

MARRIAGE PENALTY RELIEF IN THE 2001 AND 2003 TAX CUTS: IMPLICATIONS FOR HORIZONTAL EQUITY*

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INTRODUCTION

HORIZONTAL EQUITY IS COMMONLY DEFINED as the “equal” treatment of “equals.” The principle is generally regarded as a desirable public policy goal, as it is similar in spirit to the fourteenth amendment of the U.S. Constitution, which limits the powers of government bodies by conferring equal protection under the law to individuals. There are, however, critics of the notion of horizontal equity. Kaplow (2001) argues that there is no independent normative basis for horizontal equity and that it is in conflict with the basic principles of welfare economics. In addition, even proponents of horizontal equity recognize the thorny issues that arise in defining what constitutes “equals.” In an attempt to refine the notion of equals, Galbiati and Vertova (2008) restate the definition of horizontal equity as “Individuals treated equally by a policy should be those who are deemed normatively equals.” (p. 385) They noted that horizontal inequity arises when equals are defined in a normatively non-appropriate way, whereby a policy treats differently equals defined in the appropriate way. Thus, their definition places more emphasis on the normative definition of equals.

In relation to the tax system, horizontal equity dictates that those deemed as equals should bear similar tax burdens. Defining equals and providing for their equal treatment in the current tax system is an exceedingly difficult task, as the principle often conflicts or is intertwined with other goals including vertical equity, efficiency, and transparency. This paper is the beginning of the first step in the direction of laying out a normative case for horizontal equity.

AUERBACH AND HASSETT MEASURE

Auerbach and Hassett (2002), henceforth referred to as AH, created a measure of horizontal

equity based on the functional form developed by Atkinson (1970). The measure is derived from a preference function that values consumption across different dates and states of nature and relaxes the von Neumann-Morgenstern axioms of expected utility. AH’s measure of horizontal equity uses a normal probability density function $f(\cdot)$ to determine the reference group at income level i over some distance defined by differences of group i ’s income, y_i , and group k ’s income, y_k . The peak of the density function occurs at $k = i$. The standard deviation of the density function determines the range of income used to define the reference group for income class i . Thus, a smaller standard deviation implies a smaller income range for the reference group. The number of members, N_k , in each reference group is constant over all k . Thus, the measure for group i is given by

$$H_i = \left[\sum_k b_{ik} \frac{1}{N_k} \sum_j \left(\frac{1-t_{kj}}{1-\tilde{t}_i} \right)^{1-\gamma} \right]^{\frac{1}{1-\gamma}},$$

where γ is the parameter of inequality aversion within the reference group; b_{ik} is the weight for each individual in the reference group which depend on γ and assign more weight to lower income reference group members; t_{kj} is the average tax rate for the j^{th} member of group k ; and \tilde{t}_i is the representative tax rate for group i . An aggregate index of horizontal equity is given by

$$\tilde{H} = \left[\frac{\sum_i \left(\sum_k f_i(y_k - y_i) N_k \right)^{\sim{1-\rho}} y_i \left(1-\tilde{t}_i \right)^{1-\rho} H_i^{1-\rho}}{\sum_i \left(\sum_k f_i(y_k - y_i) N_k \right)^{\sim{1-\rho}} y_i \left(1-\tilde{t}_i \right)^{1-\rho}} \right]^{\frac{1}{1-\rho}},$$

which is not independent of the inequality aversion parameter across classes, ρ .

AH applied their measure of horizontal equity to two datasets, the NBER Michigan tax panel and the 1994 NBER tax file. The Michigan tax panel collected income and tax data on 5,022 households over a 12-year time frame, from 1979 to 1990.

*The views expressed in this paper are those of the authors and do not necessarily reflect those of the Internal Revenue Service or the Baker Institute for Public Policy.

When the measure was applied to the 12-year average data, the results indicated that horizontal equity was higher, the lower the aversion to inequality. AH subsequently applied the measure over each individual year to analyze the change in horizontal equity over the time frame, which encompasses the passage of the 1981 and 1986 tax reform acts. The results indicated that horizontal equity was generally reduced by the 1981 tax act. Tax reform in 1986, however, had a positive effect on horizontal equity. Horizontal equity continued to improve over the subsequent four years of the sample, particularly in the middle- to upper-income ranges.

The NBER 1994 tax file, which allowed for analysis of horizontal equity post the 1993 tax act, was utilized to investigate the marriage tax. The dataset contains 90,132 observations. AH subdivided the data into 4,506 groups of 20. They considered the impact on horizontal equity of allowing joint filers to divide their income, deductions, and exemptions and file as single filers. The results indicated that the proposed reform reduced horizontal equity when no income adjustment was included, suggesting an adjustment was necessitated. AH subsequently included an adjustment of income based on family size and the square root of family size. In the case of an income adjustment based on family size, horizontal equity increased at all income levels upon adoption of the reform. When income was adjusted by the square root of family size, adoption of the reform caused horizontal equity to increase in the bottom half of the income distribution and fall in the top half. In both instances, horizontal equity registered a sizeable increase between approximately the 60th and 80th income percentiles, suggesting the case for reducing the marriage penalty is weakest for the upper middle income brackets.

In this paper, we adopt AH's approach to the measurement of horizontal equity. We apply their method to the 1999 IRS Panel data file, which includes household income and tax data from 1999 to 2006. This sample period is particularly interesting since a major part of the 2001 tax cut was intended to reduce the marriage penalty. Thus we begin by examining the effects of the 2001 and 2003 tax cuts on a very simple measure of horizontal equity, which ignores factors other than income that should be included in the definition of equals. In addition, we examine changes in horizontal equity across subgroups of the population that are

affected by the marriage tax or subsidy and the Earned Income Tax Credit (EITC).

A marriage tax (bonus) arises when married couples filing jointly owe more (less) in taxes than if they filed as unmarried single individuals. Marriage penalties are more likely the smaller the variance in the married couple's distribution of income, while a marriage bonus is more likely the larger the variance in the married couples distribution of income. The extent of penalties and bonuses is difficult to assess, as it requires the adoption of theoretical assumptions of behavior of married individuals if they were single and single individuals if they were married. Thus, estimates vary based on the adopted assumptions. In a study conducted by the U.S. Congressional Budget Office (1997), they calculated a net tax bonus to married couples of \$49 billion. The CBO study allocated deductions and custody of children based upon typically observed behavior and utilized a tax minimization strategy. Bull et al. (1999) adopted an alternative method, the resource pooling approach, which assumes that married couples would continue living together, that income would be divided based on earnings, and that the primary earner would claim head of household status and child custody, while the secondary earner would file as a single individual. The utilization of this method yielded a net marriage tax of \$1.6 billion.

Those most likely to incur a marriage penalty are two-income households where there is little variance in earnings. Of particular interest are two-income earning households at the top and bottom of the income distribution. At the top of the income distribution, the passage of the Omnibus Budget and Reconciliation Act in 1993, which increased tax rates on the upper income brackets, exacerbated the presence of the marriage penalty in this group. Bull et al. (1999) calculated that 61 percent of couples with incomes over \$100,000 were penalized for marriage status. The 2001 and 2003 tax cuts failed to directly address the marriage penalty burden on upper-income households, although the repeal of limitations on itemized deductions and exemptions may have had some positive effect on measured inequality. Thus, it is expected that horizontal inequity for this group remains. Our results appear to confirm this expectation.

At the bottom of the income distribution, the structure of the EITC, with phase-in levels, phase-out levels, and child credits, penalizes married two-income earning households. Holtzblatt and

Rebelein (2000) concluded that between 4 percent and 12 percent of married EITC-eligible couples are penalized under the tax system, and though estimates vary based on underlying assumptions, they calculated EITC marriage penalties that total \$21 billion. In another study, Hoffman (2004) simulated the presence of EITC marriage penalties. He found the existence of a marriage penalty in every possible situation involving two-income households and the presence of children, with the largest penalty occurring in equal earning low-income households.

Both Holtzblatt and Rebelein (2000) and Hoffman's (2004) estimates of the marriage penalty in EITC eligible couples were calculated prior to full adoption and enactment of the legislation passed in 2001 and 2003 which was geared towards reducing the marriage penalty in low-income households. The Economic Growth and Tax Reduction Act of 2001 created a new 10 percent tax rate bracket, increased the width of the 10 percent and 15 percent tax brackets for joint filers to twice the width of the bracket for single filers, and increased the standard deduction to double that of single filers. However, these changes were scheduled to be phased in over several years. The Jobs and Growth Tax Relief and Reconciliation Act of 2003 accelerated the adoption of these measures to phase in during 2003 and 2004, but after 2004 they reverted to the phase-in schedule under the 2001 Act. It is expected that the new measures aimed at reducing the marriage penalty would have a positive effect on horizontal equity in the lower income brackets. And though our results do indicate the Acts had a positive effect on horizontal equity for this group, significant inequity at the bottom of the income distribution remains, indicating other factors are negatively affecting equity in the low-income brackets.

One of the additional factors affecting equity in lower tax brackets is the EITC's treatment of single childless and married childless adults. In contrast to low-income, single-parent households and single-income married households with children who receive incentives to work through the EITC, low-income childless single adults and childless married couples receive little incentive to enter the workforce, as taxes are levied from the first dollar earned. When including payroll taxes, Social Security taxes, sales taxes, gasoline taxes, and other excise taxes, low-income childless adults bear a heavy tax burden relative to income. Dorrance et al. (2007) noted that the tax rate for married couples

without children earning poverty level wages has held steady at approximately 15 percent for the last 35 years. In contrast, the tax rate faced by married couples with children earning poverty level wages has declined dramatically to approximately 10 percent, reflecting the significant impact of the EITC. And though the EITC provides a generous credit to low-income households with children, the credit available for low-income households without children is comparatively small. In 2006, which corresponds to the final year of our equity analysis, the Tax Policy Center historical data indicates that single individuals without children were eligible for a maximum EITC credit of \$412, with full benefits phasing in at \$5,380, phasing out at \$6,740, and being eliminated at \$12,120. For married couples without children, full benefits phased in with combined earnings of \$7,380, phased out with earnings of \$8,740, and were eliminated when earnings reached \$14,120. The phase-in rate for both single childless and married childless couples at 7.65 percent is significantly below that of one-child households (34 percent) and two-child households (40 percent). This presents a significant challenge to researchers to provide a normative justification for or against such a policy, which is required to properly assess the level of horizontal inequality.

An additional limitation placed on childless low-income workers, is an age requirement. The EITC is only available to those with qualified earnings between the ages of 25 and 64. The age requirement limits those that dropped out of high school or went straight from high school into low-wage positions from receiving EITC benefits. For those with children, an EITC age requirement does not exist. The complexities of the program and tax filing system, along with the limited benefits, have likely played a role in the high nonparticipation rate in the EITC program for childless single adults and childless married couples. Dorrance et al. (2007) report nonparticipation for this group at near 60 percent. Low participation and limited benefits available for this population is reflected in the distribution of EITC benefits. Dorrance et al (2007) reported that in 2002, married childless couples accounted for 3 percent of EITC recipients, but only 1 percent of total disbursed benefits, with the average benefit received at \$233. Single childless adults accounted for 22% of EITC recipients and received only 3 percent of total disbursed benefits, with an average benefit of \$205. In contrast, single women with children accounted for 37 percent of

EITC recipients and received 49 percent of total benefits, with an average benefit of \$2,040, while married couples with children accounted for 31 percent of recipients and received 39 percent of total benefits, with an average benefit of \$1,932. The research suggests that there is significant potential for horizontal inequity in the low-income brackets, attributable in part to the EITC program, which is less generous to dual-income households with children and childless individuals. Our results appear to confirm this expectation.

DATA

We apply AH’s method of measuring horizontal equity to the IRS 1999 based longitudinal panel spanning from 1999 to 2006. This time frame allows for analysis of the effects of the 2001 and 2003 tax reforms on horizontal equity. The IRS dataset initially contained 83,385 tax returns. Returns that were not filed every year were removed, as were returns where income in any given year was less than \$0, and returns where tax payments exceeded income. We also removed returns that had a tax rate of more than 25 percent of average income. Our final dataset consisted of 53,073 tax returns. Of the 53,073 returns, 53,060 returns were randomly selected and subdivided into groups of 20 based on income, which resulted in 2,653 observations. Table 1 provides income, tax payment, and tax rate data broken down by income percentile. The data reflects the 20 group averages.

As the basic tax data appears to suggest, horizontal inequity within the tax system persists. Horizontal inequity is particularly apparent in the lower and upper income brackets.

RESULTS

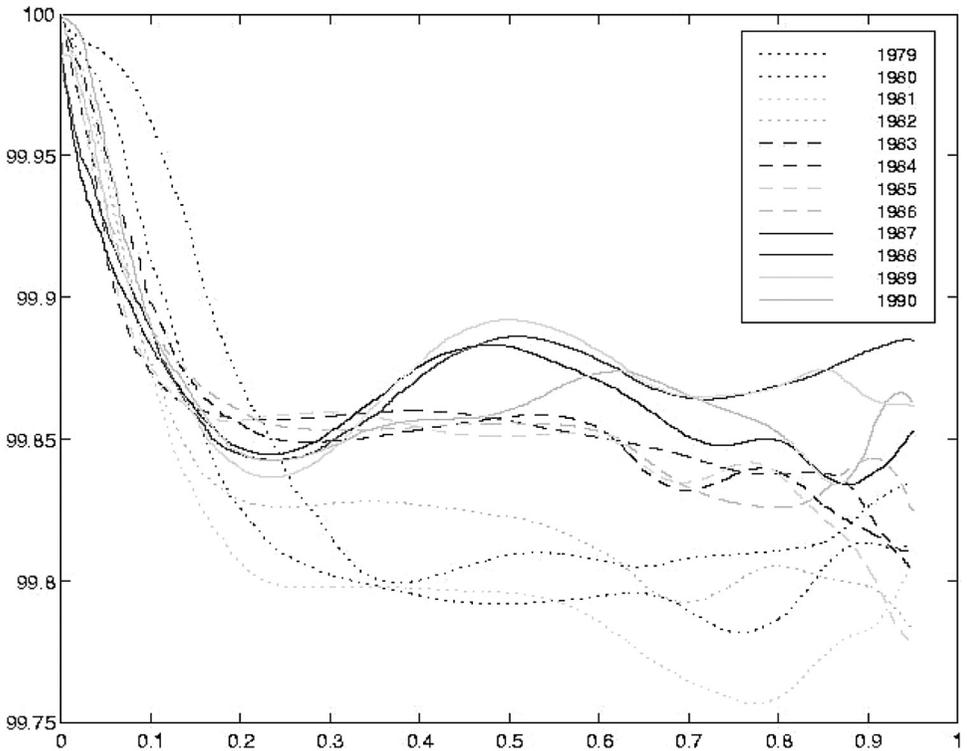
We begin by calculating the value of H_i dependent only on adjusted gross income and federal income tax (a replication of the results in AH, Figure 4). Figure 1 presents a replication of the results in AH’s Figure 7 graphing values of H_i over the 1979 to 1990 time period with $\gamma = 2$ and log scaling using a value of 0.1. We plot H_i against household income percentile. As our results mimic AH’s original results, the accuracy of our model is substantiated.

Figure 2 shows H_i calculations for each year in the 1999 based panel for the full sample with $\gamma = 2$ and log scaling using a value of 0.1. Compared to the results in AH’s original study, we see that there is a disproportional amount of horizontal inequity at the bottom and top of the income distribution, while equity is high for those in the middle third of the distribution has increased. Compared to AH’s results, the equity index for those in the top third of the income distribution is considerably more varied. We believe that the substantial amount of variation in our graphs is due to differences between the datasets, as well as changes in the tax code benefiting high-income earners. In the Michigan dataset, the highest observed income is about \$250,000 compared to \$455,167,109 for the IRS

Table 1
Income and Tax Payment Data by Income Percentile

<i>Income Percentile</i>	<i>Income</i>	<i>Tax Payment</i>	<i>Tax Rate</i>
0.0%	\$809.14	\$12.62	1.6%
5.0%	\$11,908.02	\$2,211.52	18.6%
10.0%	\$16,129.42	\$1,718.09	10.7%
20.0%	\$23,734.41	\$2,686.33	11.3%
30.0%	\$31,935.55	\$3,071.77	9.6%
40.0%	\$41,784.25	\$4,854.01	11.6%
50.0%	\$53,759.69	\$7,803.26	14.5%
60.0%	\$69,423.22	\$7,425.68	10.7%
70.0%	\$95,573.71	\$13,866.11	14.5%
80.0%	\$203,052.93	\$34,920.13	17.2%
90.0%	\$1,678,828.81	\$449,358.06	26.8%
95.0%	\$6,254,132.35	\$1,880,600.22	30.1%
100.0%	\$455,167,109.51	\$100,679,462.43	22.1%

Figure 1: **Reproduced from Auerbach and Hassett (Figure 7, 1999)**
Data Michigan Tax panel 1979-1990



dataset. Thus we expect to see much more variation at the top of the income distribution in our results.

Changes in the tax code from 1990 to 2006 have also affected the results. Since 1990, ordinary income tax rates for the upper income brackets have increased, while capital gains and dividend tax rates have decreased. In addition, the stock market boom in the late 1990s and the housing boom in the early 2000s have likely played a role, as our results may reflect an increased use of stock options, the mortgage interest deduction, and other financial tax avoidance measures. Tax laws relating to increased 401K, IRA, and other retirement account options and the creation of flexible spending accounts are also likely to play a roll in the variations in equity within this group. However, these are only conjectures as of now and are going to be the focus of future work on this issue.

The most striking feature in Figure 2 compared to AH's Figure 7, which is reproduced in this paper as Figure 1, is the apparent relative decrease in

horizontal equity in the bottom third of the income distribution. This suggests that it may be important to examine the effect of tax policies from 1990 to 2000 on horizontal equity. To further investigate horizontal equity in this group, we subset the population and graph the equity index for those located in the bottom third of the income distribution.

Figure 3 shows H_i calculations for each year in the 1999 based panel for the lowest third of the income distribution. From the 8th to 32nd percentile, horizontal equity increased over the 1999 to 2006 time frame. However, for households in the bottom 8th percentile of the income distribution, horizontal equity declined over the sample period, as equity was highest in 1999, 2000, and 2006. The graph indicates that the tax acts of 2001 and 2003 negatively affected equity for this portion of the population. As stated previously, equity levels in the bottom third of the distribution are lower in comparison to the AH levels. We suggest that the EITC and the related treatment of dual-income

Figure 2: Index of Horizontal Equity: Individual Years, 1999-2006

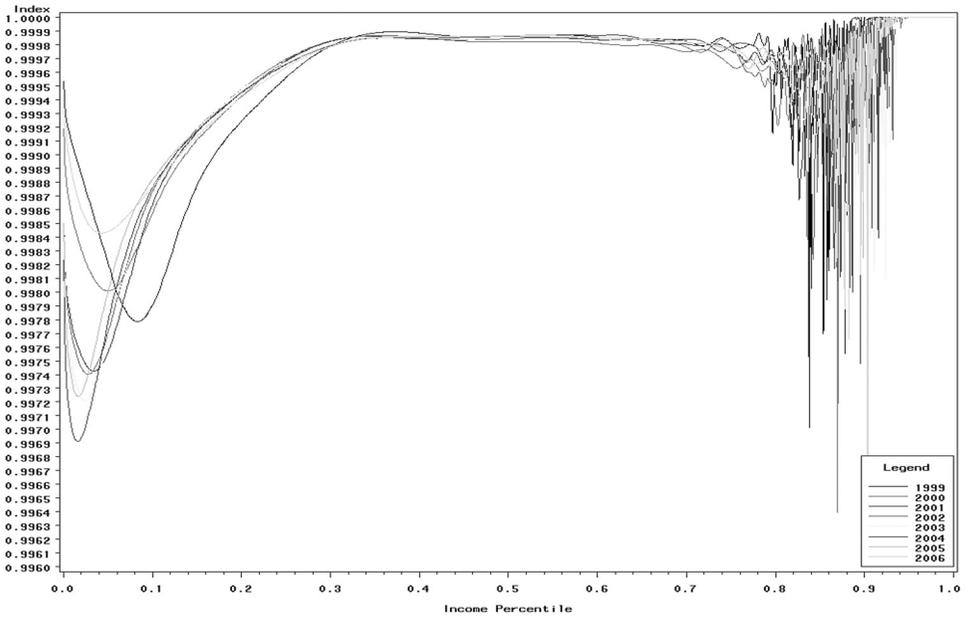
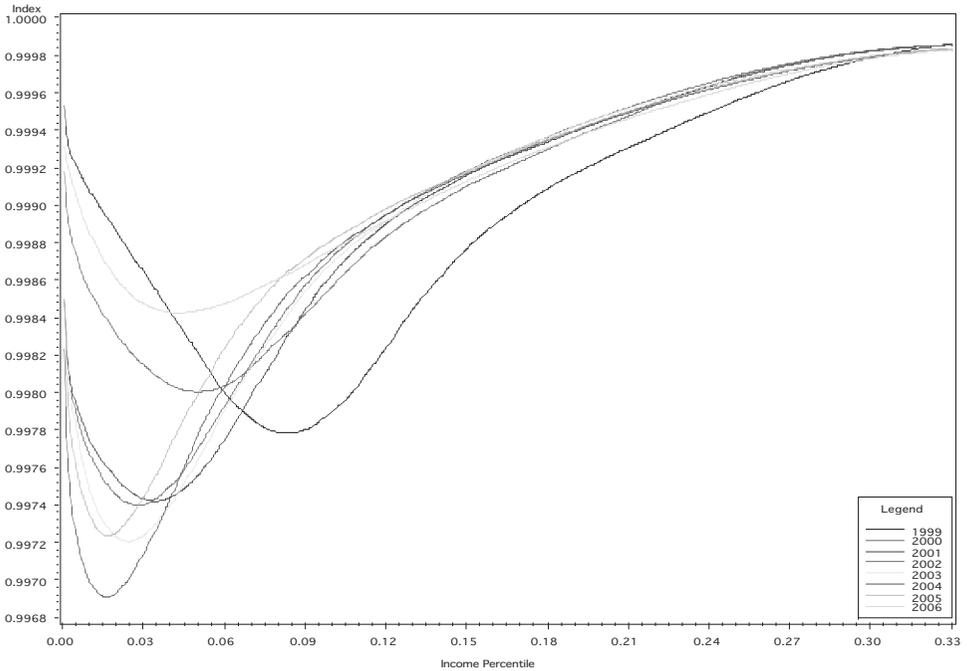


Figure 3: Index of Horizontal Equity: Individual Years, 1999-2006



households with children and childless adults is affecting the measured amount of horizontal equity in this group. The question remains if such differences in treatment are normatively justifiable.

Figure 4 shows H_i calculations for those that took the EITC and for those that did not take the EITC for 1999 and 2006. The horizontal axis depicts income as opposed to the income percentile. This graph indicates that horizontal equity has declined from 1999 to 2006 for taxpayers that claim the EITC, aside from those with incomes below \$4,000. By comparison, horizontal equity is approximately unchanged for those taxpayers that did not take the EITC at the same income levels, although horizontal equity did register a sizeable decline for taxpayers with incomes below \$7000 who did not claim the EITC.

Figure 5 shows H_i calculations for married and single filers for 1999 and 2006. This graph shows that equity for low-income married couples has

increased over the time frame, indicating the Tax Acts of 2001 and 2003 did have some positive effects on equity for this group. However, for low-income single adults, inequity remains and has increased for those earning between \$10,000 and \$30,000. We suggest the structure of the EITC program for low-income childless adults with limited benefits and low phase-in rate, along with low participation in the program by low-income single adults are contributing to the continued inequity in this group.

Figure 6 shows H_i calculations for married filers with kids and married filers without kids for 1999 and 2006. Although equity for both groups has increased over the sample period, significant inequity remains for low-income married couples with children. We believe the sizeable marriage penalties present in the EITC system for low-income two-earner households are contributing to the reduced equity levels in the population.

Figure 4: Index of Horizontal Equity: Year 1999 vs. 2006: EITC

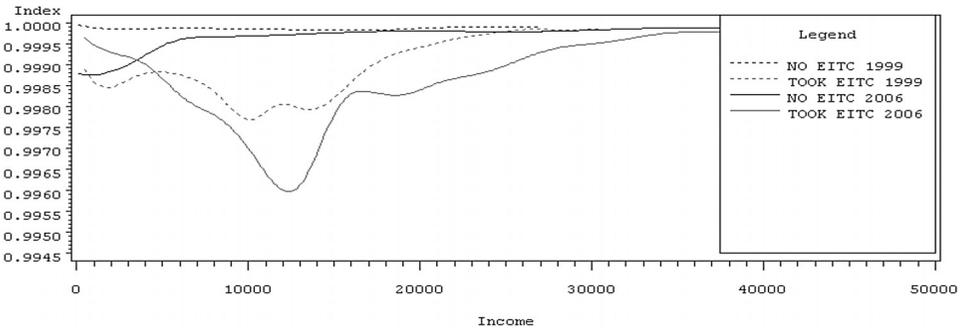


Figure 5: Index of Horizontal Equity: Year 1999 vs. 2006: MARITAL STATUS

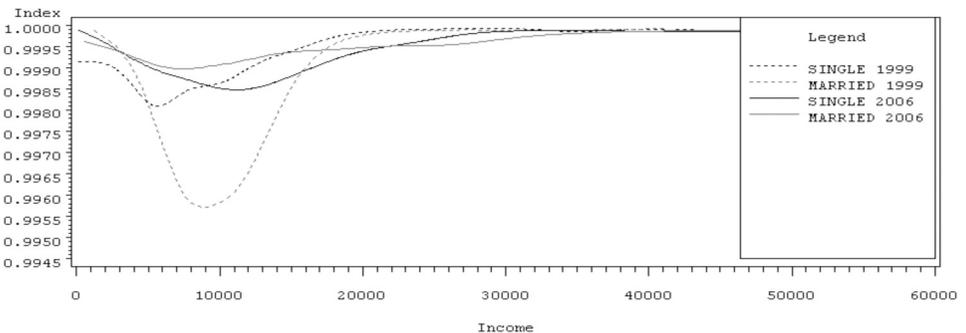
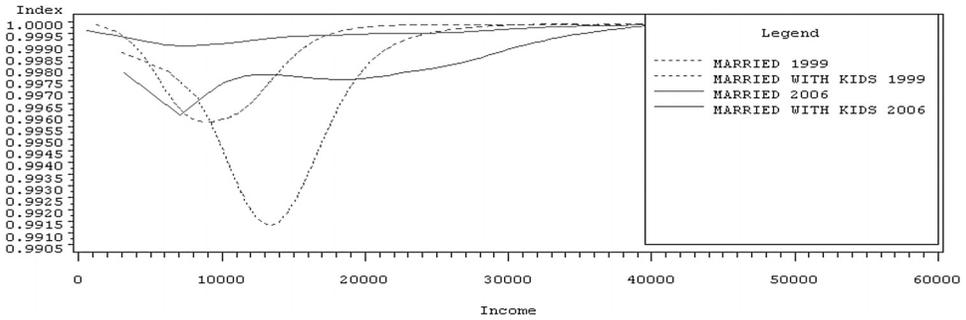


Figure 6: Index of Horizontal Equity: Year 1999 vs. 2006: MARRIED WITH KIDS



CONCLUSION

While it is possible to provide rough measurements of the amount of horizontal equity over a sample period, normative judgments about which taxpayers are “equals” is still a troublesome problem. The general conclusion of this analysis is that much work remains to be done if a reliable measure of horizontal equity is to be created. Future research should be focused on developing a normative framework that allows justifiable groups of “equals” to be compared. This work is just a small step in that direction.

References

Atkinson, Anthony B. On the Measurement of Inequality. *Journal of Economic Theory* 2 (September 1970): 244-263.

Auerbach, Alan J. and Kevin A. Hassett. A New Measure of Horizontal Equity. *American Economic Review* 92 (September 2002): 1116-1125.

Bull, Nicholas, Janet Holtzblatt, James R. Nunns, and Roberta Rebelein. *Defining and Measuring Marriage Penalties and Bonuses*. Washington, D.C.: Office of

Treasury Analysis, U.S. Department of Treasury, 1999. OTA Paper 82.

Dorrance, Jessica L., Daniel P. Gitterman, and Lucy S. Gorham. *Expanding the EITC for Single Workers and Couples Without Children*. Chapel Hill, NC: University of North Carolina at Chapel Hill Press, 2007.

Galbiati, Roberto and Vertova, Pietro. Horizontal Equity. *Economica* 75 (May 2008): 348-391.

Hoffman, Saul. The EITC Marriage Tax and EITC Reform. *Tax Notes* 104 (August 2004): 935-941.

Holtzblatt, Janet and Robert Rebelein. Measuring the Effect of the EITC on Marriage Penalties and Bonuses. *National Tax Journal* 53 (December 2000): 1107-1134.

Kaplow, Louis. Horizontal Equity: New Measures, Unclear Principles. (Commentary) In Kevin Hassett and R. Glenn Hubbard, eds. *The Role of Inequality in Tax Policy*, pp. 75-97. Washington, D.C.: American Enterprise Institute, 2001.

U.S. Congressional Budget Office. For Better or Worse: Marriage and the Federal Income Tax. Washington, D.C., 1997.