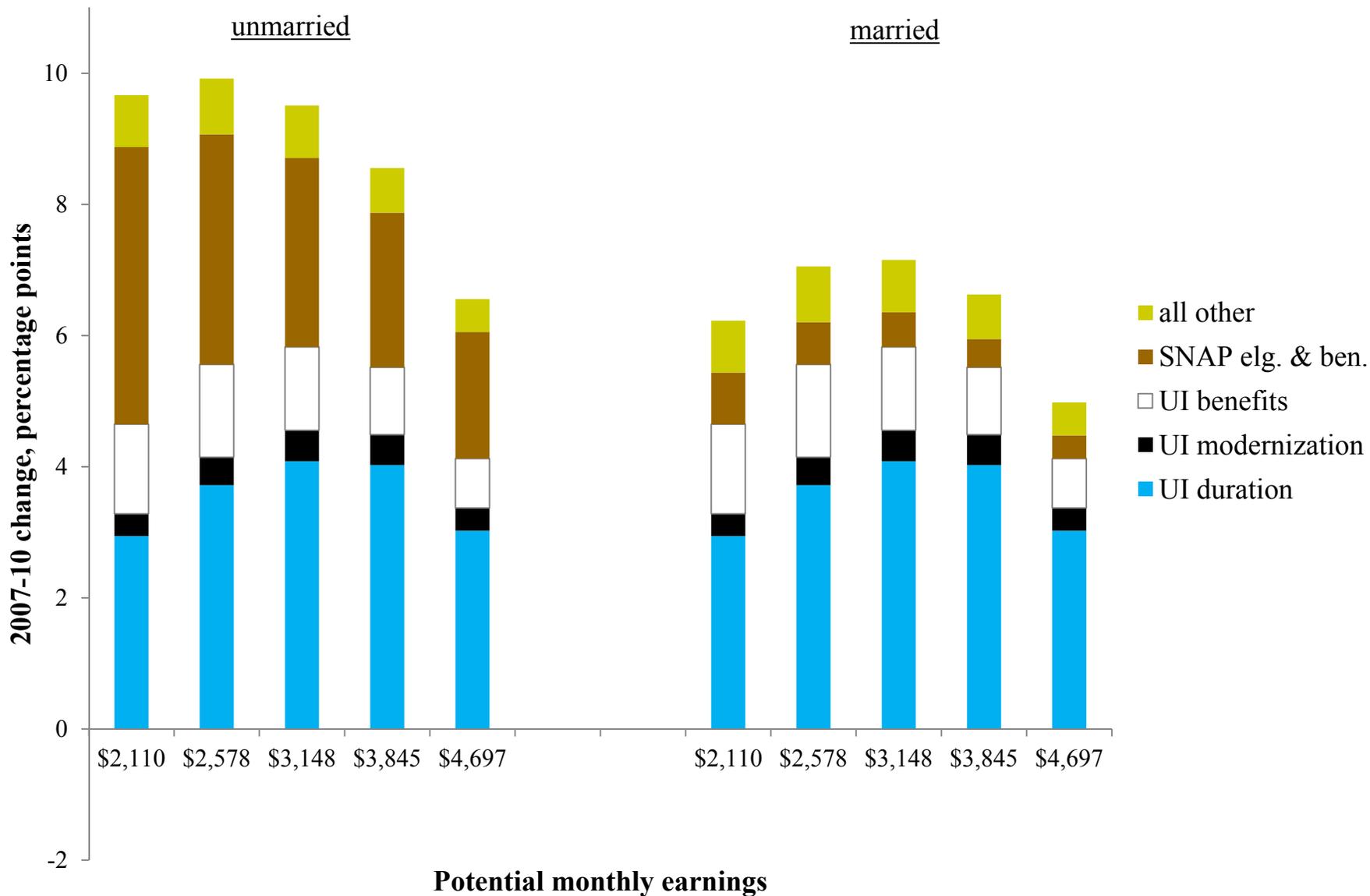
**Figure 5. Statutory Marginal Tax Rates**  
for unmarried HH heads, as a function of time and potential earnings



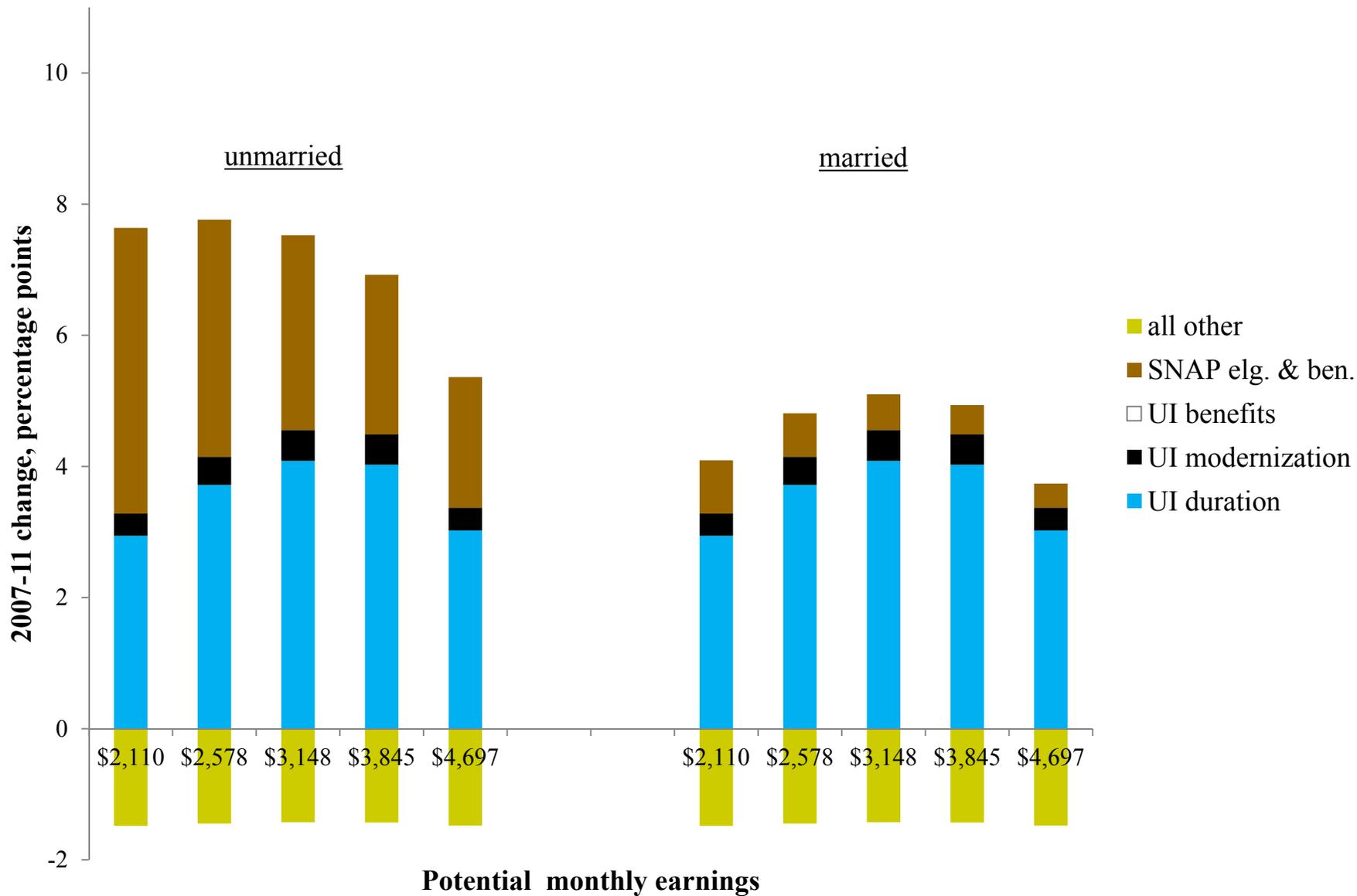
**Figure 6. Statutory Marginal Tax Rates**  
for married HH heads and spouses, as a function of time and potential earnings



**Figure 7. Components of 2007-10 Marginal Tax Rate Changes**  
by potential earnings and marital status

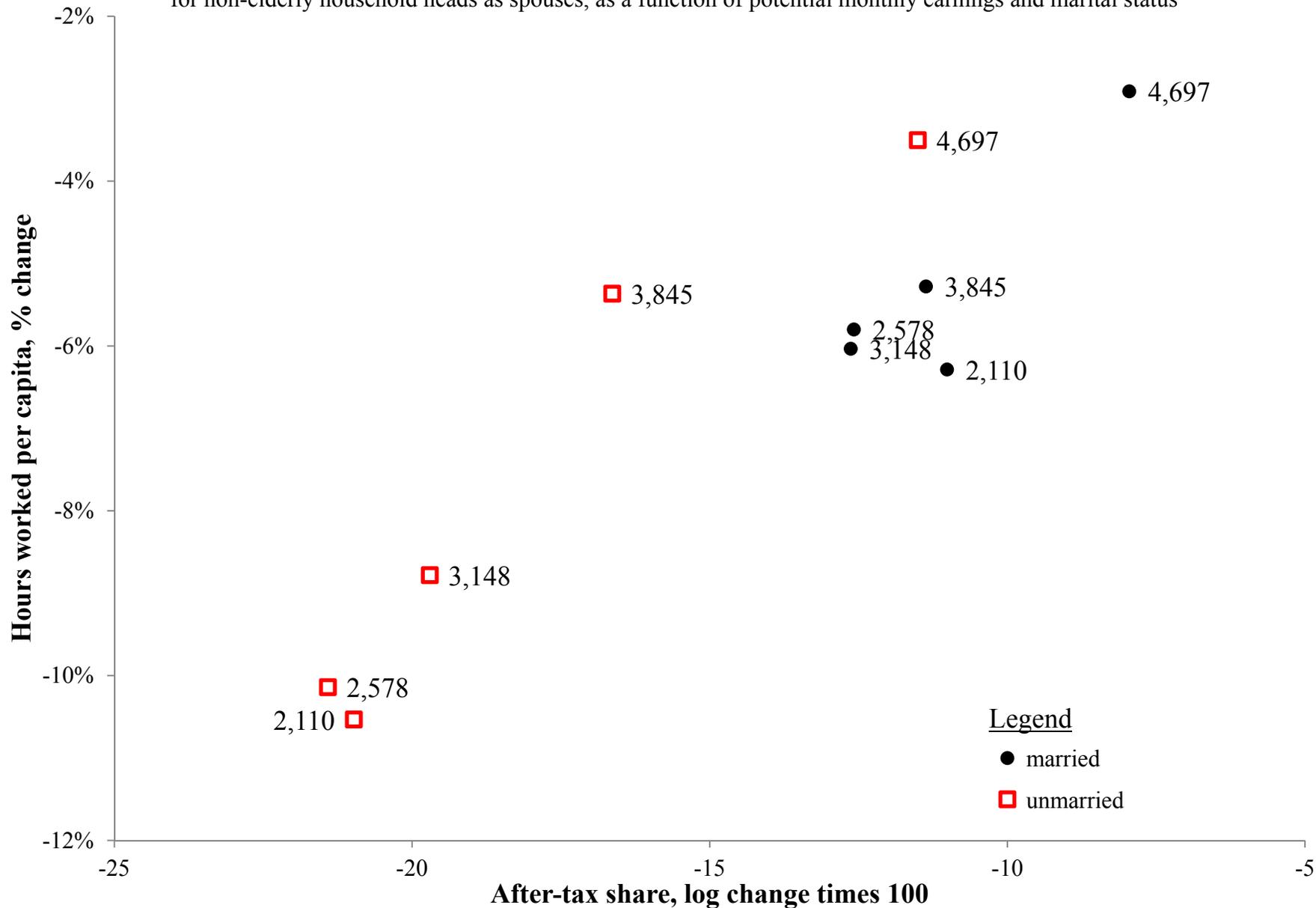


**Figure 8. Components of 2007-11 Marginal Tax Rate Changes**  
by potential earnings and marital status



### Figure 9. 2007-10 Work Hours Change and Work Incentive Changes

for non-elderly household heads as spouses, as a function of potential monthly earnings and marital status



## Bibliography

- Autor, David. "The Unsustainable Rise of Disability Roles in the United States." *NBER working paper*, no. 17697 (December 2011).
- Congressional Budget Office. "Policy Options for the Social Security Disability Insurance Program." *cbo.gov*. July 2012.  
[http://www.cbo.gov/sites/default/files/cbofiles/attachments/43421-DisabilityInsurance\\_print.pdf](http://www.cbo.gov/sites/default/files/cbofiles/attachments/43421-DisabilityInsurance_print.pdf) (accessed September 7, 2012).
- Council of Economic Advisers. *Unemployment Insurance Extensions and Reforms in the American Jobs Act*. Executive Office of the President, 2011.
- Crimmel, Beth Levin. "Employer-Sponsored Single, Employee-Plus-One, and Family Health." *Medical Expenditure Panel Survey*. July 2010.  
[http://www.meps.ahrq.gov/mepsweb/data\\_files/publications/st285/stat285.pdf](http://www.meps.ahrq.gov/mepsweb/data_files/publications/st285/stat285.pdf) (accessed November 10, 2011).
- Dague, Laura. "Effects of Medicaid Premiums and Copayments on Insurance Coverage, Utilization, and Health: A Regression Discontinuity Approach." *manuscript* (University of Wisconsin, Madison), October 2011.
- Duggan, Mark, and Scott A Imberman. "Why are the Disability Rolls Skyrocketing? The Contribution of Population Characteristics, Economic Conditions, and Program Generosity." In *Health at Older Ages: The Causes and Consequences of Declining Disability among the Elderly*, by David M. Cutler and David A. eds. Wise, 337-79. Chicago: University of Chicago Press (for NBER), 2009.
- Dynarski, Susan, Judith Scott-Clayton, and Mark Wiederspan. "Simplifying Tax Incentives and Aid for College: Progress and Prospects." Edited by Jeffrey R Brown. *Tax Policy and the Economy* 27 (forthcoming 2013).
- Elsby, Michael W., Bart Hobijn, and Aysegul Sahin. "The Labor Market in the Great Recession." *Brookings Papers on Economic Activity*, Spring 2010: 1-48.
- Eslami, Esa, Kai Filion, and Mark Strayer. "Characteristics of Supplemental Nutrition Assistance Program Households: Fiscal Year 2010." *Supplemental Nutrition Assistance Program (SNAP) Studies*. September 2011.  
<http://www.fns.usda.gov/ora/menu/Published/snap/FILES/Participation/2010Characteristics.pdf> (accessed November 5, 2011).

- Farber, Henry S., and Robert Valletta. "Extended Unemployment Insurance and Unemployment Duration in The Great Recession: The U.S. Experience." *Institute for the Study of Labor*. June 23, 2011. [http://www.iza.org/conference\\_files/UnIRE2011/valletta\\_r3299.pdf](http://www.iza.org/conference_files/UnIRE2011/valletta_r3299.pdf) (accessed February 19, 2012).
- Feldstein, Martin, and Andrew Samwick. "Social Security Rules and Marginal Tax Rates." *National Tax Journal* 45, no. 1 (March 1992): 1-22.
- Gruber, Jonathan, and David A. Wise. *Social Security and Retirement around the World*. Chicago: University of Chicago Press (for NBER), 1999.
- Hanson, Kenneth, and Margaret Andrews. *State Variations in the Food Stamp Benefit Reduction Rate for Earnings*. EIB-46, United States Department of Agriculture, Economic Research Service, March 2009.
- Herkenhoff, Kyle F., and Lee E. Ohanian. "Foreclosure Delay and U.S. Unemployment." March 19, 2012. [https://sites.google.com/site/kyleherkenhoff/z-list/foreclosure\\_delay\\_unemployment\\_3\\_19\\_12\\_edit.pdf](https://sites.google.com/site/kyleherkenhoff/z-list/foreclosure_delay_unemployment_3_19_12_edit.pdf) (accessed July 26, 2012).
- Herkenhoff, Kyle F., and Lee E. Ohanian. "Labor Market Dysfunction During the Great Recession." *NBER working paper*, no. 17313 (August 2011).
- Kotlikoff, Laurence J., and David Rapson. "Does it pay, at the margin, to work and save?" In *Tax Policy and the Economy*, edited by James M. Poterba, 83-144. Cambridge, MA: National Bureau of Economic Research, 2007.
- Liebman, Jeffrey B. "The Impact of the Earned Income Tax Credit on Incentives and Income Distribution." *Tax Policy and the Economy*, 1998: 83-119.
- Meyer, Bruce D., Wallace K.C. Mok, and James X. Sullivan. "The Under-Reporting of Transfers in Household Surveys: Its Nature and Consequences." *NBER Working Paper*, no. 15181 (July 2009).
- Mulligan, Casey B. *The Redistribution Recession*. New York: Oxford University Press, forthcoming, 2012.
- National Bureau of Economic Research. *Marginal Tax Rates, Federal Only*. October 15, 2010. <http://www.nber.org/~taxsim/marginal-tax-rates/af.html> (accessed February 8, 2012).
- Pear, Robert, and Jennifer Steinhauer. "Tax Cut Extension Passes; Everyone Claims a Win." *New York Times*, February 18, 2012: A16.
- Sherman, Arloc. "Poverty and Financial Distress would have been Substantially Worse in 2010 without Government Action, New Census Data Show." *Center on Budget and Policy*

- Priorities*. November 7, 2011. <http://www.cbpp.org/files/11-7-11pov.pdf> (accessed November 21, 2011).
- Solon, Gary, Robert Barsky, and Jonathan A. Parker. "Measuring the Cyclicity of Real Wages: How Important is Composition Bias?" *Quarterly Journal of Economics* 109, no. 1 (February 1994): 1-25.
- United State Department of Agriculture. "Able Bodied Adults without Dependents." *Food and Nutrition Service*. February 16, 2012. <http://www.fns.usda.gov/snap/rules/memo/PRWORA/abawds/abawdspage.htm> (accessed April 21, 2012).
- United States Department of Agriculture. "SNAP-Statewide Able Bodied Adults without Dependents (ABAWD) Waivers Effective Immediately for Eligible States." *Food and Nutrition Service*. February 25, 2009. <http://www.fns.usda.gov/snap/rules/memo/2009/022509.pdf> (accessed April 21, 2012).
- . "Supplemental Nutrition Assistance Program (SNAP)-Able Bodied Adults without Dependents Waivers for Fiscal Year 2012." *Food and Nutrition Service*. May 3, 2011. [http://www.fns.usda.gov/snap/rules/Memo/PRWORA/abawds/waivers\\_2012.pdf](http://www.fns.usda.gov/snap/rules/Memo/PRWORA/abawds/waivers_2012.pdf) (accessed April 24, 2012).
- United States Department of Labor. "Unemployment Insurance Program Letter No.14-09." *Employment and Training Administration*. February 26, 2009. [http://wdr.doleta.gov/directives/corr\\_doc.cfm?DOCN=2715](http://wdr.doleta.gov/directives/corr_doc.cfm?DOCN=2715) (accessed January 18, 2012).
- . "Unemployment Laws and Insurance." *Chronology of Federal Unemployment Compensation Laws*. May 3, 2011. <http://workforcesecurity.doleta.gov/unemploy/pdf/chronfedlaws.pdf> (accessed October 28, 2011).
- Yelowitz, Aaron S. "The Medicaid Notch, Labor Supply, and Welfare Participation: Evidence from Eligibility Expansions." *Quarterly Journal of Economics* 11, no. 4 (November 1995): 909-39.