

Taxing Women: A Macroeconomic Analysis

Extended Abstract

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February 2011

1 Motivation

Perhaps the most significant change in the U.S. labor force during the 20th century has been the extremely rapid increase in female labor force participation. Female labor force participation increased from 38% to 60% between 1960 and 2008. This increase has been even more dramatic for married women, from 35% to 61%, and in particular for women with young (under age 6) children, from 19% to 62%. As a result, women today constitute a much larger fraction of total labor force. In 1960 females were about a third of the total labor force, while today 46% of the total labor force are females, and in about 65% of married households both husbands and wives work.²

There are still, however, important differences between male and female labor supply decisions, reflecting mainly the importance of children. First, children continue playing a key role in female labor force participation decisions and the marginal effect of children have been relatively stable in last couple decades (Cohany and Sok, 2007; Hoffman, 2009). Between 1994 and 2005, married females with children under 1 were much less likely to work than married females with children between ages 6 and 17 (55% versus 75%, respectively). Second, birth and child care are a central reason for why females do not work. Dalirazar (2007) reports that in 2004 about 40% of females between ages 20 and 64 list birth or child care as the main reason why they do not participate in the labor force.

The link between children and female labor force participation hinges, leaving biological constraints aside, on the high resource costs of child care. In 2005, total child care expenditure of married females with children under 5, who made any child care payments, was about 17% of mother's income.³ Not surprisingly, this fraction is higher for women with

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²Calculations are based on data published in The 2010 Statistical Abstract by the U.S. Census Bureau, <http://www.census.gov/compendia/statab/>.

³Based on the U.S. Census Bureau estimates, <http://www.census.gov/population/www/socdemo/childcare.html>

lower incomes. Working mothers with less than a high school degree pay about 25% of their incomes on child care.

Children, child care costs, in conjunction with a gender wage gap (which has been relatively stable around 20% in recent years), have led women to non participation and to become secondary earners in most married households. As a result, as it is well known, labor supply elasticities of married females are higher than those of men, especially in terms of labor supply elasticities along the extensive margin.⁴

From an optimal taxation point of view, the higher labor supply elasticities of women have a clear message: women should be taxed at lower marginal rates than men. This simple insight has led Alessina, Ichino, and Karabarbounis (2010) and Kleven, Kreiner, and Saez (2009) to study the optimality of gender-based taxes, or differential taxation of earnings of males and females.⁵ Although *gender-based* or secondary earner-based tax systems are specially attractive from a theoretical standpoint, it remains an open question what are the quantitative effects associated to changing the current structure of taxation in this direction. This is the question that we address in this project.

Current U.S. Taxes In contrast to developments that call for lower tax rates on women, the current U.S. tax system is indeed strongly biased against women's work.⁶ This bias originates in the fact that the U.S. tax system taxes the income of *households*, not the income of individuals. As a result, for a woman who considers entering the labor force, her marginal tax rate depends on her husbands' income. Consider the effective tax function for a married couple with 2 children in the year 2000 presented in Figures 1 and 2.⁷ Imagine a household in which only the husband works and earns about the mean household income the U.S. (about \$ 57,000 in year 2000). The average and marginal tax rates of this household are about 7.6% and 15%, respectively. Hence, the marginal tax rate that the wife faces is 15% for her first hour of work. Combined with payroll taxes and the additional child care

⁴See Blundell and McCurdy (1999) for a review and discussion. With growing labor force participation of females, the labor supply elasticity of men and women recently became more similar (see Blau and Kahn, 2007; Heim, 2007). There still exist, however, substantial differences.

⁵See also Boskin and Sheshinski (1983) and Apps and Rees (2010), who reach similar conclusions within a model with home production.

⁶See McCaffery (1999) for a comprehensive description.

⁷These functions are estimated using the micro-tax data from the Internal Revenue Services and they capture the relation between incomes and taxes actually paid by households. We fit the following equation to the data,

$$average\ tax\ rate = \alpha + \beta \log(income) + \varepsilon,$$

We calculate *income* by normalizing average income in each income bracket by the mean household income in 2000.

expenses that the family might face, the combined reduction on the additional income that the female generates can be substantial, leading to strong disincentives for labor market participation. Clearly, as Figure 1 illustrates, the disincentives become stronger for women at higher levels of household income.

2 What We Do

In this project we ask: Quantitatively, what are the effects on aggregate output, labor supply, and welfare of taxing females at a lower rate than males? How large should be the gap in marginal tax rates for males and females?

To address these questions, we build an equilibrium life-cycle model populated by heterogeneous single and married agents. Married households decide if both or only one members should work. Labor supply decisions of women capture central elements of reality; if a married female with children works, the household incurs resource, time and utility costs. We calibrate the model economy to the U.S. under the current tax system and then study the effects of a gender-based tax system that imposes different *linear taxes* on males and females. As a by-product, our analysis allows us to separate the effects of differential taxation by gender from the effects associated to the elimination or reduction of tax progressivity.

2.1 The Economic Environment

The model economy we study is built on Guner, Kaygusuz and Ventura (2010). We study a life-cycle economy populated by males and females. Agents enter the economy as married or single and their marital status remains constant over their life-cycle. Each agent starts his/her life as a worker, retires at an exogenously given retirement age, and dies with certainty at a given age. Married households are comprised by individuals who are of the same age, and experience identical life-cycle dynamics. Both males and females are heterogeneous in their productivity levels. While male age-earnings profiles are exogenously given, the labor market productivity levels of females are endogenous and depend on their labor market histories. In particular, not working is *costly* for females since their human capital depreciates. Retired agents do not work, but receive social security payments.

All households (single males, since females and married agents) decide on consumption, savings (in the form of risk-free capital) and labor supply. Prices that the household face (wage and the interest rate) are determined by the factor demands of an aggregate firm that operates a constant returns to scale technology.

Married households decide whether both members should work, and if so, how much in

terms of hours of work. That is, our model captures labor supply decisions at the *extensive* margin as well as at the *intensive* margin. In our environment, there are several reasons for why a married woman might not work. One reason is related to child care costs. In the model economy, married households and single females can have children that are attached to them during certain parts of their life-cycle. These children do not provide any utility, but require their mother’s time input and child care services if their mother works. A second reason is a utility cost that a married household incurs if both members work. This utility cost captures the difficulty of coordinating multiple household activities in a household with two-workers. The structure of taxation critically affects this decision, as it affects the marginal and inframarginal benefits from labor market participation.

The momentary utility function for a single agent is given by

$$U^S(c, l) = \log(c) - \varphi l^{1+\frac{1}{\gamma}},$$

where c is consumption, l is time devoted to market work. Married households maximize the sum of their members utilities:

$$U^M(c, l_f, q) = 2 \log(c) - \varphi l_f^{1+\frac{1}{\gamma}} - \varphi l_m^{1+\frac{1}{\gamma}} - \chi\{l_f\}q,$$

where $\chi\{\cdot\}$ denote the indicator function for females labor supply and q is the utility cost. Consumption is a public good within the household. Note that the parameter $\gamma > 0$, the intertemporal elasticity of labor supply, and φ , the weight on disutility of work, are *independent of gender and marital status*. Hence, the gender-differences in elasticities emerging in our model are *endogenous* and not directly dependent of standard structural parameters.

Household pay income taxes on their total labor and capital income. They face tax schedules, similar to ones presented in Figure 1, that depend on their marital status and the number of children. Besides income taxes, there is also a (flat) payroll tax that taxes individual labor incomes that finances the social security transfers.

3 Road Map and Preliminary Results

We first calibrate the model economy to the current U.S. economy. The calibration exercise delivers a benchmark economy that is consistent with aggregate and cross-sectional observations for the U.S. economy. In particular, our economy is consistent with a host of demographic observations (e.g. relative fractions of married and single people and the structure of marital sorting) as well as the observed structure of labor force participation of married females, with and without children.

3.1 Gender-based Linear Taxes

We study the effects moving from the current U.S. tax system to a linear tax system where males and females face different proportional tax rates on their labor earnings, τ_m and τ_f and receive transfers θ . All households pay a common tax rate on capital income, τ_k .

More concretely, let I_m and I_f be the labor income of males and females, respectively. Hence, the after tax-transfer labor income of a single male is simply $I_m(1 - \tau_m) + \theta$, while for single females it is given by $I_f(1 - \tau_f) + \theta(1 + \omega\chi(k))$, where $\chi(k)$ is an indicator for the presence of children and ω is a factor with which the transfers are increased due to children. For married males and females, respectively, the after tax-transfer labor income is given by $I_m(1 - \tau_m) + \theta(1 + \frac{\omega}{2}\chi(k))$ and $I_f(1 - \tau_f) + \theta(1 + \frac{\omega}{2}\chi(k))$, where $\frac{\omega}{2}$ reflects the fact that each married couple declares one of the children in the household. This formulation with transfers captures potential, welfare-enhancing redistribution. Naturally, higher redistribution leads to a trade off, as higher tax rates are needed to pay for it.

We plan to study the consequences of two sets of hypothetical reforms. First, we set the transfers equal to zero and study the effects of proportional taxes. This will capture the potential effects of taxing earnings of males and females differently, relative to the current system. Furthermore, these results can also be compared to those emerging from a move from the current system to gender-neutral proportional taxes ($\tau_m = \tau_f$). Second, we plan to repeat the same exercise for different levels of lump-sum transfers; e.g. 10%, 15%, 20% of mean income in the initial steady state.

In all cases, we plan to evaluate the *welfare consequences* of the changes in the structure of taxation by computing *transitional dynamics* across steady states. This will allow us to identify winners and losers, and assess the magnitude of welfare gains/losses emerging from a move to gender-based taxes. This is critical for the question at hand since a gender-based system will generate winners and losers. Which households win and which households lose will depend on the key dimensions of heterogeneity in the model; e.g. who is married with whom, who has children, etc.

If time and space permit, we also plan to address the implications of secondary-earner taxes as alternatives to gender-based taxes. That is, tax systems that impose lower marginal tax rates on those with lower wages, either men or women. Our model can be suitably modified to address this case, and in consequence, quantitatively evaluate the critiques to gender-based taxes (Saint-Paul, 2007).

3.2 Preliminary Results

In order to illustrate the role of gender-based taxation in our model economy, we compute stationary equilibria under current taxes, and report the aggregate consequences of introducing different tax rates for males and females in the absence of transfers. The effects on selected variables are displayed in Table 1. We consider two possibilities. The first one corresponds to tax rates on males equal to 13% whereas the second correspond to tax rates on males of 16%. In both cases, the tax rate on females is found in order to balance the budget. As the table indicates, in the first case the tax rate on females equals 10.8% whereas in the second case amounts to 7.2%.

Table 1: Steady-State Effects of Gender-Based Taxes

Taxes on Males	13.0%	16.0%
Taxes on Females	10.8%	7.2%
Participation Rate (married fem)	5.9	11.5
Aggregate Hours	5.1	6.5
Aggregate Hours (married fem.)	10.1	16.2
Hours per worker (female)	3.8	3.5
Hours per worker (male)	3.6	3.1
Aggregate Output	7.7	8.3

Two findings are worth highlighting at the moment. First, not surprisingly, the replacement of current taxes by proportional ones leads to substantial gains in output and labor supply. But importantly for the purposes of this project, the gains in terms of hours are asymmetric as married females respond *disproportionately*. Changes along the extensive margin (participation) lead to changes in total hours of married females that far exceed the changes in male hours.

Second, different gender-based taxes have non-trivial effects on output and female labor supply. Replacing current taxes by taxes of 16% on males and 7.2% (*large gap*) leads to changes in aggregate output that are larger than under taxes of 13% on males and 7.2% on females (*small gap*). These changes in output are driven by the much stronger response of married females under lower taxation of females. Married females under a large tax gap increase their participation by about 11.5% in relation to the benchmark economy. In contrast, under a small gap, the changes in participation relative to the benchmark economy are of about 5.9%.

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