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IS OUR FISCAL SYSTEM DISCOURAGING MARRIAGE? A NEW LOOK AT THE MARRIAGE TAX

Elias Ilin
Laurence J. Kotlikoff
Melinda Pitts

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ABSTRACT

We provide a new measure of the marriage tax – the percentage change in remaining lifetime (future) spending from marrying. (Equivalently, the increase in future net taxes divided by initial future spending.) We calculate this tax for young respondents to the 2016 Survey of Consumer Finance, impute the tax facing single young respondents to the 2018 American Community Survey (ACS), and study whether the tax alters the ACS respondents' decisions to marry. We control for endogenous spousal selection by assuming clone marriage – marriage to oneself. Our clone-marriage tax is comprehensive, intertemporal, and actuarial. It includes all key federal and state tax and benefit programs, weighing the present value of extra net taxes along each marital survivor path by the path's probability. The weighted average marriage tax – 2.69 percent – is very large, corresponding to a year or two of lost earnings for most singles. The range of clone-marriage tax rates – -74.4 percent to 45.8 percent – is equally remarkable. The average marriage tax rate is twice as high for the poor than for the rich and twice as high in some states than in others. Marriage taxation has a small overall impact on marrying, but a substantial impact for subgroups. Absent the tax, 13.7 percent more low-income, single females with children would marry annually and 7.5 percent more would be married by age 35. Our results are robust to assuming ACS singles marry higher- or lower-earning variants of themself and to adjusting for partial benefit takeup. Clearly, making each fiscal policies marriage neutral or using the federal income tax to annually adjust a couple's total net tax burden to ensure it's twice that of singles represent two ways to eliminate marriage taxation. An alternative, partial reform lies in adopting universal health insurance whose receipt is not income based. As we show, Medicaid and the ACA embed substantial marriage taxes.

Elias Ilin
Federal Reserve Bank of Atlanta
1000 Peachtree St NE
Atlanta, GA 30309
Elias.Ilin@atl.frb.org

Melinda Pitts
Federal Reserve Bank of Altanta
1000 Peachtree Street NE
Atlanta, GA 30309-4470
melinda.pitts@atl.frb.org

Laurence J. Kotlikoff
Department of Economics
Boston University
270 Bay State Road
Boston, MA 02215
and NBER
kotlikoff@gmail.com

1 Introduction

This paper develops a new measure of the marriage tax to study whether the U.S. fiscal system impacts marriage decisions of single respondents to the American Community Survey (ACS). In calculating marriage taxes, we control for selection of spouses by assuming clone marriage – marriage to oneself as well as higher- and lower-earning variants of oneself. Our *clone-marriage tax* is comprehensive, intertemporal, and actuarial. It incorporates all important federal, state tax and benefit programs and weighs the present value of additional net taxes from marrying along each marital survivor path by the path's probability. We calculate clone-marriage taxes for young single and singleized (hypothetically divorced) respondents to the Survey of Consumer Finances. Next, we use the SCF results to impute marriage taxes to 2018 ACS respondents who were single in 2018. Finally, we consider whether the marriage tax lowered the single ACS respondents' propensity to marry.

Marriage, at least in the U.S., matters. It stabilizes relationships (Lundberg et al. 2016; Waite 1995), improves children's outcomes (Amato 2005; DeLeire and Lopoo 2010; McLanahan and Sawhill 2015), facilitates spousal human-capital development (Matouschek and Rasul 2008), and mitigates a range of risks (e.g., Kotlikoff and Spivak (1981)). It also protects marital investments through the provision of alimony. The many social, economic, health, and related advantages to marriage underlie the longstanding concern with marriage taxation, specifically its potential discouragement, postponement, and shortening of marriage.[1]

Marriage taxes (subsidies) are often discussed with reference to federal income-tax brackets, specifically whether raising a household's income via marriage places it in a higher bracket. Remaining in the same bracket is described as *marriage neutrality*. Federal income-tax brackets are largely marriage neutral. But other features of the federal income tax, state income taxes, and federal and state-specific benefit programs, are decidedly non-neutral.[2] A

[1] For example, see Moffitt (1992), Alm and Whittington (1995a), Whittington and Alm (1997), Dickert-Conlin and Houser (1998), Dickert-Conlin (1999), Alm and Whittington (1999), Gibson-Davis et al. (2005), Wilcox et al. (2016), and others.

[2] Moffitt (1992) provides a comprehensive analysis of the plethora of incentives and disincentives, including those influencing marriage and divorce, underlying the U.S. fiscal system.

prime example are transfer programs whose eligibility criteria and payment amounts depend on family, not individual income. For low-income singles, the potential marriage-related loss of benefits, whether cash or in-kind, otherwise provided by Medicaid, Obamacare, Food Stamps, TANF, Section-8 Housing, the Earned Income Tax Credit, etc., can be major to huge.

Including the entire gamut of fiscal policies is clearly important. A dollar's a dollar. Whether marriage raises taxes by X or cuts benefits by X and does so in one program rather than another should be irrelevant. Marriage, moreover, is viewed as a long-term commitment. Considering only immediate taxes and benefits can readily under or overstate the penalty. Social Security provides a clear example. Its mandatory FICA tax payments when working deliver Social Security benefits when retired. For married couples, these benefits include spousal and widow(er) benefits. Leaving out those future marriage-specific benefits will clearly overstate the net marriage tax. Finally, marriage ends, or is anticipated to end, when *death do us part.*[3] Hence, it's critical to consider spending per person along all survivor paths. It's also essential to define spending inclusive of non-discretionary spending, such as imputed rent and property taxes on owned homes, government-provided in-kind (non fungible) benefits, such as Medicare, and bequests, whether intended or not, that arise along each survivor path.

Our marriage tax measure equals the expected (over survivor paths) percentage change in a couple's collective future spending from marrying themself or variants of themself compared with their combined future spending were the couple to remain single.[4] Thus, if a single SCF respondent's expected future spending is S, then the clone couple's combined spending when single is 2S. If their collective expected spending as a couple is M, the clone marriage tax is $(M-2S)/2S$. *Expected* references forming the actuarial average of future spending along all survivor paths, i.e., weighing future spending on each path by the probability of that path

[3]It is assumed that individuals do not anticipate divorcing at the time the decision to marry is made.
[4]The assumed alternative to not marrying is never marrying.

and then summing all weighted future spending amounts.[5] When a respondent marries a lower-earning version of themself, the marriage tax is $(M_l - (S + S_l)/(S + S_l)$, where M_l and S_l reference, respectively, collective expected future marital spending when marrying a lower-earning variant and expected future spending of a single low-earning variant. The marriage tax on marrying a high-earning variant is $(M_h - (S + S_h)/(S + S_h)$, where h references high-earning variant.

How do these measures relate to higher future net taxes paid due to marriage? As we make clear below, future spending, whether of a single or married household, equals the household's future resources (current net worth plus the present expected value of remaining lifetime resources) less its future net taxes. This is simply a reflection of lifetime budget balance, which holds along each household survival path. Getting married is assumed to leave future resources unchanged. Hence, the absolute change, due to marrying, in a respondent's future spending – the numerator in our tax rate – equals the respondent's change in future net taxes.

Our clone-marriage tax differs markedly from the standard couple-specific measure in most of the literature. The couple-specific measure compares taxes paid by a married couple to what the two spouses would jointly pay were they divorced. The use of this measure raises endogenous selection issues. To see this in stark relief, suppose singles adamantly refuse to marry anyone who will raise their taxes. Also suppose that singles search less intensively for a marriage partner due to the low odds of finding one that's tax friendly. Then all couple-specific marriage taxes would be zero or negative. And relating, as Alm and Whittington (1999) do, the probability of marriage to the couple-specific marriage tax (computed for actual married couples and for singles with assigned/imputed/projected spouses) would miss the tax's main impact, namely reducing partner search and marriage-proposal acceptance.[6]

Defining the marriage tax as we do is designed to limit selection problems and to capture

[5]Hence, for the couple, all survivor paths except one – the path where both spouses live to their maximum ages of life – will involve periods of widow(er)hood, widow(er)hood that's assumed to not include remarriage.

[6]This may explain some of the differences in our results and theirs.

the fiscal system's overall impact on marrying as opposed to its impact on marrying a specific person, namely one's actual or statistically assigned spouse. The trick is simply to a) not condition the tax's calculation on the characteristics of actual or assigned spouses and b) not include characteristics of eventual actual spouses or those of assigned spouses as determinants of the marrying probability. Instead, our clone and clone-variant taxes impact all actions leading up to and including marrying – to search, to pairing up, to potentially cohabiting, and to ultimately marrying with the expectation that if one does marry, it will be to someone like them or to higher- or lower-earning variants.

Each of the ACS singles will be at one stage of this process including having given up search, having decided marriage is not for them at this time, and having just set a wedding date. But past clone-marriage taxes are surely highly correlated with current clone-marriage taxes. Hence, our analysis is best understood as studying the impact of marriage taxation on the probability that someone who is single at the beginning of 2018 reaches the point of marrying before the time of the survey in 2018 knowing the likely impact of marriage taxation if they marry someone like themself. The clone-marriage tax assumes perfect self-marriage. The variants assume clone-marriage except to a clone who earns 50 percent more or 50 percent less.

The 2018 ACS indicates whether respondents married over the prior year. But it lacks many of the inputs needed to form clone-marriage tax rates. To surmount this problem, we calculated clone-marriage tax rates for single and singleized (hypothetically divorced) young respondents to the 2016 SCF and statistically match the two surveys to impute clone-marriage tax rates facing ACS singles. One variable the ACS does record, but the SCF does not is respondents' states of residence.[7] As described below, we use the ACS to impute state residency. Doing so leads to the requirement of calculating the clone-marriage tax for each SCF household 51 times – one for each of the 50 states plus Washington, D.C.

[7]To be precise, the publicly released version of the SCF does not include state identifiers. The Federal Reserve's data base does include state residency. But survey weights are national rather than state-specific, which is what's needed.

1.1 Calculating Clone-Marriage Net Tax Rates in the SCF

Our SCF sample includes all single individuals as well as *singleized* married or partnered SCF respondents age 20-49. This age range spans the bulk of family formation.[8] Singleizing, which we do to increase sample size, involves pseudo-divorcing married and partnered couples, allocating half of all assets to each spouse. Children are assumed to live with their mothers or the primary respondent in the case of same-sex couples. Calculating clone-marriage tax rate of singleized respondents is quite different from the common practice (e.g., Whittington and Alm (1997), among others) of comparing a couple's total taxes when married with its total taxes when divorced. Both calculations pseudo-divorce married couples. But the clone marriage tax considers the tax on marrying oneself, not the change in taxes from divorcing one's current marriage partner.

To compute clone marriage taxes for our SCF singles and singleized sample, we turned to the Fiscal Analyzer (TFA), introduced in Auerbach et al. (2016, 2017) and Altig et al. (2020a,b). TFA is a life-cycle, consumption-smoothing research tool that calculates lifetime spending for single individuals and married or partnered couples. The tool incorporates all major federal and states taxes and benefit programs. It smooths consumption subject to cash-flow constraints and considers all survival paths that single individuals or married couples might experience. Respondents' states of residence, number and ages of children, earnings levels, income levels, asset levels (including taxable retirement accounts balances that will produce future taxable income), and family compositions can materially influence their marriage taxes. This variation interacting with the extreme non-linearities of the 20 federal and state major tax and benefit programs, including Social Security with its 12 separate benefits, lets us identify the impact of marriage taxation on the probability of marrying. It also permits determining differential responses to gross marriage taxes and transfer claw-backs.

Table 1 lists the federal and state fiscal programs included in TFA and, thus, our marriage-

[8] See Alm and Whittington (1995a); Moffitt (1994).

tax measure. As indicated, marriage neutrality means that per-person taxes and benefits are not altered by clone marriage. The table indicates that thirteen of the twenty tax/benefit programs are not marriage neutral. See Appendix A for program-specific details.

Table 1: Marriage Neutrality for Taxes and Benefits Included in Marriage Tax Calculation

Taxes and Tax Credits	Rules Level	Marriage Neutral for Clone Marriage
Personal Income Tax	Federal, State	No
Earned Income Tax Credit (EITC)	Federal, State	No
Child Tax Credit (CTC)	Federal, State	Yes
Federal Insurance Contributions Act (FICA) Tax	Federal	Yes
Corporate Income Tax	Federal, State	Yes
Estate and Gift Tax	Federal, State	Yes
Property Tax	State	Yes
Sales Tax	State	Yes
Excise Tax	Federal	Yes
Benefit Programs		
Social Security Benefits	Federal	No
Social Security Disability Insurance (SSDI)	Federal	No
Supplemental Security Income (SSI)	Federal	No
Medicaid/Children's Health Insurance Program (CHIP)	Federal, State	No
Medicare Part B Premiums	Federal	No
Medicare Benefits	Federal	Yes
Marketplace Subsidies	State	No*
Supplemental Nutritional Assistance Program (SNAP)	State	No
Temporary Assistance for Needy Families (TANF)	State	No
Section 8 Housing Vouchers	State, County	No
Child Care and Development Fund (CCDF) Subsidies	State, County	No

*Marriage subsidization can arise if the combined income of a couple is higher than the minimum-income eligibility threshold.
Source: Federal Reserve Bank of Atlanta Policy Rules Database (Ilin and Terry 2021)

1.2 Preview of Findings

Our calculated weighted average clone-marriage tax is a 2.69 percent. There is a substantial variation by income, with households in the lowest income quintile facing an average marriage tax of 3.71 percent — more than twice the 1.49 percent average rate faced by the top-income quintile. Average marriage tax rates also vary substantially across states – ranging from 1.53 percent in New Mexico to 3.99 percent in Hawaii. These state differences are due to a range of state-specific tax and benefit provisions, most notably differences in Medicaid eligibility. Across our sample of 4,396 SCF respondents ages 20-49, the minimum marriage tax rate is -74.4 percent, due to the fact that marriage to a partner with children can provide a

childless clone access to the ACA premium subsidy in states that did not expand Medicaid. The maximum rate is 45.8 percent, driven, in the main, by the loss of Medicaid and housing subsidies.

Across all respondents, the presence of children does little to alter the marriage tax rate, as child-tax subsidies offset transfer claw-backs. The gross tax rate is -0.50 percent for those with children and 0.33 percent for those without children. The transfer claw-back rate is 3.18 percent for those with children and 2.36 percent for those without. The case of bottom-quintile single women is of particular interest. We find no impact, on average, of children on the average marriage tax.[9]

We find a statistically and economically significant negative impact of the marriage tax on the likelihood of marriage among ACS singles. Take, for example, 20 to 49-year-old single females with children. A one percentage point increase in the tax rate decreases the 2018 probability of marrying by 3.69 percentage points. These findings are robust across multiple specifications, including adjusting the marriage tax for partial take-up of benefits and defining the marriage tax rate based on marrying higher- and lower-earning clone variants.

Our simulations show that absent marriage taxation, females and males in the baseline clone-marriage simulation with children and incomes in the bottom quintile would have, on average, 13.68 and 1.46 percentage point higher marrying rates, respectively. For those without children, eliminating marriage taxation would increase their propensity to marry by 4.70 percentage points for low-income females but by 5.10 percentage points for low-income males. The tax-induced reduction in the annual marrying rate has implications for the stock of marriage. For 25-year-old, low-income females with children, the marriage tax reduces their chances of being married ten years later by 7.52 percentage points.

The U.S. fiscal system can certainly be reformed to eliminate marriage taxation. This could be done by either making each fiscal policy marriage neutral or using the federal income

[9]The presence of children increases the average transfer claw-back rate from 4.40 percent to 5.13 percent, but decreases the average gross tax rate from -0.68 to -1.42 percent, leaving the overall average marriage tax rate unchanged at 3.71 percent.

tax to annually adjust a couple's total net tax burden to ensure it is twice that of singles. An alternative, partial reform lies in adopting universal health insurance whose receipt is not income based. As we show, Medicaid and the ACA embed substantial marriage taxes.

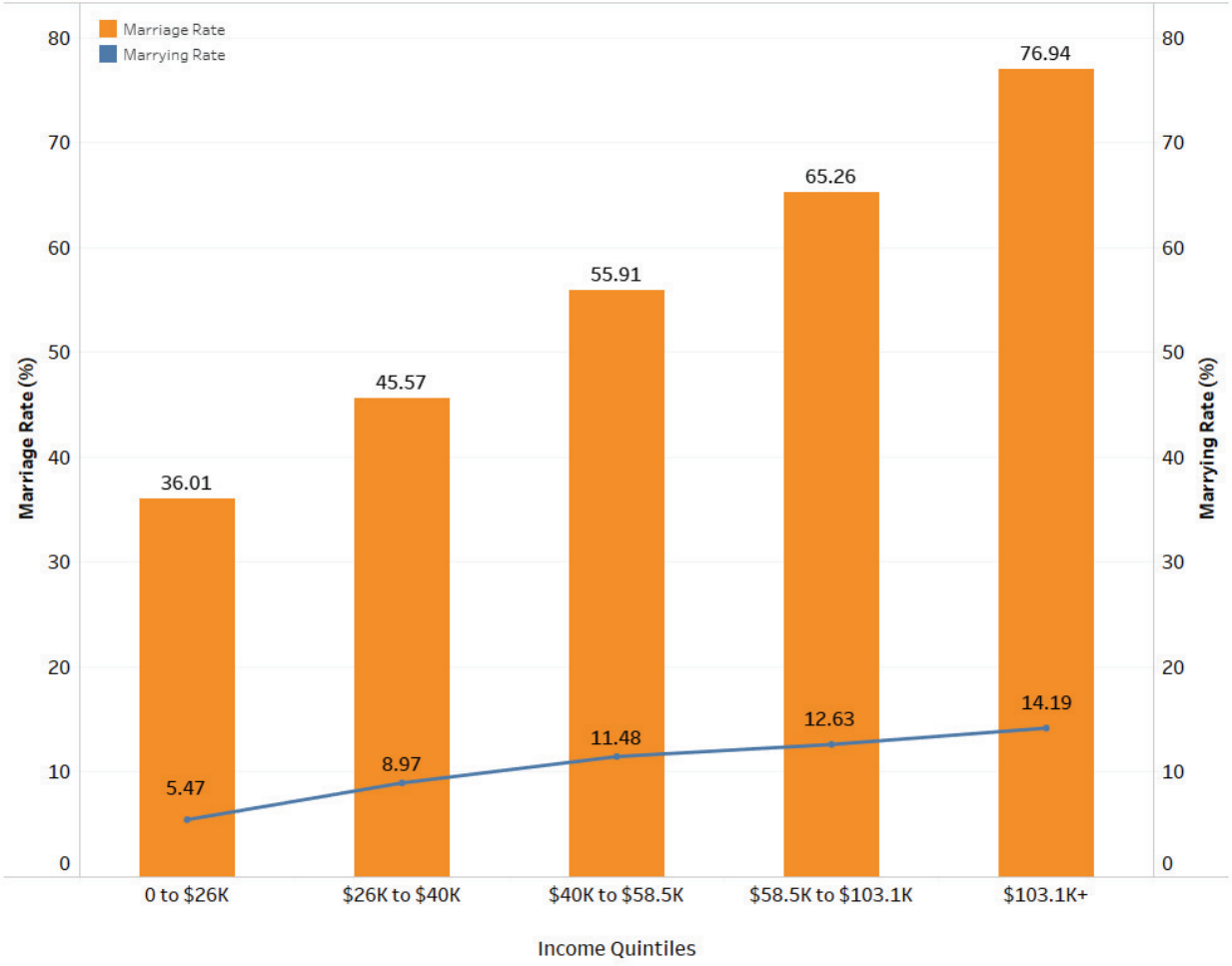
2 Background

Figure 1 charts, by personal income quintiles, the share of married ACS respondents (the marriage rate) as well as the fraction of respondents who reported marrying in the prior year (the marrying rate). For both measures, there is a gap between high- and low-income groups as the rate of marrying increases with income. Over time, this difference in marrying leads to significant gaps in the stock of marriage. For example, only 5.47 percent of those who were single and had annual incomes below $26,000 in 2017 married in 2018, compared to 14.19 percent with annual incomes above $103,100. The marriage rate shows similar differences. Only 36.01 percent of individuals with annual incomes below $26,000 are married, while the marriage rate for those with annual incomes above $103,100 is more than double, at 76.94 percent.

These statistics are troubling given that marriage is correlated with economic well-being. Waite (1995), using Health and Retirement Study (HRS) data, shows that married couples' average per capita wealth is more than twice that of the never married. Zissimopoulos et al. (2015) also uses HRS data and finds that married men have higher lifetime earnings than unmarried men – $840,000 and $600,000 respectively. In addition, compared to cohabitants, those who marry have healthier behaviors, better career outcomes, and lower mortality. The reasons for these better outcomes are social, arising from the support of family and friends, religious, publicly demonstrated via a religious ceremony, and legal, due to child support requirements and alimony agreements or, in rare cases, court-ordered judgments (Waite 1995).

The higher economic well-being of married individuals reflects many factors. Marriage

Figure 1: Marriage and Marrying Rates by Income. Age 20-49.



Notes: The marriage rate is the married share of the population. The marrying rate is the share of the population that married in the prior year.
The income quintiles are based on the total current-year earned and unearned income from all sources of the single respondent before the simulated marriage.
Source: U.S. Census Bureau, 2018 American Community Survey 1-Year Estimates

offers a way for couples to share the costs of investing in public goods, from air conditioners to children. Marriage also acts as a commitment device that promotes cooperation among spouses and increases marriage-specific investments (Matouschek and Rasul 2008; Lundberg and Pollak 2015).

Children also benefit materially from having married parents. They are more likely to succeed in school, be gainfully employed, and achieve upward economic mobility. Amato (2005) and McLanahan and Sawhill (2015) find parents' investment in their children is higher

among married couples relative to cohabitating couples, which positively affects the children's cognitive and social-emotional development and their life chances. Lerman et al. (2017) analyze data from the National Longitudinal Survey of Youth and find that relative to adult children who lived with both parents at age 14, adult children who lived with a single parent at age 14 have completed 0.36 fewer years of school, are 3.9 percentage points less likely to be working full-time, have 12 percent lower personal income, and 21 percent lower family income. However, Lang and Zagorsky (2001) show that some of these adverse outcomes might be caused by other social and economic circumstances correlated with having a single parent. Using parental death as an exogenous cause of absence, they find that the death of a mother negatively affects cognitive performance of a daughter and the death of a father decreases a son's chance of marriage.

3 Prior Literature

The prior literature generally measures the marriage tax on a couple-specific basis. As indicated, this tax compares actual and, in some cases, imputed married couples' total net taxes before and after hypothetical divorce. Some studies simply compare how changes over time in the federal income tax differently impacted married versus single households. Alm and Whittington (1996) is an example. They use the data from the Panel Study of Income Dynamics (PSID) to consider eight such changes enacted between 1968 and 1993. Their main conclusion? Taxation of married couples has risen over time relative to that of singles.

Rosen (1987) examines couple-specific marriage taxes pre- and post enactment of the Tax Reform Act of 1986. As he shows, forty percent of his sample of married IRS tax returns faced a substantially higher marriage tax. Fifty-three percent experienced a substantially higher marriage subsidy. Couples with similar incomes were penalized the most. Feenberg and Rosen (1994) perform a similar analysis after the implementation of the Omnibus Budget Reconciliation Act of 1993, which altered income-tax rules. They show that the average

marriage tax changed from a slight subsidy to a slight penalty. But they also indicated substantial variation by income. For higher-income couples the average tax more than doubled. And certain low-income couples experienced marriage taxes amounting to 18 percent or more of income. Compared to Rosen (1987), a larger share – 53 percent – were being taxed, with a smaller share – 38 percent – being subsidized.

Dickert-Conlin and Houser (1998) include AFDC, Food Stamps, and SSI benefits in addition to the federal income tax in assessing the marriage tax. Their data are the 1990 Survey of Income and Program Participation (SIPP) to calculate and their focus is on young and middle-aged, low-income married couples with children. They find that most of their sample would enjoy sizeable benefit increases, but partially offsetting federal income tax hikes were they to divorce. They report similar results from simulating marriage for single women and calculating the change in joint benefits and income taxes.

Alm and Whittington (1995b) explores the relationship between aggregate marriage rates and marriage taxes. They compute income taxes paid by single men and women by applying the relevant yearly federal income tax schedules to the median income of men and women in each year, assuming a standard deduction and one personal exemption. They then compute the income tax paid for married couples by applying the tax schedules to the sum of the median income of single men and women, with the couple filing a joint return with the standard deduction and two personal exemptions. They compute the marriage tax in two ways. The first method calculates the difference between the married tax liability minus the total tax liability for the two single individuals. The second method uses the ratio of the married tax liability to the sum of the two spouses tax liabilities when single. They report a small negative elasticity, with a decline in the marriage tax of 20 percent leading to a one percent increase in the aggregate rate of marriage. Sjoquist and Walker (1995) perform a similar analysis on aggregate marriage rates and find that the marriage tax affects only the timing and not the rate of marriage. Dickert-Conlin (1999) also explores the impact of couple-specific marriage taxation but focus on the probability of separation. Their data

are a sample of married women in the 1990 SIPP. Dickert finds some, albeit weak, evidence that higher income taxes and lower benefits reduce marriage. Alm and Whittington (1999) calculate marriage taxes for actual PSID couples and hypothetical PSID couples consisting of singles with assigned spouses. They predict the assigned spouse's income by regressing spousal income on the characteristics of an individual using a sample of married persons. They show that the marriage tax has a small, but significant impact on raising time to first marriage. Alm and Whittington (2003) also use the PSID to explore the role of the marriage tax on the decision to cohabitate versus marry, making use of the panel aspect of the PSID. They first calculate how the couples combined taxes and marginal tax rates would differ between cohabitation and marriage and then explore the impact of both variables on the decision to cohabitate as well as the decision of cohabitants to marry. They found that couples choosing between cohabitation and marriage faced a marriage subsidy, on average, while couples that were already cohabitating faced a marriage penalty, on average. They find a 10 percent decrease in both the marginal tax rate and total tax liability results in a small – 0.3 percent – increase in the probability of marriage and a slightly larger – 0.7 percent – increase in the probability of cohabitants marrying.

Wilcox et al. (2016) also examine the decision to cohabitate versus marry for couples with young children under age 2 using data from the ACS. They report that 66 percent of couples in the bottom quintile and 82 percent in the second and third quintiles would lose Medicaid benefits, welfare benefits, andFood Stamps were they to marry. They report that couples facing the highest net marriage tax are two to four percentage points less likely to be married.

To summarize, the literature measures the size of couple-specific marriage taxes, albeit for a subset of fiscal policies. State income taxes, Social Security benefits, Medicare benefits, and Section-8 Housing are noticeable omissions. The calculated marriage taxes are also static. There is no consideration of the impact of marriage on future taxes or benefits. The literature also studies how federal income tax changes have altered marriage taxation. Such

studies abstract entirely from other fiscal policies.

The literature generally reports small to moderate couple-specific marriage taxes with small marriage impacts. But the marriage tax in these studies leave out much of the current fiscal impact and all of the future fiscal impact from marrying. Moreover, the couple-specific method of measuring the tax raises the aforementioned selection concern. In addition, married couples have likely altered their labor supply decisions to minimize the marriage tax. The selection and labor-supply adjustments militate toward finding smaller marriage taxes and, potentially, smaller impacts of marriage taxation on the propensity to marry.

4 Methodology[10]

4.1 Intertemporal Budget Balance and Definitions

Consider any realized survival path, i, which is the path for which an individual lives to a specific age with a certain probability. Along this path, the realized present value of a household's total remaining lifetime spending (including bequests), S_i, must equal the realized present value of the household's lifetime net resources along the same path. Thus, path-specific intertemporal budgets satisfy

$$S_i = R_i - T_i, \tag{1}$$

where R_i and T_i reference, respectively, the realized present values on path i of the household's remaining lifetime resources and net taxes (including estate taxes). The realized present value of remaining lifetime resources, R_i, is the sum of the household's current net wealth, W, and path i's realized present value of future labor earnings (realized human wealth), H_i. Thus,

$$R_i = W + H_i. \tag{2}$$

[10]The description of The Fiscal Analyzer in this section draws heavily or verbatim from Auerbach et al. (2016, 2017) and Altig et al. (2020a,b), which pre-dates this paper and uses an identical method.

Lifetime spending, S, human wealth, H, the expected present value of remaining lifetime resources (henceforth, lifetime resources), R, and lifetime net taxes, T, satisfy

$$S = \sum_i p_i S_i, \tag{3}$$

$$H = \sum_i p_i H_i, \tag{4}$$

$$T = \sum_i p_i T_i, \tag{5}$$

and

$$R = \sum_i p_i R_i, \tag{6}$$

where p_i is the probability the household experiences survival path i. The above equations imply:

$$R = W + H, \tag{7}$$

$$S = R - T. \tag{8}$$

Expected lifetime net taxes, T, can be decomposed into lifetime total taxes, Z, minus lifetime transfers, B.

$$T = Z - B. \tag{9}$$

Marriage can increase a couple's total tax liability and decrease their total transfer payments relative to their combined pre-marriage total amounts. We define the remaining lifetime net marriage tax rate, τ, as the marriage-induced percentage change in lifetime net resources or, equivalently, lifetime spending due to the marriage-induced change in lifetime net taxes. We further decompose τ into the lifetime gross tax rate, θ, plus the lifetime transfer claw-back rate, ϕ. Thus,

$$\tau = \frac{\Delta Z - \Delta B}{S} \tag{10}$$

$$\theta = \frac{\Delta Z}{S} \tag{11}$$

$$\phi = \frac{-\Delta B}{S}. \tag{12}$$

where ΔZ is equal to combined lifetime taxes of both clones when they are single minus total lifetime taxes when they are married, ΔB is equal to the combined lifetime transfers of both clones when they are single minus total lifetime transfers when they are married, and S is combined lifetime spending of both clones when they are single.

4.2 The Fiscal Analyzer

The Fiscal Analyzer (TFA), introduced in Auerbach et al. (2016, 2017) and Altig et al. (2020a,b), calculates lifetime net resources, lifetime taxes, and lifetime transfers.[11] TFA uses an iterative, dynamic programming method to calculate each household's smoothest living standard path, subject to borrowing constraints, assuming the household head and spouse/partner live to their maximum potential ages. In forming this maximal-longevity (base) path of discretionary spending, TFA takes into account the household's current and future labor earnings, regular and retirement accounts, year-specific demographics, year-specific non-discretionary expenditures on housing, childcare, healthcare, and other off-the-top expenses, and year-specific net taxes (annual taxes paid less annual transfers received). Calculations for all other survivor paths are made as part of TFA's computation of life insurance needs. The program determines annual, non-negative term life insurance amounts for household heads and their spouse/partners. These amounts provide survivors (including children) sufficient resources to achieve precisely the same annual living standard as would arise had no one died.[12] In the course of determining age-specific insurance needs, TFA also calculates survivor-path-specific taxes and transfers. All living standard paths, not

[11] TFA's development has been supported by the National Institute of Aging, Boston University, the Sloan Foundation, the Goodman Institute, the Federal Reserve Bank of Atlanta, and other non-profit entities, as well as Economic Security Planning, Inc. The program's underlying calculation engine is MaxiFi.com, a personal financial planning software program developed by Laurence Kotlikoff through Economic Security Planning, Inc.

[12] When TFA's recommended life insurance is zero, reflecting the program's assumption of no marginal annuity purchases, survivors experience higher living standards.

just the maximum-longevity survival path, are calculated assuming non-negative cash-flow (borrowing) constraints.

The program's iteration resolves the simultaneity between the household's paths of spending, taxes, and transfers. To understand this simultaneity, note that the household's asset income in each year impacts its various tax payments and transfer-payment receipts in that year. But the path of taxable asset income depends on the spending path, which depends on the path of taxes and transfers. Hence, the spending path depends on the tax/transfer path and vice versa. Clearly, the paths of net taxes and spending must be simultaneously determined. A similar chicken and egg problem arises in calculating year-specific life insurance needs. The amount of life insurance needed in a given year depends on the future living standard path that must be insured; i.e., it depends on the base spending path. But the associated insurance premiums limit what can be spent. Hence, the base spending path depends on the base life-insurance premium path. But the base path of life insurance premiums depend on the base path of spending.

TFA is comprised of three dynamic programs that jointly iterate to solve these simultaneity problems for the maximum-longevity case. The first program smooths consumption — maintaining a constant living standard per effective household adult (with adjustments for economies of shared living and the relative cost of children) through time subject to borrowing constraints. The second computes the path of taxes and benefits. The third calculates the path of life insurance needs. Each program takes the outputs of the other two as inputs.

4.3 TFA's Algorithm

TFA's base program smooths consumption utilizing the following dynamic program. Total discretionary expenditures of the household in period t, e_t, satisfies

$$e_t = c_t(N_t + \lambda K_t)^{\gamma} \tag{13}$$

where c_t is consumption per equivalent adult, N_t is the number of adults in the household, K_t is the number of children, and λ is the weight given to the children in the household, assumed to equal 0.7. The parameter γ governs "economies of joint living". Since the goal is to isolate the marriage tax from other potential costs and benefits of marriage, we set γ the economies of joint living to one, thus ignoring potential savings due to cohabitation. We assume that all non-disabled children leave the household when they reach age 19. Disabled children are assumed to remain in the household through the year of death of the last remaining spouse/parent.

The dynamic program starts from the final year, F (set to 100), in which a household head or spouse/partner could be alive. In the final year, the household consumes all resources:

$$e_F = x_F,$$

, where x references the household's cash on hand in the final year, F. Cash on hand includes regular (non-retirement account assets), labor income, asset income, withdrawals from retirement accounts, plus all other income less all fixed expenses on housing, other off-the-top expenditures, such as alimony and child support payments, specified bequests, and funeral expenses, as well as net tax payments. In-kind benefit payments are incorporated after the fact when determining the lifetime marriage tax rate τ. Home equity is treated as trapped and not spent in year F. But the present, actuarial value of bequests, whether specified or not, including trapped equity, is included in our measure of lifetime spending.

For periods $t < F$,

$$c_{t+1} = \begin{cases} \phi(x_{t+1}), \text{ if } e_t < x_t \\ x_t \text{ otherwise} \end{cases} \tag{14}$$

where ϕ is a consumption function and

$$x_{t+1} = x_t - e_t \tag{15}$$

TFA's second dynamic program also involves a recursion. It relates the life insurance needs at time t of a spouse in a given year of potential widow(er)hood – to maintain their living standard and that of the children through their maximum age of life – to the needs at time $t+1$ as well as cash flows at time t. TFA's third dynamic program calculates the value of all taxes and transfers for all programs listed in table 1. TFA determines eligibility in each year for each transfer program and computes the estimated value of that benefit. Each dynamic program takes the outputs of the other programs as inputs. The algorithm iterates between the three programs until convergence, at which point TFA multiplies survivor-path-specific results by the survivor path's probability and calculates expected present values.[13]

4.4 The 2016 Survey of Consumer Finances and the Calculation of Marriage Tax Rates

The SCF is a cross-sectional survey of U.S. families conducted every three years. The SCF includes detailed information on household labor and asset income, assets and liabilities, and demographic characteristics. Appendix A, table 1 provides summary statistics for the SCF respondents in our artificially "singleized" data set.

Next, we project the lifetime earnings of the single and "singlelized" respondents and run the projected earnings through TFA to calculate expected lifetime taxes and lifetime spending. This step is then repeated, but under assumption that each respondent marries their clone, but without doubling the number of children. These projections are used to

[13]The algorithm is highly efficient. Indeed, its solution take less than a second notwithstanding what can be a hundreds of iterations through the three programs. The secret to the program's speed and accuracy is its use of adaptive grid shrinking in successive iterations. Since the problem TFA solves is deterministic, the paths of the program's three state variables – regular assets and the retirement accounts of the respondent and spouse/partner – as well as all other endogenous variables, e.g., annual net taxes, converge across iterations to their final trajectories.

calculate the net marriage tax rate, the gross tax rate, and the transfer claw-back rate. A more detailed description of this process is available in Appendix B.

A key concern with the SCF is the lack of state identifiers as well as state-specific weights in the SCF public-use file. The Federal Reserve proprietary-use file, to which we have access, does have state identifiers. But the file's weights are national, not state-specific. To deal with this state-weight problem, we statistically matched each SCF household to ACS households based on common characteristics. This matching allows us to infer the share of each SCF household type located in each state and, thus, to allocate each household's SCF weight across the 50 states and the District of Columbia. The three state-specific marriage tax rates are estimated for each respondent in each state, regardless of state of residence, first as single and then as clone married. These state-specific tax rates are weighted by the ACS state-specific weights to produce national state-weighted average values of the tax rates for each respondent.

5 The Size and Distribution of Marriage Taxes

The distribution of marriage tax rates, gross tax rates, and transfer claw-back rates by SCF respondents' annual total family income is shown in figure 2.[14] Consider the top chart. A quick glance indicates four important things. First, the vast majority of SCF single or singleized respondents face positive marriage tax rates. Second, marriage tax rates can be very high. Third, there is major dispersion in the marriage-tax treatment of people with the same level of annual income. Fourth, low-income singles face much higher as well as far more dispersed marriage tax rates.

These rates are shares of lifetime spending. Hence, a 10 percent tax means that marrying comes at the price of a permanent 10 percent reduction in one's annual living standard. As another way to grasp the magnitude of our derived clone-marriage tax rates, consider a single

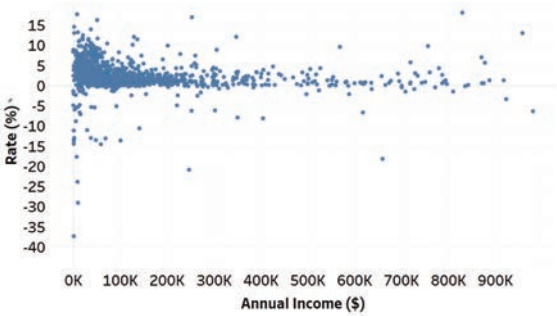
[14]Note that the distinction between gross taxes rates and claw-back rates is quite arbitrary. The Earned Income Tax Credit is, for example, counted as part of taxes even though it could equally well be labeled a benefit program.

30 year-old earning $100,000 through retirement at age 65. Also assume the person has a maximum age of life of 100. Ignoring all fiscal policies and assuming the real interest rate is zero, the person's sustainable annual real spending is $50,000 and their lifetime spending is $3.5 million. A 5 percent marriage tax would, then, represent $175,000, or almost two years of earnings. Add in fiscal policy and this figure might fall to one year's earnings. Either way, marriage would come with a major net tax bill.

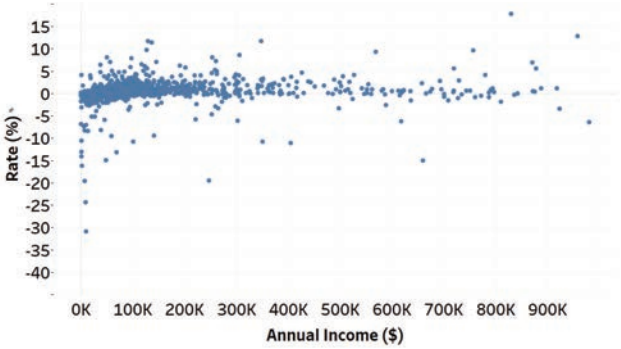
Charts (b) and (c) in 2 show that both gross marriage tax rates and claw back rates are higher and more dispersed for those with low incomes. It's also clear that benefit claw-backs produce most of the dispersion in the marriage tax rate for the poor. As for the rich, taxes are the major source of dispersion. This is no surprise, as most benefits are income based.

Figure 2: Distribution of Marriage Tax Rates in 2016 Survey of Consumer Finances

(a) Marriage Tax Rate



(b) Gross Tax Rate



(c) Claw-Back Rate

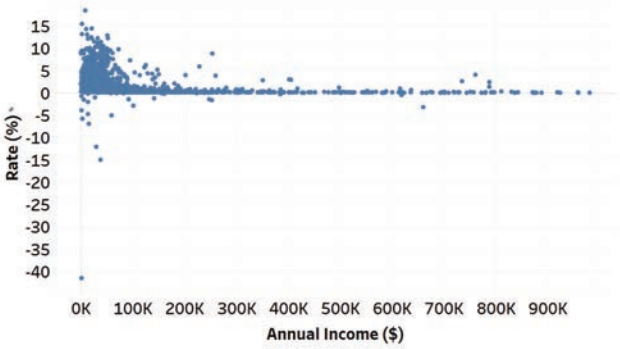


Table 2 presents average marriage penalties for the full SCF sample and separately for families with and without children. The overall average marriage tax rate is just under 2.7 percent and differs little for families with children. However, the composition of penalties

is different. On average, individuals with children face higher transfer claw-back rates than those without because some benefit programs, such as Medicaid for children, federal and state child tax credits, and childcare subsidies, are available only for families with children. Indeed, in some states, Medicaid is available only for adults with children or other dependents.[15] Higher transfer claw-back rates for individuals with children are partially offset by a larger marriage tax subsidy – taxpayers with children are generally eligible for more generous federal and state tax credits, such as the EITC and the CTC.

Table 2: Average Lifetime Marriage Penalties in the 2016 SCF

	Marriage Tax	Gross Tax	Transfer Claw-Back Rate
Full Sample	2.69	0.06	2.63
	(4.68)	(2.54)	(4.12)
With Children	2.68	-0.50	3.18
	(4.78)	(2.49)	(4.23)
Without Children	2.69	0.33	2.36
	(4.63)	(2.51)	(4.03)

Notes: Standard deviation is reported in parenthesis
The income quintiles are based on the total current-year earned and unearned income from all sources of the single respondent before the simulated marriage.

Table 3 summarizes average marriage penalties by gender and child status. Females have both lower incomes and more children, on average, meaning lower taxes and greater eligibility for benefit programs. This results in higher marriage taxes and more to lose from marrying.

Table 4 presents average marriage tax rates by income quintiles. The rate is highest for individuals with incomes between $26,000 and $40,000. On average, they face a 3.95 percent marriage tax rate, more than twice the 1.49 percent rate for the top-income quintile. The bottom-income quintile has the highest claw-back rate. On average, this group loses 4.65 percent of their lifetime spending power due to loss of benefits, although this loss is partially offset by a one percentage point reduction in their tax liability. The transfer claw-back rate declines monotonically with income, with the top-income quintile facing virtually no transfer claw-back. The gross tax rate is close to zero or negative for all but the top two

[15] As of 2019, the list comprised Alabama, Florida, Georgia, Kansas, Mississippi, Missouri, Nebraska, North Carolina, South Carolina, South Dakota, Tennessee, Texas, Utah, and Wyoming.

Table 3: Average Lifetime Marriage Penalties in the 2016 SCF by Gender and Child Status

	Female		Male	
	With Children	No Children	With Children	No Children
Marriage Tax	2.71	2.98	2.02	2.59
	(1.05)	(1.08)	(4.73)	(1.13)
Gross Tax	-0.49	0.25	-0.64	0.36
	(0.36)	(0.58)	(0.97)	(0.42)
Transfer Claw-Back Rate	3.21	2.73	2.67	2.24
	(1.04)	(1.35)	(5.38)	(1.15)

Notes: Standard deviation is reported in parenthesis

income quintiles. The top-income quintile loses 1.09 percent of its lifetime spending due to an increase in total tax liabilities.

The tables presents standard deviations in parentheses. They are remarkably large. Consider the net marriage tax of those in the bottom quintile. One standard deviation ranges from -2.86 to 10.28. This is a remarkable statement about unequal treatment of equals, at least at a cursory level.

Table 4: Average Marriage Tax by Income Quintiles

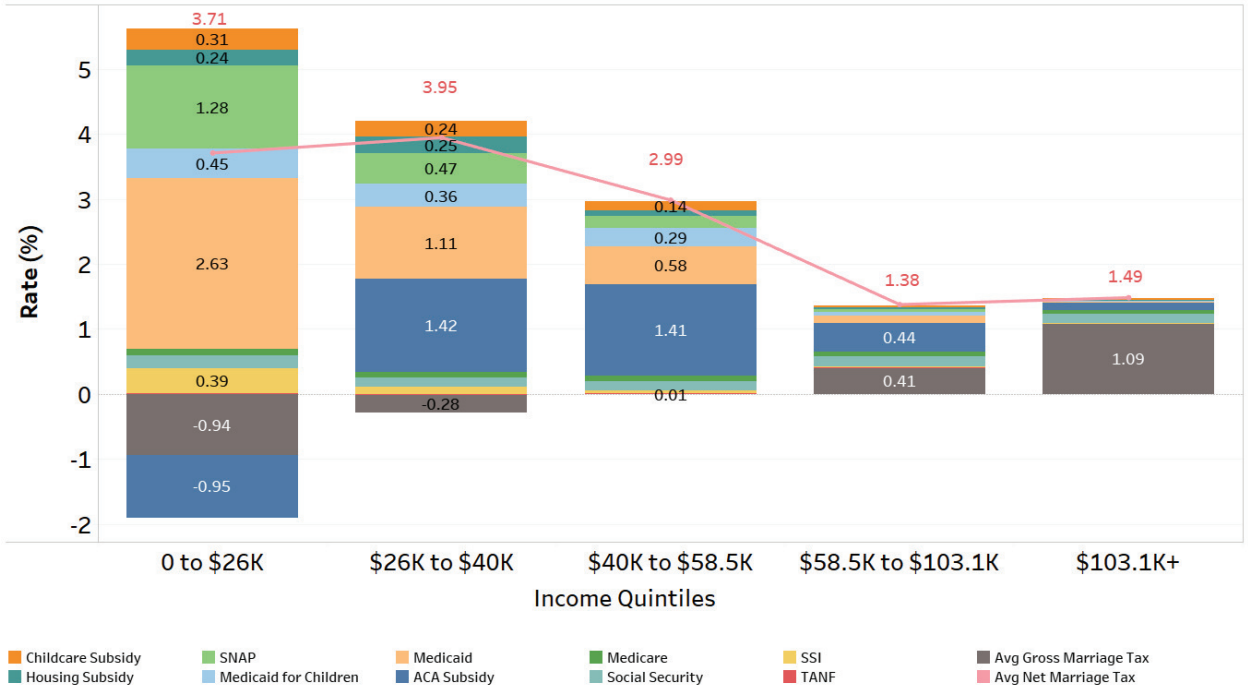
Income Quintile	Lifetime Net Marriage tax	Gross Marriage Tax	Transfer Claw-Back Rate
0 to $26K	3.71	-0.94	4.65
	(6.57)	(2.86)	(5.49)
$26K to $40K	3.95	-0.28	4.23
	(4.35)	(1.43)	(4.30)
$40K to $58.5K	2.99	0.01	2.98
	(4.16)	(1.54)	(4.05)
$58.5K to $103.1K	1.38	0.41	0.97
	(3.43)	(2.34)	(2.10)
$103.1K+	1.49	1.09	0.40
	(3.57)	(3.43)	(1.11)

Notes: Standard deviation is reported in parenthesis
The income quintiles are based on the total current-year earned and unearned income from all sources of the single respondent before the simulated marriage.

The source of the transfer claw-back differs by income quintiles. For each income quintile, figure 3 breaks down the average marriage tax rate into ten components, including the change in total tax liability and the change in nine major benefit programs – childcare subsidy,

housing subsidy, SNAP, Medicaid, Medicare, ACA subsidy, Social Security, SSI, and TANF.

Figure 3: Decomposition of Marriage Taxes by Income Quintile



Notes: The income quintiles are based on the total current-year earned and unearned income from all sources of the single respondent before the simulated marriage.

The bottom-income quintile, on average, loses 2.63 percent of their lifetime net resources from the loss of Medicaid for adults, 1.28 percent from the decline in SNAP, and 0.45 percent from the loss of Medicaid for children. However, 0.95 percent of lifetime net resources are gained due to an increase in the ACA premium subsidy. Finally, 0.94 percent is gained in lifetime net resources due to a decrease in taxes.

Those in the second- and third-income quintiles are more likely to lose access to the ACA premium subsidies after marriage. In general, the loss of healthcare-related benefits – Medicaid for adults and children and ACA premium subsidies – is the main contributor to the marriage tax for those in the bottom three income quintiles.

A detailed description of the distribution of marriage tax rates across income quintiles is provided in table 5. There is a sizable variation in the individual marriage tax rate across and within income quintiles. Across the full sample, the lowest marriage tax rate is a remarkably

low -74.45 percent and the highest is a remarkably high 45.84 percent. The dispersion of marriage tax rates is, as indicated above, highest in the bottom quintile (with an interquartile range of 5.43 percentage points), with this dispersion much lower at the top of the income distribution.

Table 5: Summary Statistics for the Marriage Tax Rates (%)

Income Quintile	min	q10	q25	median	mean	q75	q90	max
All	-74.45	0.00	0.42	1.62	2.69	4.52	8.05	45.84
0 to $26K	-74.45	-1.32	1.30	4.19	3.71	6.73	9.87	45.84
$26K to $40K	-54.05	0.17	0.92	3.30	3.95	6.18	9.52	33.79
$40K to $58.5K	-25.52	0.06	0.41	1.48	2.99	4.73	8.84	30.04
$58.5K to $103.1K	-34.71	-0.05	0.26	0.80	1.38	1.97	4.19	25.03
$103.1K+	-23.66	-0.08	0.29	0.98	1.49	2.22	3.77	44.18

Notes: The income quintiles are based on the total current-year earned and unearned income from all sources of the single respondent before the simulated marriage.

There are several explanations for the substantial negative marriage tax rates (i.e., subsidies) in our SCF sample. First, in some states, Medicaid coverage is available only for adults with dependents. Therefore, in our singleized SCF sample, childless clones of adults to whom children were initially assigned can gain eligibility for Medicaid coverage from marriage. Hence, the formerly childless clone finds themself in a marriage with children, permitting them to qualify for Medicaid in states, like Louisiana, that don't provide Medicaid to childless adults. Second, as discussed, certain families can gain access to the ACA premium subsidy by marrying and raising their household's income. Finally, certain individuals in the top income quintile have large gross tax subsidies related to the structure of tax brackets and standard deductions.[16]

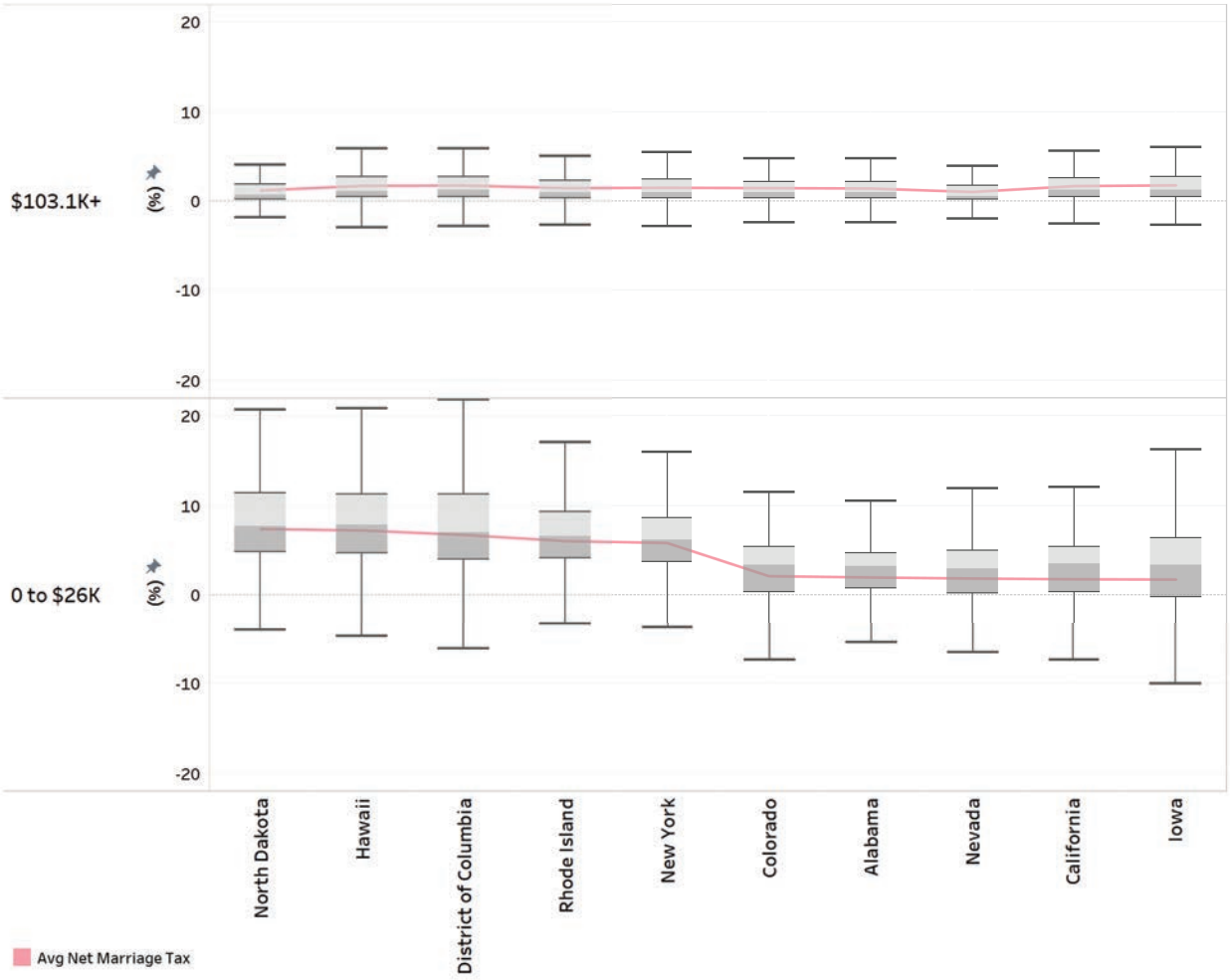
5.1 Variation in the Marriage Tax Across States

As figure 4 makes clear, marriage tax rates as well as the variation in these rates across households vary significantly by state. The figure shows the 10th, 25th, 50th, 75th, and 90th

[16]See Appendix D, figures 2-5 for further examples of the distribution of the marriage tax by income quintile.

percentiles of marriage tax rates for the top- and the bottom-income quintiles for the five states with the highest and the five with the lowest average marriage tax rate. The solid red line shows the average rate. Appendix D, figure 1 details the variation in marriage taxation across all states.

Figure 4: Variation in Marriage Taxes Across States



Notes: The income quintiles are based on the total current-year earned and unearned income from all sources of the single respondent before the simulated marriage.

There are several contributors to this cross-state variation in the marriage tax. First, nine states do not have an income tax, and the forty-two states that do can have very different non-marriage neutral income-tax schedules and tax credits. Second, eligibility requirements for certain benefit programs vary by state. For example, the Section 8 Housing Voucher and CCDF childcare assistance eligibility is determined based on the Area Median Income

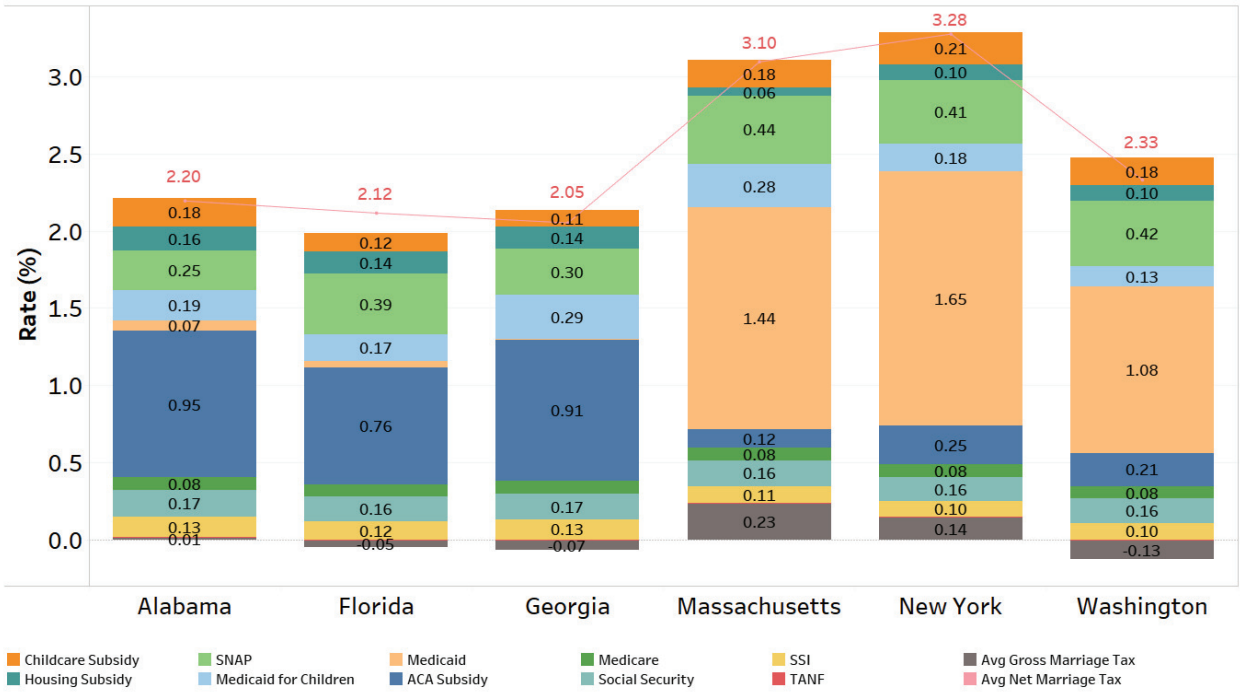
(AMI) or State Median Income (SMI). In addition, even though the rules for SNAP and Medicaid are set at the federal level, states can adjust income-eligibility limits. For example, SNAP's federal income eligibility threshold is 130 percent of the FPL, but Broad-Based Categorical Eligibility (BBCE) allows states to set higher thresholds. Finally, health care benefits also vary by state and, indeed, local area. The Affordable Care Act of 2010 allowed states to expand Medicaid coverage to families with income up to 138 percent of the FPL. But 12 states chose not to do so. The ACA subsidy depends on the cost of silver plans in the recipient's local area, which results in ACA participants with equal incomes living in different states receiving different subsidies. These differences interact with the many sources of ACA non-marriage neutrality. CHIP coverage of uninsured children is a further source of state differences in the marriage tax as each state has its own non marriage-neutral income-eligibility guidelines.

5.2 Medicaid Expansion and Marriage Taxation

The loss of Medicaid is one of the largest drivers of the marriage tax. Figure 5 shows the marriage tax composition for three states that expanded Medicaid in 2014 – Massachusetts, New York, and Washington and three states that did not – Alabama, Florida, and Georgia. In the expansion states, individuals can receive Medicaid coverage if family income is below 138 percent of the FPL. In states that didn't expand Medicaid coverage, households with children can still receive coverage but only if their income is sufficiently low – typically around 40 percent of FPL.

Medicaid expansion provided healthcare coverage to many uninsured individuals and families. However, it also raised marriage taxes in expansion states by including more Medicaid-covered individuals who could lose coverage by marrying. Although marriage would likely lead to eligibility for ACA premium subsidies, these subsidies are of smaller value than Medicaid. In states that didn't expand Medicaid, the phase-out of ACA premium subsidies is the most significant healthcare component of the marriage tax. For example, a low-income

Figure 5: Marriage Tax and Medicaid Expansion



person in an expansion state can keep Medicaid coverage up to 138 percent of the FPL and then switch to a subsidized, but still more costly ACA marketplace coverage at higher income levels. For this person, the loss of Medicaid is the main source of marriage taxation. A similar low-income person in a non-expansion state would not have access to Medicaid but would be eligible for the ACA premium subsidy. If family income increases after marriage, the amount of the subsidy declines.

6 The Effect of Marriage Taxation on Marrying

Our calculated marriage tax rates are interesting on their own. But the practical policy question is whether they influence marriage. Unfortunately, the SCF does not have information on family formation in the prior year. However, the 2018 ACS asks respondents about their prior-year marital status and whether they married over the prior year, although the ACS resource data is not sufficiently detailed to accurately estimate marriage taxes. Hence, we apply a two-step estimation procedure. In the first step, we regress the calculated SCF

marriage tax rates on observables common to both surveys and use the regression results to predict the three marriage tax rates for ACS respondents. In the second step, the decision to marry is regressed on the first-stage estimates of the marriage tax, controlling for other individual characteristics. Finally, we apply generated regressor correction by bootstrapping standard errors of the second-stage coefficients.

6.1 Imputing Marriage Tax Rates

As indicated, our measure of the marriage tax captures only the effect of the U.S. fiscal system, not preferences over whom to marry let alone choice of spouse. Thus, the measure varies only by characteristics that directly affect eligibility status for public assistance, the size of benefits, and the size of tax liabilities.[17] Our imputation of ACS marriage tax rates is, therefore, based on regressing SCF marriage tax rates on determinants that are also available in the ACS and included as controls.

$$\tau_{is} = \beta_{0sg} + \beta_{1sg}F_i(Y_i + Y_i^2) + \beta_{2sg}K_i^{0-12}F_i(Y_i + Y_i^2) + \beta_{3sg}K_i^{13-18}F_i(Y_i + Y_i^2) + \beta_{4sg}H_iF_i(Y_i + Y_i^2) + \delta_{sg}X_i + \epsilon_i, \quad (16)$$

where $\tau_{1,s}$ is the marriage tax rate of respondent i in state s, F is family size, K^{0-12} is an indicator for whether the respondent has children under age 12, K^{13-18} is an indicator of whether the respondent has children between age 13 and 18, H references housing status (home owner or renter), Y is total household income from all sources, and X is a vector that includes the remaining controls – family size, an indicator of whether the respondent has children under age 12, an indicator of whether the respondent has children between age

[17] For example, eligibility for and the value of means-tested public assistance is a non-linear function of total family earnings. Income eligibility thresholds for most benefit programs and tax credits are based on the FPL, SMI, or AMI, which vary by family size. Families with children are eligible for additional benefit programs, and if the child is under the age of 12, the family can access subsidized childcare through the CCDF. There is also the possibility of housing support for renters. Age also affects ACA health insurance premiums and, thus, the size of ACA subsidies. Finally, eligibility rules for these programs vary at the state level. In addition to differences in program eligibility, there are also differences in the projections of lifetime earnings by level of education, which has implications for the value of the marriage tax.

13 and 18, housing status, integer age, and level of education. Equation 16 is estimated separately for each state s and gender g.

6.2 Predicting Marriage Tax Rates Facing Unmarried ACS Respondents

The sample consists of all 2018 ACS respondents aged 20-49 who reported being single in 2017. Appendix table 2 provides our ACS sample's summary statistics broken down by gender and presence of children.

Table 6: Average Predicted Marriage Taxes in the 2018 ACS by Gender and Child Status

	Female		Male	
	With Children	No Children	With Children	No Children
Marriage Tax Rate	3.35	2.67	2.53	2.34
	(1.05)	(1.08)	(4.73)	(1.13)
Gross Tax Rate	-0.75	-0.45	-0.67	-0.17
	(0.36)	(0.58)	(0.97)	(0.42)
Transfer Claw-Back Rate	4.10	3.12	3.20	2.51
	(1.04)	(1.35)	(5.38)	(1.15)

Standard deviation is reported in parenthesis

Table 6 reports average predicted marriage tax rates, gross tax rates, and transfer claw-back rates for the ACS sample by gender and presence of children. ACS respondents with children face higher marriage tax rates and transfer claw-back rates relative to childless adults. This child-based difference is expected as adults with children are eligible for a wider set of benefits – benefits that can be reduced or eliminated via marriage. On the other hand, these respondents face lower gross tax rates. In addition, females face a higher marriage tax rate relative to males, regardless of child status. This is due to the lower relative earnings of females. These average rates differ somewhat from the average rates in the SCF, with generally higher transfer claw-back rates and lower gross tax rates, reflecting the oversampling of higher income households in the SCF.

6.3 The Effect of Marriage Taxation on the Decision to Marry

Having predicted marriage tax rates for the ACS sample, we estimate the effect of marriage taxation on marrying using a linear probability model.[18] Our second-stage regression is given by

$$M_i = \gamma_{0g} + \gamma_1 \hat{\tau}_i + \gamma_{2g} Y_i + \gamma_{3g} Y_i^2 + \gamma_{4g} A_i + \gamma_{5g} A_i^2 + \gamma_{6g} A_i (Y_i + Y_i^2) + \beta_g^T X_i + \mu_s + \epsilon_i, \quad (17)$$

where M_i is the binary outcome of whether individual i married in the 12 months preceding the survey; $\hat{\tau}_i$ is the predicted marriage tax rate, μ_s is the state fixed-effect, Y_i is total individual income from all sources, A_i is age, and X_i is a set of individual-level controls that includes race, education, and number of children. Potential measurement errors in equation 17 are discussed in Appendix C. Equation 17 is estimated separately for males and females, g, using either the net marriage tax rate or its gross tax and transfer claw-back components. Identification of marriage-tax effects on marrying rates is based on the exceptionally non-linear relationship of state-specific marriage taxes on ACS singles' socio-economic characteristics.

The marriage tax has a statistically significant negative effect on the probability of marrying for both females and males, independent of the presence of children. A one-percentage point increase in the marriage tax rate decreases the probability of marrying for females with children by 3.69 percentage points and 1.12 percentage points for females without children. Given that the mean tax rates for these groups are 3.35 and 2.67, respectively, these are very large effects. For females with children, both components of the marriage tax — the

[18] Alternatively, the second-stage equation 17 can be estimated using Probit. However, as shown in figure 2 and table 5, marriage tax rates tend to be more dispersed for low-income people. For example, for the bottom income quintile, the interquartile range (IQR) of the marriage tax rate distribution is 8.05 percent – more than four times larger than the 1.93 percent IQR of the top income quintile. Thus, the error terms of the first stage regression (equation 16) are larger for observations with low income. This introduces heteroskedasticity in the second stage regression (equation 17). Probit and Logit models would produce biased and inconsistent estimates, while OLS estimates are unbiased and consistent (Yatchew and Griliches 1985; Inkmann 2000; Moussa 2019).

Table 7: Marriage-Probability Impact of 1 Percentage-Point Increases in Marriage Tax Rates and Tax Components

	Female				Male			
	With Children		No Children		With Children		No Children	
Marriage Tax Rate	-3.69***	–	-1.12***	–	-0.21*	–	-1.54***	–
	(0.64)	–	(0.29)	–	(0.09)	–	(0.39)	–
Gross Tax Rate	–	-14.86***	–	-6.00***	–	-2.78***	–	2.13*
	–	(1.51)	–	(1.08)	–	(0.83)	–	(1.07)
Transfer Claw-Back Rate	–	-2.14**	–	0.07	–	-0.63***	–	-2.17***
	–	(0.67)	–	(0.37)	–	(0.18)	–	(0.38)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	73,784	73,784	129,303	129,303	55,126	55,126	169,239	169,239

***, ** and * indicate significance levels at 0.1%, 1% and 5% respectively
Standard errors (in parentheses) are based on 50 bootstrap samples

claw-back and the gross tax — have statistically significant negative effects on the probability of marrying. A one percentage-point increase in the transfer claw-back and gross tax rates decrease the probability of marrying by 2.14 and 14.86 percentage points, respectively. Clearly, the impact of an increase in the marriage tax delivered via a rise in the gross tax is significantly larger, both statistically and economically, than an equal sized increase in the transfer claw-back rate. This may reflect less transparency among benefit than tax programs.

In the sample of males with and without children, we also find that the marriage tax and its components have a statistically significant negative effect on marrying, with a one percentage point increase in the marriage tax decreasing the probability of marrying for males with children by 0.21 percentage points and by 1.54 percentage points for males without children. In addition, for males with children, the marginal effect is lower than for females. However, for males without children, the marginal effect of transfer claw-backs is, surprisingly, larger than for single females.

6.4 Simulating the Elimination of Marriage Taxation

Table 8 shows how the elimination of the marriage tax would impact the decision to marry for different gender, child statuses, and prior-year income levels. In all cases, marrying would be higher in the absence of the marriage tax, but the differential is largest for women with children, especially those in the lower earnings quintiles. For example, if the marriage tax rate is set to zero for females with children in the bottom income quintile, their average probability of marrying increases by 13.68 percentage points. Stated differently, the fiscal system is keeping almost 14 percent of low-income young females with children from getting married in a given year. For low-income males with children, setting the marriage tax to zero would also have a significant but much smaller positive effect on the decision to marry. It would increase their average probability of marrying by 1.46 percentage points.

As an example of how this negative impact of marriage taxation on *annual* marrying affects the cumulative stock of marriage over time, consider the case of a single 25-years-old female without children who earns $33,614 and faces a lifetime marriage tax rate of 2.61 percent – the average value among females in our sample. Our estimated probability that she marries over the next ten years is 76.1 percent. In the absence of marriage taxation, this probability would equal 85.6 percent.[19]

6.5 Sensitivity Analysis

6.5.1 Partial Take-up of Benefit Programs

Although TFA incorporates all eligibility rules for the programs listed in table 1, simply applying those rules to eligible households could overestimate the marriage tax rate. Program participation rates among eligible households are generally less than 100 percent for a variety of reasons, including lack of information, stigma, complicated application procedures, and

[19]To produce these estimates, we compute weighted average predicted marrying rates at given initial ages with and without marriage taxation across all states, education groups, races, and age categories. We then account for changes in marrying rates as a respondent moves between age categories.

Table 8: Impact of Marriage Taxation on Marrying

	Marrying Rate (%)	Predicted Marrying Rate without Marriage Tax
Female, with Children		
0 to $26K	9.40	23.08
$26K to $40K	11.82	25.57
$40K to $58.5K	16.36	27.70
$58.5K to $103.1K, Q4	22.73	30.88
$103.1K+	26.80	34.74
Female, without Children		
0 to $26K	6.47	11.17
$26K to $40K	9.81	13.79
$40K to $58.5K	12.15	15.12
$58.5K to $103.1K	13.52	16.07
$103.1K+	14.28	17.18
Male, with Children		
0 to $26K	7.49	8.95
$26K to $40K	15.24	17.45
$40K to $58.5K	23.17	23.31
$58.5K to $103.1K	29.92	31.21
$103.1K+	43.28	47.58
Male, without Children		
0 to $26K	3.51	8.61
$26K to $40K	7.08	11.47
$40K to $58.5K	9.88	13.24
$58.5K to $103.1K	12.44	15.81
$103.1K+	15.49	20.73

Source: 2018 American Community Survey, authors calculations
Notes: The income quintiles are based on the total current-year earned and unearned income from all sources of the single respondent before the simulated marriage.

benefit rationing in some programs (see Stuber et al. (2000); Finkelstein and Notowidigdo (2019)). This suggests that our baseline calculation provides an upper bound on the potential impact of the marriage tax.

Appendix D, table 3 presents national take-up rates, i.e., the share of eligible families participating in major programs and tax credits. Our baseline calculations of the marriage tax rates assume full take-up of benefits and tax credits. However, given the low take-up

rates in certain programs, we also produce alternative calculations of the marriage tax that account for less than full benefit take-up. Specifically, we weight each benefit of an eligible family by the probability of program take-up reported in Appendix D, table 3.

Appendix D, table 4 reports participation-adjusted average marriage tax rate, gross tax rates, and claw-back rates by gender. As expected, the average take-up rates-adjusted marriage tax and transfer claw-back rates are smaller – less than half the size of the full take-up rates reported in table 6.

Next, we re-estimate equation 17 with the adjusted marriage penalties. Table 9 shows the results by gender and presence of children. In all samples, the participation-adjusted marriage tax rate has a significant negative effect on the probability of marrying. The effects are of the same magnitude and sign as the estimated effects of unadjusted marriage tax rates apart from males with no children. For example, for females with children, a one percentage point increase in lifetime marriage tax (adjusted for take-up) decreases the probability of marriage by 3.95 percentage points. For the unadjusted marriage tax we estimated a 3.69 percentage points reduction in the probability of marriage.

Table 9: Effects of 1 Percent Increases in Marriage Tax Rate and Its Components, Adjusted for Partial Take-up of Benefits, on the Probability of Marrying.

	Probability of Marrying(%)							
	Female				Male			
	With Children		No Children		With Children		No Children	
Marriage Tax Rate	-3.95***	–	-1.55***	–	-1.09***	–	-1.26**	–
	(0.32)	–	(0.69)	–	(0.30)	–	(0.45)	–
Gross Tax Rate	–	-15.52***	–	-5.58***	–	-2.03**	–	-2.88**
	–	(1.52)	–	(1.01)	–	(0.67)	–	(1.06)
Transfer Claw-Back Rate	–	-2.67***	–	-0.78*	–	-1.38***	–	0.81
	–	(0.70)	–	(0.37)	–	(0.36)	–	(0.44)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	73,784	73,784	129,303	129,303	55,126	55,126	169,239	169,239

***, ** and * indicate significance levels at 0.1%, 1% and 5% respectively
Standard errors (in parentheses) are based on 50 bootstrap samples

6.5.2 Current-Year Estimates

As indicated, the earlier literature considers static marriage-tax measures, particularly the impact on net taxes per spouse of getting divorced. We also consider a static measure – the current-year marriage tax. We define this alternative measure as the change in current-year net taxes arising from clone marriage divided by current-year disposable income. Table 5 shows average current-year predicted marriage penalties for the ACS respondents. Table 10 provides results from re-estimating equation 17 using the new measure. Again, we find a negative impact of marriage taxation on the rate of marrying. We also find differences in the impact of the gross tax and the claw-back tax.

Table 10: Effects of Increasing Current-Year Marriage Tax Rate by 1 Percentage Point on the Probability of Marrying

	Female				Male			
	With Children		No Children		With Children		No Children	
Marriage Tax Rate	-1.45***	–	-0.83***	–	-0.08*	–	-2.58***	–
	(0.38)	–	(0.21)	–	(0.03)	–	(0.31)	–
Gross Tax Rate	–	-22.40***	–	-14.13***	–	0.36	–	-10.88***
	–	(1.83)	–	(1.53)	–	(0.43)	–	(1.85)
Transfer Claw-Back Rate	–	-0.92*	–	-0.30	–	-0.06	–	-1.77***
	–	(0.43)	–	(0.22)	–	(0.04)	–	(0.35)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	73,784	73,784	129,303	129,303	55,126	55,126	169,239	169,239

***, ** and * indicate significance levels at 0.1%, 1% and 5% respectively
Standard errors (in parentheses) are based on 50 bootstrap samples.

Appendix D, table 6 shows simulated marrying rates by gender, child status, and prior year income levels in the absence of current-year marriage taxation. Compared with table 8, the simulated increase in the marrying rate is significantly smaller, suggesting the importance of the lifetime perspective on marriage taxation. For example, in the absence of a lifetime marriage tax, the marrying rate for females with children in the bottom-income quintile would be 13.7 percentage points higher. Conversely, setting the current-year marriage tax rate to zero would increase marrying rates for this group by only 0.68 percentage points.

These current-year results are somewhat similar to those found in the literature in that they are statistically significant but small in magnitude.

6.5.3 Accounting for Differences in Partners' Earnings

We next rerun equation equation 17, but using marriage taxes based on marrying clones with either 50 percent lower or 50 percent higher earnings. As a comparison of regression coefficients in tables 7 and Table 11 shows, there are small differences in net tax coefficients and somewhat larger differences in the gross-tax and claw-back coefficients. Table 12's predicted impacts on marrying rates and the share married at 35 also largely consistent with the baseline results reported in Table 8.

Figure 6 displays differences across tax measures in estimated actual and predicted marrying rates with results broken down by initial household income, gender and child status. The vertical axis is the simulated marrying rate under each scenario minus the actual marrying rate for each group. Clearly, females with children face the highest marriage penalties, regardless of the income of their simulated spouse and initial household-income quintile. The figure confirms that changing the income level of the potential spouse, either up or down, albeit by no more than 50 percent, produce no major change in marrying behavior. Intuitively, adding another earner with relatively close earnings makes little difference to net marriage taxes as adding even a low-earning extra spouse to the household makes it ineligible for particular benefits.

Table 11: Effects of 1 Percentage-Point Increases in the Marriage Tax Rate and Its Components on the Probability of Marrying Under Alternative Assumptions on Partners' Earnings

Panel A: Assuming Marriage to Replicant with 50% Lower Earnings

	Female				Male			
	With Children		No Children		With Children		No Children	
Marriage Tax Rate	-3.45***	–	-1.52***	–	-0.19*	–	-1.26***	–
	(0.57)	–	(0.31)	–	(0.08)	–	(0.36)	–
Gross Tax Rate	–	-16.03***	–	-9.97***	–	-3.26***	–	3.00
	–	(1.38)	–	(1.13)	–	(0.95)	–	(1.51)
Transfer Claw-Back Rate	–	-0.10**	–	0.68	–	-0.57***	–	-1.67***
	–	(0.03)	–	(0.41)	–	(0.17)	–	(0.36)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	73,784	73,784	129,303	129,303	55,126	55,126	169,239	169,239

Panel B: Assuming Marriage to Replicant with 50% Higher Earnings

	Female				Male			
	With Children		No Children		With Children		No Children	
Marriage Tax Rate	-3.75***	–	-1.06***	–	-0.23*	–	-0.79*	–
	(0.70)	–	(0.31)	–	(0.10)	–	(0.39)	–
Gross Tax Rate	–	-10.75***	–	-3.38**	–	-3.10***	–	2.20
	–	(1.60)	–	(1.12)	–	(0.71)	–	(1.82)
Transfer Claw-Back Rate	–	-3.03***	–	-0.59	–	-0.71***	–	-1.74***
	–	(0.74)	–	(0.36)	–	(0.20)	–	(0.38)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	73,784	73,784	129,303	129,303	55,126	55,126	169,239	169,239

***, ** and * indicate significance levels at 0.1%, 1% and 5% respectively
Standard errors (in parentheses) are based on 50 bootstrap samples

Table 12: Impact of Marriage Taxation on Marrying Under Alternative Assumptions on Partners' Earnings

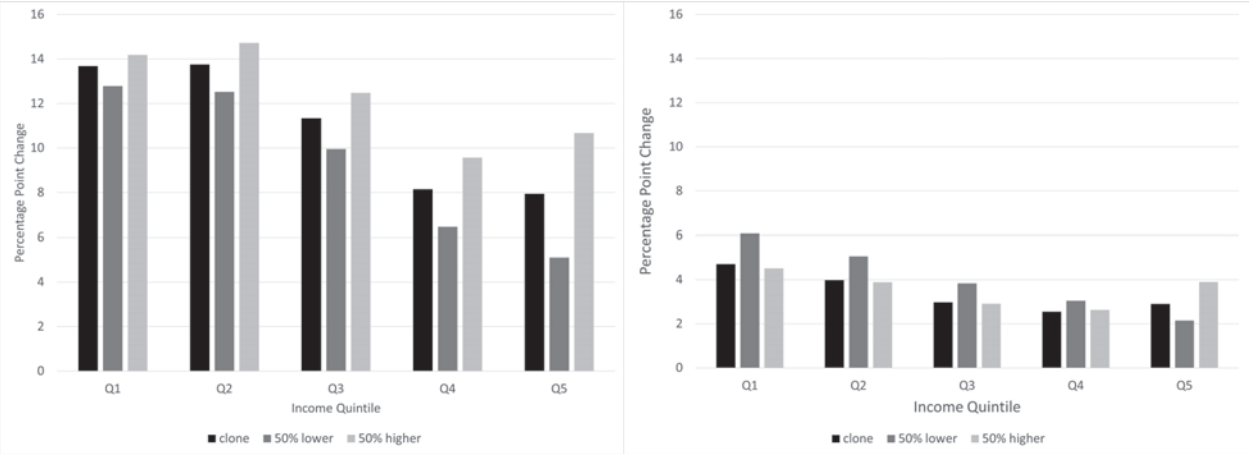
	Marrying Rate (%)	Predicted Marrying Rate Without Marriage Tax	
		Replicant with 50% Lower Earnings	Replicant with 50% Higher Earnings
Female, with Children			
0 to $26K	9.40	22.18	23.58
$26K to $40K	11.82	24.34	26.54
$40K to $58.5K	16.36	26.31	28.84
$58.5K to $103.1K, Q4	22.73	29.19	32.30
$103.1K+	26.80	31.90	37.47
Female, without Children			
0 to $26K	6.47	12.54	10.98
$26K to $40K	9.81	14.87	13.70
$40K to $58.5K	12.15	15.98	15.06
$58.5K to $103.1K	13.52	16.57	16.15
$103.1K+	14.28	16.43	18.18
Male, with Children			
0 to $26K	7.49	8.91	8.98
$26K to $40K	15.24	17.41	17.49
$40K to $58.5K	23.17	23.27	23.36
$58.5K to $103.1K	29.92	31.18	31.27
$103.1K+	43.28	47.62	47.68
Male, without Children			
0 to $26K	3.51	7.94	6.68
$26K to $40K	7.08	10.76	9.72
$40K to $58.5K	9.88	12.54	11.68
$58.5K to $103.1K	12.44	15.12	14.56
$103.1K+	15.49	19.84	20.17

Source: 2018 American Community Survey, authors' calculations
Notes: The income quintiles are based on the total current-year earned and unearned income from all sources of the single respondent before the simulated marriage.

Figure 6: The Predicted Percentage Point Increase in the Marrying Rate in the Absence of Lifetime Marriage Tax by Partner's Earnings, Gender, Child Status, and Household Income Quintile

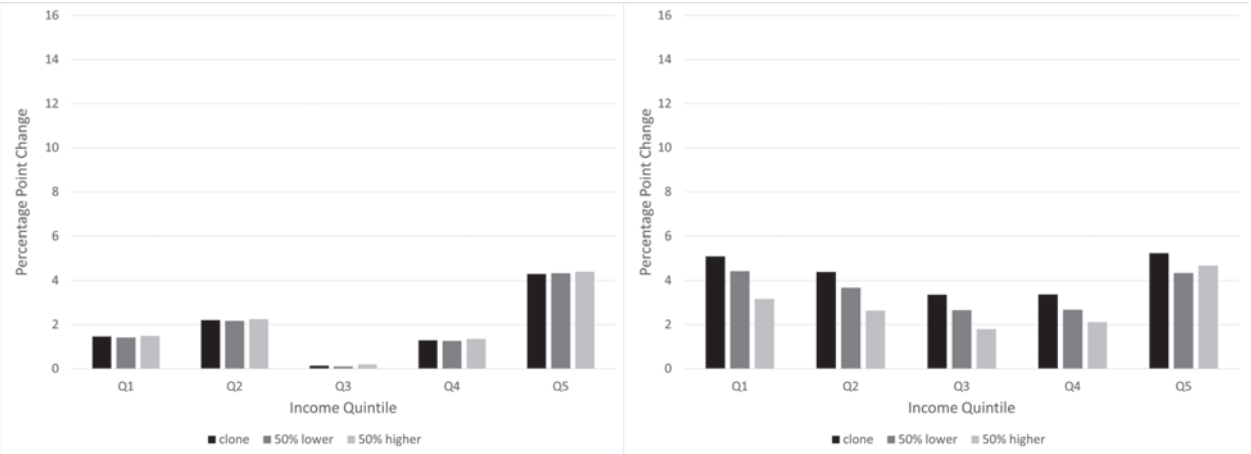
(a) Female, with Children

(b) Female, No Children



(c) Male, with Children

(d) Male, No Children



Source: 2018 American Community Survey, authors' calculations
Notes: Income Quintiles: 0 to $26K; $26K to $40K; $40K to $58.5K; $58.5K to $103.1K; $103.1K+
The income quintiles are based on the total current-year earned and unearned income from all sources of the single respondent before the simulated marriage.

7 Conclusion

This paper provides a new measure of marriage taxation, namely the reduction in future spending from marrying oneself or a higher- or lower-variant of oneself. We calculate clone-marriage taxes for single as well as singleized respondents to the 2016 Survey of Consumer Finances. Singleized respondents are married or partnered couples who we counterfactually divorce. Our clone-marriage tax differs from the convention couple-specific marriage-tax measure, which considers the additional net taxes being paid by actual married couples compared to what the couple would pay were the spouses to divorce. Unfortunately, the conventional measure can reflect the decision to marry, which is what we hope to explain. In contrast, the clone-marriage tax depends solely on the fiscal system, not reactions to it.

Since decreases (increases) in future spending from marrying equal increases (decrease) in future net taxes, spending changes are capturing future net tax changes. Thus, accurately calculating clone-marriages taxes requires incorporating, as we do, all major and, to the extent possible, minor federal and state tax and benefit programs. Assuming full benefit-program participation, we calculate a 2.69 percent average clone-marriage tax rate facing those aged 20 through 49. Among the bottom income quintile, the average is higher – 3.71 percent. Among the richest quintile, it's lower – 1.49 percent. These tax rates may seem small, but they are percentages of a large number – the actuarial present value of remaining lifetime spending. Hence, a 2.69 percent average marriage tax rate references, for most young households, one to two years of labor earnings.

Interestingly, the average clone-marriage tax is no higher among low-income respondents with children than among low-income respondents without children thanks to offsetting benefit losses and tax savings. But these averages encompass substantial within-group variation. In particular, a significant share of single females with children face very high marriage taxes. There is also major variation in marriage tax rates across states. The average rate ranges from 1.53 percent in New Mexico to 3.99 percent in Hawaii. These differences arise due to a range of state-specific tax and benefit provisions, including, in most states, Medicaid's

expansion as encouraged by the Affordable Care Act.

To determine the impact of marriage taxation on marrying, we first impute clone-marriage taxes, based on the SCF results, to respondents to the 2018 American Community Survey (ACS). Next we determined how their imputed clone-marriage tax affected the propensity of single ACS respondents to marry. We found a statistically and economically significant negative impact of the marriage tax. Among young ACS singles, a one-percentage-point increase in the clone-marriage tax rate decreases marriage probabilities of females with and without children by 3.69 and 1.12 percentage points, respectively. For males with and without children, the respective impacts are 0.21 and 1.54 percentage points.

Our simulations show that absent marriage taxation, females and males with children and income in the bottom quintile would have 13.68 and 1.46 percentage-point higher marrying rates, respectively. The tax-induced reduction in the annual marrying rate has, of course, implications for the stock of marriage. For 25-year-old, low-income females with children, the marriage tax reduces their chances of being married ten years later by 7.52 percent. Correction for program participation makes lowers this value from 7.52 percent to 6.24 percent. Our results are also robust to respondents marrying higher- or lower-earning variants of themselves.

Our lifetime clone-marriage tax differs dramatically from that based only on current-year fiscal effects, specifically, the current-year net tax measured as a share of current-year income. In addition, estimating the propensity to marry based on the current-year net tax rather than our remaining lifetime measure generates smaller effects. Now the marriage tax reduces the age-35 married share by 3.41, not 7.52 percentage points.

Our bottom line? The U.S. tax and transfer system discourages marriage especially for low-income females with children. Given the importance to children of living with both parents and the economic benefits to both children and adults of forming and maintaining a nuclear family, researching ways to make the fiscal system marriage-neutral seems highly worthwhile. Reforming the system policy by policy is one option. Another is using the

federal income tax to adjust a couple's net taxes to ensure they equal what the couple would jointly pay when if. Certainly, adopting universal health insurance would go a long way to lowering U.S. marriage taxation. As we show, Medicare and the Affordable Care Act embed particularly large marriage taxes.

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Appendices

Appendix A Marriage Incentives and Disincentives Created by the U.S. Fiscal System[20]

A.1 Federal and State Income Taxes – Marriage Non-Neutralities

The federal income tax has a history of bracket-based marriage taxation of certain middle- and upper-income individuals depending on the size of their incomes. Table 1 reports federal income-tax brackets and rates before and after adoption of the Tax Cuts and Jobs Act (TCJA) of 2017. Prior to TCJA individuals with identical taxable incomes below $37,950 faced no federal bracket-based income-tax penalty in marrying. Those with higher, identical taxable incomes did face a penalty depending on the size of their common taxable incomes. For example, marriage by two people with taxable incomes of $76,550 each left them in the 25 percent bracket. But if each had $76,551 in taxable income, marriage transported them from the 25 percent to the 28 percent bracket. Individuals with taxable incomes between $91,901 and $418,400 also jumped brackets in marrying someone with the same taxable income. But for those with taxable incomes above $418,400, the marriage tax went away. Whether they married or not, their tax bracket was 39.6 percent.

The TCJA greatly reduced, but did not eliminate bracket-based marriage taxation. Under TCJA's 2018 brackets, individuals with identical taxable incomes up to $200,000 remain in the same tax bracket after marrying. But if they both earned between $300,001 and $500,000 their bracket increases from 35 percent to 37 percent. But if the common taxable income was over $500,000, marriage leaves the tax bracket unchanged at 37 percent.

If the marriage is between those with different taxable incomes, the system provides marriage subsidies depending on the spread in the two individuals' taxable incomes. For

[20]Description of all tax policies and transfer programs in this section come from the Atlanta Fed Policy Rules Database developed in Ilin and Terry (2021)

Table 1: Federal Tax Brackets Pre- and Post-TCJA

Post-TCJA (2018)			Pre-TCJA (2017)		
Rate	Taxable Income (Single)	Taxable Income (Married*)	Rate	Taxable Income (Single)	Taxable Income (Married*)
10%	Up to $9,525	Up to $19,050	10%	Up to $9,325	Up to $18,650
12%	$9,526-$38,700	$19,051-$77,400	15%	$9,326-$37,950	$18,651-$75,900
22%	$38,701-$82,500	$77,401-$165,000	25%	$37,951-$91,900	$75,901-$153,100
24%	$82,501-$157,500	$165,001-$315,000	28%	$91,901-$191,650	$153,101-$233,350
32%	$157,501-$200,000	$315,001-$400,000	33%	$191,651-$416,700	$233,351-$416,700
35%	$200,001-$500,000	$400,001-$600,000	35%	$416,701-$418,400	$416,701-$470,000
37%	Over $500,001	Over $600,000	39.6%	Over $418,401	Over $470,001

* The table assumes married couples file joint tax returns.

example, pre-TCJA a person with $100,000 in 2017 taxable income was in the 28 percent bracket. But in marrying someone with zero taxable income, the tax bracket dropped to 25 percent. In 2018, under TCJA, the tax bracket dropped from 24 percent to 22 percent.

The income tax systems of some U.S. states and D.C. feature additional marriage non-neutralities. Twelve states calculate tax liability or taxable income proportional to the federal income-tax levels and therefore have the same pattern of marriage penalties and subsidies. Fifteen states have special joint rate schedules with broader tax brackets for married couples that reduce or eliminate the marriage penalty. Ten states allow married couples to file returns as single individuals, permitting them to avoid marriage taxation. Six states have a flat tax rate with no marital status variation in their deductions or exemptions and, therefore, no marriage penalty. Finally, nine states have no income tax.

The Alternative Minimum Tax (AMT) provision of the income tax can generate additional marriage penalties. Some households with particularly large "tax preference items" that lower their taxable income are subject to the AMT provided it exceeds an exemption amount. The 2020 AMT exemption is $113,400 for married couples and $72,900 for individuals. Marriage could easily push a couple into AMT territory.

The Earned Income Tax Credit (EITC) is another source of federal income tax non neutrality. The EITC is means-tested and available only to filers with earned incomes below

a certain threshold. Therefore, the income of a two-earner family may exceed the maximum allowable income for EITC eligibility, but if the two spouses were single, then one (or both) may be eligible. For example, in 2020, the eligibility limit for a single adult with one child was $41,756 compared to $47,646 for a married couple with one child. Clearly, there is a substantial potential loss in EITC tax credits associated with marriage.

A.2 Benefit Programs – Marriage Non-Neutralities

Means-tested benefit programs may also violate marriage neutrality if the combined income of all family members is counted towards eligibility. Family-income eligibility limits are typically set as a percentage of the federal poverty level (FPL), state median income (SMI), or area median income (AMI) and do not double when two individuals with the same income marry. Thus, two unmarried individuals with sufficiently low income may be eligible for public assistance when single, but not when married. Stated differently, any program that conditions participation or benefit levels on family income has the potential to embed a marriage tax. That said, the marriage tax associated with any such program will impact only a subset of marriages. For example, two singles, neither of whom qualify on their own, won't qualify if they marry.

Temporary Assistance for Needy Families (TANF) provides temporary cash support to families with children when their income is too low to cover basic needs. Benefit amounts and eligibility are determined at state level and depend upon income and, in some states, assets. In addition, receipt of cash assistance is limited to a certain number of months over one's lifetime. The federal lifetime limit is sixty months, but states can set limits below this. In some states TANF is available only for single parents, thus it directly penalizes marriage. Other states offer TANF to two-parent families, but the income eligibility limits do not double when two individuals marry and can lead to a loss of benefits following marriage.

The Supplementary Nutrition Assistance Program (SNAP) provides needy families with electronic benefit cards, similar to debit cards, that can be used to purchase eligible food

items. All household members are included in the SNAP unit. Consequently, marriage may push the family over the SNAP income limit. In addition, the joint benefits of two unmarried low-income individuals may be higher than their total benefits when they are married if the maximum payment for a single-person household exceeds half the maximum payment for a two-person household. Like TANF, SNAP benefits levels are determined at the federal level, with eligibility rules varying by state, family size, family income, and, in some states, assets. Income eligibility limits are based on the FPL and vary by state, particularly as some states have expanded eligibility under what's called "Broad-Based Categorical Eligibility".

The Child Care and Development Fund (CCDF) provides childcare assistance to low-income families. Available benefits vary by state, age of the child(ren), and family income. The benefit amount is calculated as the estimated cost for childcare minus the family co-payment. Childcare costs vary by state and age of the child, while co-payment amounts vary by state, family size, and household income. To receive a subsidy, a family's income must be below an initial eligibility threshold. Once eligible, families can continue receiving a subsidy provided their income remains below a continuous eligibility threshold, which is typically higher than the initial eligibility threshold. States can adjust both thresholds but cannot set them higher than 85 percent of the state median income (SMI). SMI levels do not change proportionally with family size. Hence, marriage can make a family ineligible for a subsidy.

The Housing Choice Voucher Program (Section 8) helps very low-income families, the elderly, and the disabled afford private-market housing. Participants pay 30 percent of their income towards rent, with the rest covered by a voucher up to a maximum payment standard, including an allowance for utilities. The initial income-eligibility threshold is set at 50 percent of SMI. Once eligible, a family can keep the voucher indefinitely. However, if a voucher recipient marries someone with sufficient income, the voucher amount is reduced, if not eliminated. Additionally, a family waiting to start receiving the voucher can lose initial eligibility due to marriage.

Both Medicaid and the Children's Health Insurance Program (CHIP) are joint federal and

state programs that assist low-income adults and children with medical costs. Eligibility for both programs is based on the federal poverty level (FPL). In states that expanded Medicaid, the eligibility limit for Medicaid is 138 percent of the FPL. In most non-expansion states, adults without dependents aren't eligible and those with dependents face lower income thresholds. Income thresholds for CHIP vary by state. Since FPL levels don't change proportionally with family size, marriage can push Medicaid or CHIP recipients above the income eligibility limit.

Health Insurance Marketplace (ACA) subsidies are designed to assist the uninsured with healthcare coverage. The law provides consumers with subsidies, called premium tax credits, that lower costs for certain households. Eligibility for subsidies is determined at the national level. Family income must be between 100 percent and 400 percent of the FPL. Given that the program has a lower bound on income eligibility, a marriage subsidy can arise if the married couple's combined income is above the poverty line, even if each individual's income is below the threshold. In addition, since the ACA premium subsidy declines with family income, marriage can lower a couple's total subsidy if it places the couple in a lower subsidy bracket. The size of the ACA subsidy depends on a household's modified adjusted gross income (MAGI) and applicable FPL as well as the cost of the silver ACA plan in the household's geographic region. Since the FPL and local premium depend, in turn, on family size and the ages of family members, the ACA's contribution to the marriage tax will depend on a variety of variables. The ACA also provides a second subsidy in the form of a ceiling on out-of-pocket healthcare spending that depends on MAGI. Eligibility for this ceiling can also disappear if marriage raises the couple's MAGI above the eligibility threshold.

Supplementary Security Income (SSI) provides cash payments to aged, blind, and disabled individuals or married couples. The federal SSI benefit standards depend on whether the unit is eligible as an individual, a couple, or an individual living with an ineligible spouse. Marriage may decrease SSI benefits in two ways. First, SSI counts a portion of an ineligible spouse's income toward the categorically eligible person's income. Therefore, marriage to

an ineligible spouse may make the eligible spouse ineligible. Second, if both members of a couple are categorically eligible for SSI, the sum of their individual payments is higher if they are not married.

Appendix B Illustrating our Lifetime Marriage Tax Calculation

The following example demonstrates how we measure the lifetime net marriage tax for SCF respondents. Consider a hypothetical 30 year-old, Connecticut woman (Adult 1)with two young children under age 12 who earns $27,000 per year and receives a variety of public-assistance benefits. Table 1 shows the lifetime benefits and tax liabilities for her and for her financial, but childless clone (Adult 2).

If adult 1 doesn't marry, she pays $29,936 in expected lifetime taxes and receives $257,256 in expected lifetime benefits. To be precise, she receives, at different ages, TANF, SNAP, a housing voucher, SSI, Medicaid for adults and children, Medicare, a Marketplace (ACA) subsidy, and a CCDF childcare subsidy. Her childless clone, adult 2, pays more in lifetime taxes and receives less in lifetime benefits because she has no children.

After marriage, the couple's combined tax liability and eligibility for benefit programs changes. Over time, the couple receives less in TANF, SNAP, housing support, SSI, Medicaid, Medicare, and childcare benefits. This loss is partially offset by larger ACA subsidies and a decrease in lifetime taxes.

If she remains single, her lifetime net tax is -$227,320. Her childless clone's lifetime net tax is -$71,671. Together, these sum to -$298,991, which is a $61,960 larger subsidy than the -$237,031 they would receive if they marry. Dividing $61,960 by the couple's combined lifetime spending when single of $1,078,969 results in a 5.74 percent lifetime net marriage tax for adult 1.

Table 1: Calculating the Marriage Tax Rate

	Single Adult 1	Single Adult 2	Married	Δ**
TANF*	4,513	0	0	-4,513
SNAP	15,646	5,083	0	-20,729
Housing Voucher	15,649	13,938	20,226	-9,361
SSI	1,151	1,151	0	-2,301
SSDI	0	0	0	0
Social Security	14,595	14,595	28,352	-839
Medicaid for Adults	50,644	11,534	1,301	-60,877
Medicaid for Children	55,330	0	42,379	-12,950
Medicare	12,044	12,044	23,389	-699
ACA Subsidy	70,343	107,868	231,285	53,074
CCDF Subsidy	17,341	0	2,890	-14,451
Total Taxes	29,936	94,542	112,792	-11,686
Total Transfers	257,256	166,213	349,822	-73,646
Net Taxes	-227,320	-71,671	-237,031	61,960
Total Resources	389,989	389,989	779,978	0
Net Resources	617,309	461,660	1,017,009	-61,960

*Connecticut fiscal rules are applied to determine eligibility for benefit programs and corresponding benefits values
**Δ = Married - (Single Adult 1 + Single Adult 2)
Single Adult 2 is identical to Single Adult 1 except she has no children.

Appendix C Potential Measurement Error in Estimates

Equation 17 contains two sources of measurement error that can potentially bias our estimates. First, marriage tax rates used in the second stage regression 17 are not directly observable. Instead, they are generated using the first-stage regression. This "generated regressor" may include measurement error that is carried over to the second stage regression. Anderson et al. (1976) and Barro (1977) show that under some regularity conditions, consistency and asymptotic normality of the least squares estimator are preserved, but asymptotic variance has a different form in general. We correct standard errors for both stages by applying Pagan (1984)'s bootstrap method.

Second, our marriage tax rate measure τ is an imperfect measure of the "true" marriage tax and, thus, contains measurement error. If the difference between the estimated marriage

tax and the actual marriage tax is orthogonal to the actual tax rate, then our OLS estimates are unbiased and consistent. However, there can be multiple reasons why this condition is not satisfied. It can create downward or upward biases in our OLS estimates. Suppose, for example, that low-income SCF respondents systematically under-reported income and that, as a result, τ underestimated the actual marriage tax for low-income families. In this case, the measurement error is negatively correlated with income and would bias the OLS coefficient downward. As another example, if people tend to marry partners with higher income, then τ would consistently *overestimate* the actual marriage tax for low-income people. In this case, measurement error is positively correlated with income and produces upward bias in the OLS coefficient. This is further explored in Section 6.5.3 where we study how marrying someone with 50 percent-lower or 50 percent-higher earnings would impact the results.

Appendix D Additional Tables and Figures

Table 1: "Singleized" 2016 Survey of Consumer Finances. Summary Statistics

	Female		Male	
	With Children	No Children	With Children	No Children
Age*	36.38	34.80	39.60	36.09
	7.35	8.94	6.99	8.03
Income**	34,995	34,000	46,500	50,000
	(47,033)	(34,886)	(337,556)	(124,612)
Number of Children*	1.97	–	1.56	–
	(1.00)	–	(0.68)	–
Renters	0.39	0.51	0.41	0.42
Sample Size	1,610	759	368	1,935

*Mean values are reported
**Median values are reported
Standard deviation is reported in parenthesis
Income is defined as an individual's current-year earned and unearned income from all sources of the single respondent before the simulated marriage. The assets of married/partnered couples assets are divided equally and children are assigned to the mother or the primary respondent for same-sex couples when respondents are "singleized".

Table 2: 2018 American Community Survey. Summary Statistics

	Female		Male	
	With Children	No Children	With Children	No Children
Married in the Previous Year	0.13	0.10	0.15	0.08
Age*	30.09	29.09	29.25	29.89
	(7.62)	(7.63)	(7.77)	(7.56)
Income**	16,769	25,563	22,904	27,608
	(27,521)	(36,942)	(34,649)	(45,406)
Number of Children*	1.72	–	1.62	–
	(0.92)		(0.84)	
High School Degree or Less	0.51	0.28	0.62	0.42
Some College or Associate	0.34	0.30	0.28	0.28
College Degree	0.15	0.42	0.11	0.29
White, non-Hispanic	0.39	0.63	0.44	0.62
Black, non-Hispanic	0.27	0.17	0.18	0.15
Hispanic	0.29	0.17	0.34	0.19
Other Race	0.04	0.04	0.04	0.04
Renters	0.54	0.53	0.46	0.50
Sample Size	73,784	129,303	55,126	169,239

*Mean values are reported
**Median values are reported
Standard deviation is reported in parenthesis
Sample comprises 2017 single 20-49 year-olds.
Income is defined as an individual's current-year earned and unearned income from all sources of the single respondent before the simulated marriage.

Table 3: Estimated Participation and Take-Up of Benefit Programs

	Number of Participating Units ('000)	Number of Eligible Units ('000)	Year	Take Up Rate (%)
TANF	1,213 families	4,869 families	2016	24.9
SNAP	40,776 persons	60,334 persons	2018	67.6
CCDF Childcare Subsidy	2,099 children	8,417 children	2015	24.9
Section 8 Housing Voucher	2,200 families	19,517 families	2016	11.2
Marketplace Subsidy	9,600 persons	112,942 persons	2020	8.5
Medicaid (Adults)	39,042 persons	48,863 persons	2016	79.9
Medicaid/CHIP (Children)	35,953 persons	38,370 persons	2016	93.7
EITC	26,500 taxpayers	33,974 taxpayers	2018	78.0
CTC	48,000 taxpayers	56,946 taxpayers	2020	84.3

Sources: Data on the number of participating and eligible units for TANF as those of Giannarelli (2019). Data on the number of participating and eligible units for CCDF are provided in Chien (2019). The number of participating and eligible units for Medicaid is reported by the Kaiser Family Foundation (https://www.kff.org/). The number of expected Child Tax Credit claims is provided by the Joint Committee on Taxation (https://www.jct.gov). EITC participation and eligibility are provided by the Internal Revenue Service (IRS) statistics for tax returns (https://www.eitc.irs.gov/eitc-central/participation-rate/eitc-participation-rate-by-states). The number of SNAP participating units is available at the USDA website (https://www.fns.usda.gov). The number of participating units for the Section 8 Housing Voucher is provided by the Housing and Urban Development Department's (HUD) Office of Policy Development and Research (https://www.huduser.gov). The number of eligible units for SNAP, Section 8 Housing Voucher, Health Insurance Marketplace Subsidy, and Child Tax Credit are estimated by applying the Policy Rules Database (Ilin and Terry 2021) to the Annual Social and Economic Supplement of the Current Population Survey.

Table 4: Average Predicted Marriage Penalties in the 2018 ACS by Gender, Adjusted for Partial Take-up Rates

	Female		Male	
	With Children	No Children	With Children	No Children
Marriage Tax Rate	2.36	1.61	0.90	0.94
	(1.22)	(1.18)	(1.61)	(1.03)
Gross Tax Rate	-0.75	-0.45	-0.67	-0.17
	(0.36)	(0.58)	(0.97)	(0.42)
Claw-Back Rate	3.11	2.06	1.57	1.11
	(1.20)	(1.37)	(2.01)	(0.93)

Standard deviation is reported in parenthesis

Table 5: Average Predicted Current-Year Marriage Penalties in the 2018 ACS by Gender

	Female		Male	
	With Children	No Children	With Children	No Children
Marriage Tax Rate	5.26	4.06	4.11	2.56
	(1.77)	(2.18)	(10.94)	(1.18)
Gross Marriage Tax Rate	-0.28	-0.24	-0.31	-0.25
	(0.22)	(0.20)	(0.69)	(0.18)
Claw-Back Rate	5.54	4.30	4.42	2.81
	(1.83)	(2.30)	(11.50)	(1.27)

Standard deviation is reported in parenthesis

Table 6: Impact of Current-Year Marriage Taxation on Marrying

	Actual Marriage Initiation	Predicted Marriage Initiation without Current Year Marriage Tax
Female, with Children		
0 to $26K	9.40	10.18
$26K to $40K	11.82	13.45
$40K to $58.5K	16.36	16.58
$58.5K to $103.1K, Q4	22.73	21.46
$103.1K+	26.80	28.63
Female, without Children		
0 to $26K	6.47	7.71
$26K to $40K	9.81	10.85
$40K to $58.5K	12.15	12.67
$58.5K to $103.1K	13.52	14.20
$103.1K+	14.28	16.13
Male, with Children		
0 to $26K	7.49	8.34
$26K to $40K	15.24	16.86
$40K to $58.5K	23.17	22.76
$58.5K to $103.1K	29.92	30.79
$103.1K+	43.28	48.82
Male, without Children		
0 to $26K	3.51	4.57
$26K to $40K	7.08	7.84
$40K to $58.5K	9.88	9.96
$58.5K to $103.1K	12.44	12.99
$103.1K+	15.49	18.60

Source: 2018 American Community Survey, authors calculations
Notes: The income quintiles are based on the total current-year earned and unearned income from all sources of the single respondent before the simulated marriage.

Figure 1: Variation in Marriage Taxes Across the U.S. States

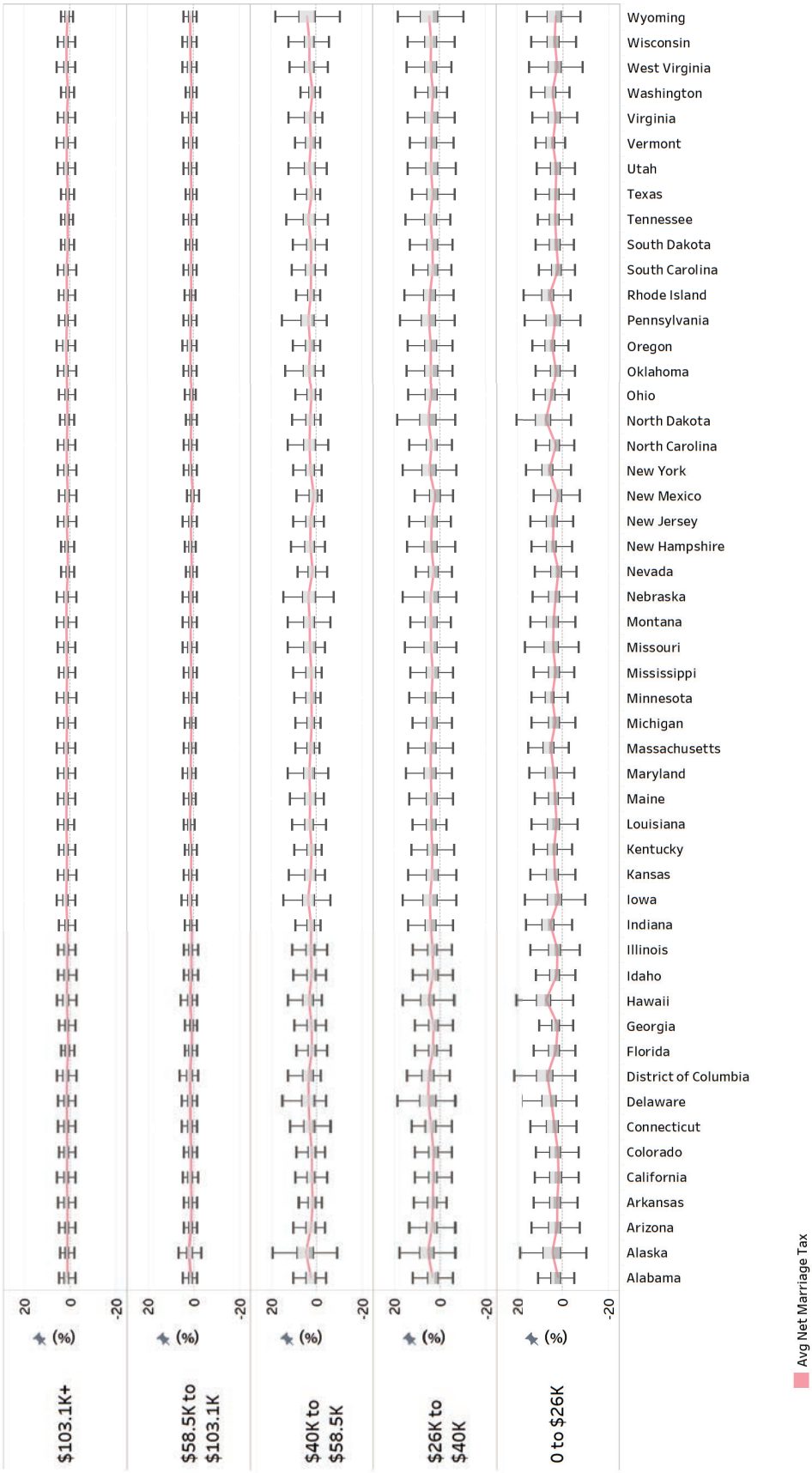

Figure 2: Decomposition of the Marriage Tax by Income Quintile. Individuals with Children.

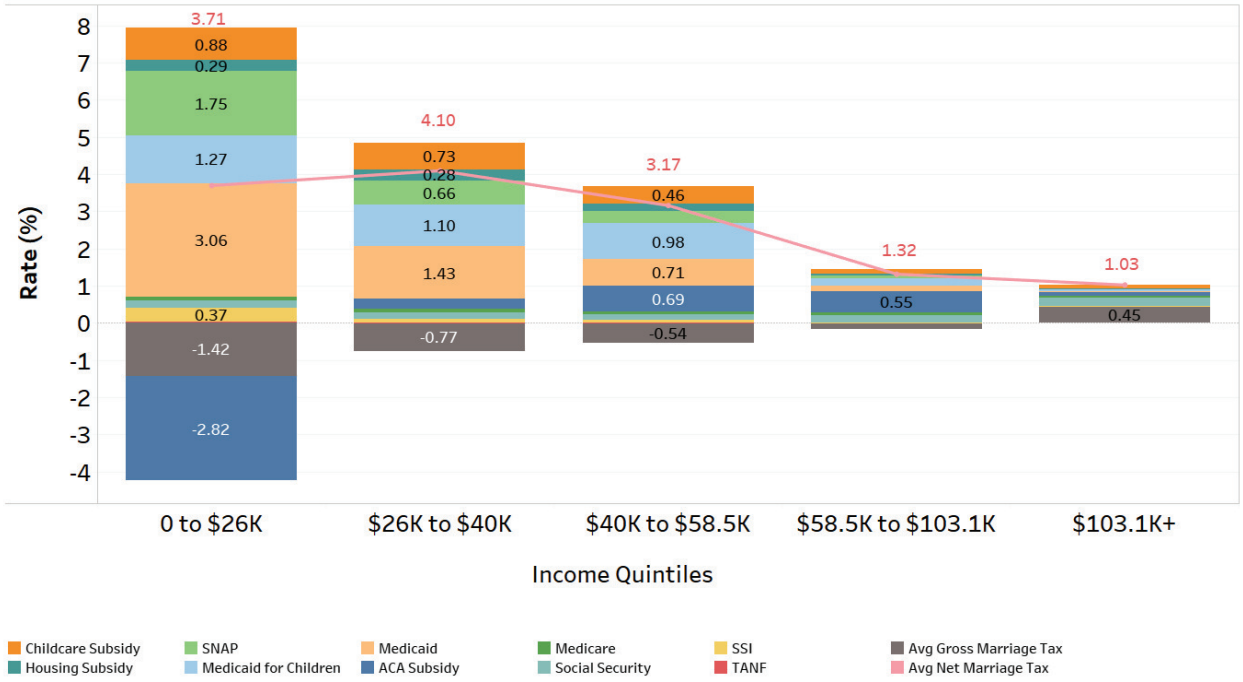

Figure 3: Decomposition of the Marriage Tax by Income Quintile. Individuals without Children.

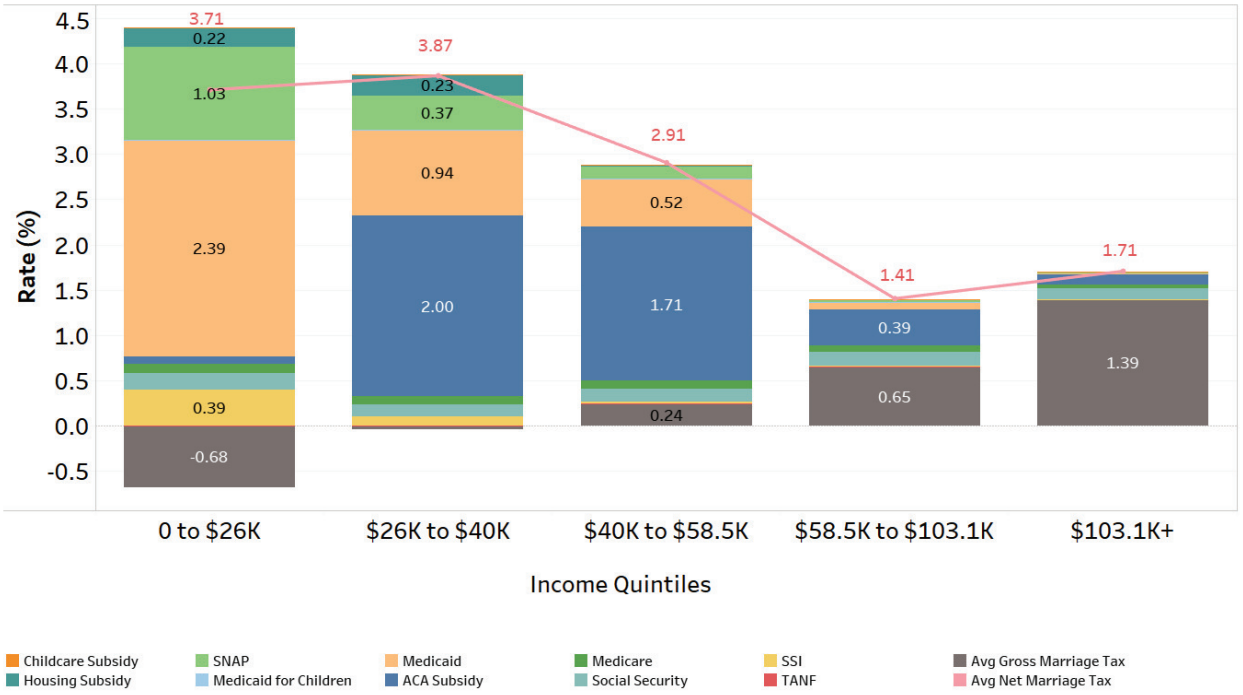

Figure 4: Decomposition of the Marriage Tax by Income Quintile. Maximums.

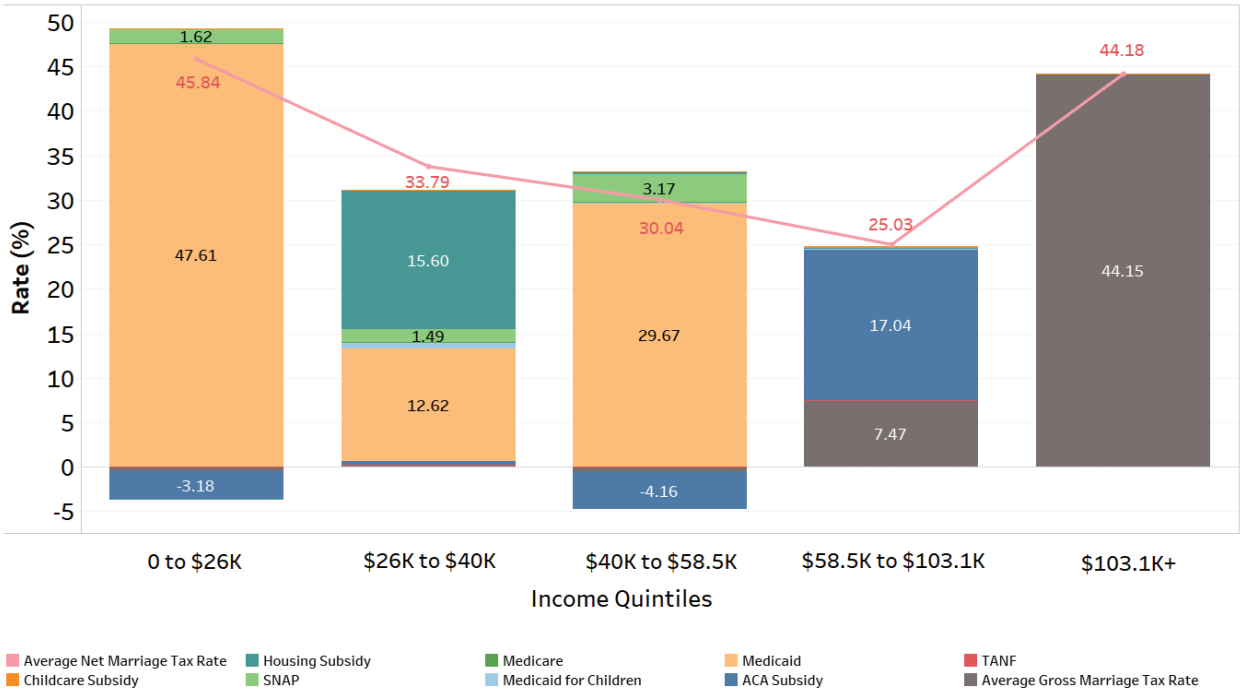

Figure 5: Decomposition of the Marriage Tax by Income Quintile. Minimums.