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**Conference Paper**

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Beiträge zur Jahrestagung des Vereins für Socialpolitik 2014: Evidenzbasierte Wirtschaftspolitik  
- Session: Health I, No. A10-V1

**Provided in Cooperation with:**

Verein für Socialpolitik / German Economic Association

*Suggested Citation:* Schröder, Melanie; Schmitt, Norma; Mantei, Britta; Brünn, Claudia (2014) : Social Norms or Income Taxation - What Drives Couple's Labor Supply? Experimental Evidence, Beiträge zur Jahrestagung des Vereins für Socialpolitik 2014: Evidenzbasierte Wirtschaftspolitik - Session: Health I, No. A10-V1, ZBW - Deutsche Zentralbibliothek für Wirtschaftswissenschaften, Leibniz-Informationszentrum Wirtschaft, Kiel und Hamburg

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# Social Norms or Income Taxation - What Drives Couple's Labor Supply? Experimental Evidence\*

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This version: February 2014

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## Abstract

We investigate the determinants of couples labor supply within an experimental setting. On the one hand, we are interested in the effect of taxes on couples labor supply, but on the other hand we focus on factors beyond purely economic incentives: the role of the social norm of a male breadwinner. 58 established cohabiting heterosexual and married couples (116 participants) perform under a piece rate payment on real effort tasks (i.e. solving mazes) within a given time and with work effort (i.e. number of solved mazes) serving as our proxy for labor supply. We demonstrate that gender identity and (dis)satisfaction with income opportunities dominated the effects of taxation within a couple context.

**JEL-Codes:** H31, D13, C93, J16

**Keywords:** real effort experiment, labor supply, household decision making, gender, identity economics

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\* We would like to thank Anne Wernsdorf and Martin Schewe for excellent assistance in preparation and realization of the experiments. We are especially grateful for helpful comments and suggestions by Miriam Beblo, Denis Beninger, Kay Blaufus, Friedel Bolle, Hermann Ribhegge, and the participants of efas annual meeting 2012 and Florence Workshop on Behavioral and Experimental Economics 2013. Of course, all errors remain our own.

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# 1 Introduction

Although it is well known in public and political debates that high income taxes cause disincentives in labor supply, the direction and strength of the effect is not clear from a theoretical and empirical perspective. 'There are two forces at play' (Manski, 2012), the income and substitution effect, each leading to different behavioral responses to taxes. It depends upon their individual labor-leisure preferences, which effect dominates the other. Empirical findings support a negative effect on labor supply when tax rates increase but they differ on the magnitude (Meghir & Phillips, 2008).

Labor supply can also be determined by a collection of background and family characteristics which affect one's tastes for work (Meghir & Phillips, 2008). Besides these characteristics like the number and age of children, according to Akerlof & Kranton (2000) we suggest that also social norms affect decisions on labor supply through a behavioral prescription. Bertrand et al. (2013) show that gender identity and the behavioral expectation that 'a man should earn more than his wife' as well as wife's aversion to earn more than her husband' has an impact on women's labor market participation. Furthermore, Liebig et al. (2010) show that men evaluate their personal income as unfair when their wife's income is relatively higher, whereas women's perception of fairness is not affected by income differences. According to the "fair wage-effort hypothesis" by Akerlof & Yellen (1990) dissatisfaction with income differentials should also determine work effort decisions.

We examine how sensitive labor supply in terms of work effort is to changes in work incentives that are introduced through different taxation systems and how far this is determined by social aspects. In our framed field experiment (Harrison & List, 2004), established cohabiting heterosexual and married couples perform under a piece rate payment on real effort tasks (i.e. solving mazes) within a given time and with work effort (i.e. number of solved mazes) serving as our proxy for labor supply. There are two types of mazes differing in complexity (hard, easy) with corresponding wages (high, low) and thus determining who is the primary earner (i.e. hard mazes with higher piece rate wage) and the secondary earner (i.e. easy mazes with lower piece rate wage) within the couple. We vary the assignments to primary and secondary earners by gender throughout the sessions by contrasting situations of male and female breadwinners. Two different tax systems applied in two stages.

Our experiment contributes to the literature because there is no experimental study that focuses on both, the role of economic incentives and social norms, when investigating labor supply decisions. We shed light on "adherence to social groups" postulated by Alm (2011) by assigning the roles of primary and secondary earner within a heterosexual couple randomly for the time of the experiment. Thus, we are able to find gender differences in behavioral responses within these roles that are presumably driven by social norms of men and women within a real romantic couple.

We show that the factors beyond purely economic incentives dominate the effects from economic incentives introduced through different tax regimes within the couple. Dissatisfaction with the assigned role and income opportunities affects male secondary earner's effort positively and a woman's effort negatively. The same is true for fairness perception of income differences within the couple. Perceiving their own net wage compared to their partner's wage in the same round as unfair affects female secondary earners' effort negatively and male secondary earners' effort positively. We explain this behavior with social norms that indicate different behavioral prescriptions for men and women within a couple. Men's behavioral prescription to be the breadwinner seems to be stronger than the effect that their dissatisfaction has, which should lead to a decrease in work effort.

Women's behavioral prescription to avoid being the breadwinner does not exclude the effect that their dissatisfaction has and thus leads them to be less productive. Additionally, being married leads to different behavioral responses for men and women: Married men solve more mazes than cohabiting men and married women are less productive than cohabiting women.

The literature review in Section 2, is followed by a presentation of the theoretical background in Section 3 and the description of the experiment in Section 4. In Section 5, we present our results, followed by a discussion in Section 6 and concluding remarks in the final section.

## 2 Review of the Literature

There is a long standing experimental literature that focuses on labor supply decisions in real effort experiments. Subjects are provided with a work task and a leisure task and they are able to choose their work intensity during a given period (Alm, 2011).

Swenson (1988) was the first to examine labor supply responses to changes in tax rates experimentally. Subjects were asked to press keys on a computer within a fixed time and were paid on a piece-rate basis. His results and a replication of the study by Sillamaa (1999) show that subjects decrease their work effort as tax rates increase.

Empirical findings using survey data support a negative effect on labor supply when tax rates increase but they differ on the magnitude (Meghir & Phillips, 2008). Although it depends upon their individual labor-leisure preferences, which effect dominates the other, studies show that married women and lone mothers react more sensitively to a change in tax rates (Meghir & Phillips, 2008; Saez et al., 2012). Another study claims that 'labor supply of men may be more elastic since conventional wisdom suggests' Keane (2011).

Another strand of literature using real effort experiments investigates the impact of horizontal wage differentials on a subject's effort. Gächter & Thöni (2010) show that horizontal wage comparison plays a role in worker's effort decision: Paying one worker less than the other leads to a decrease in effort of the low income worker relatively to be paid equally. They refer to the "fair wage-effort hypothesis" by Akerlof & Yellen (1990) and claim that fairness considerations play a role. Greiner et al. (2010) support these findings by examining the role of wage transparency on workers' effort. Under private information, no significant differences between effort adjustment after wage changes could be detected. Once information about wages among peers became public, high income workers increased their effort in quality and quantity while low income workers increased the number of solved tasks but with a decrease in quality.

From our perspective it is important to look at income differences within a couple. A study by Liebig et al. (2010) uses survey data (GSOEP) and shows that men evaluate their personal income as unfair when their wife's income is relatively higher, whereas women's perception of fairness is not affected by income differences. They conclude that if men earn less money than their female partners, they cannot fulfill society's expectation toward him of him being the male breadwinner next to his female housekeeper.

That the behavioral expectation that 'a man should earn more than his wife' as well as wife's aversion to earn more than her husband, has an impact on women's labor force participation can be shown by Bertrand et al. (2013) who examine the causes and consequences of income differences within couples in the US and Canada with survey data.

### 3 Theoretical Background and Hypotheses

#### The Effects of Behavioral Prescriptions and (Dis)satisfaction

We refer to two strands in the literature that lead partly to two opposing expectations towards the effects on work effort.

The first chain of reasoning relies on findings from a pioneering study by Akerlof & Kranton (2000) which revealed that social identity could indeed be incorporated into a standard economics approach and could thus be used to explain social and gender differences. Akerlof & Kranton (2000) introduced the concept of “identity”, originally developed in social psychology, into economics. They expanded the utility function by a non-pecuniary term representing social identity. This term made it possible to reflect on the possibility of people belonging to social categories while having appropriate behavioral prescriptions in mind. Akerlof & Kranton show that individuals make choices concerning monetary incentives and also self-identity. They define identity as one’s sense of belonging to a social category argue that people derive utility from complying with social norms, a behavioral prescription for the social category, and disutility from deviating from this socially desired behavior. Thus, choices by individuals depend on self-identity, which goes beyond purely economic incentives.<sup>1</sup>

In one application of the model the two relevant social categories for our paper are ‘man’ and ‘woman’. Additionally, we assume a concrete behavioral prescription exists, that ‘a man should earn more than his wife’ (Bertrand et al., 2013). If deviating from this behavioral prescription is costly, we assume a gender difference in work effort to occur: Men struggle to solve as many mazes as they can to fulfill the prescribed behavior of a male breadwinner. On the other hand, women reduce their effort in solving mazes in order to avoid earning a higher income than their male partners and fulfill their prescribed behavior.

The second strand of literature focus on wage comparisons impact on work effort choices. Following this chain of reasoning fairness considerations might explain why people reduce their work effort. Referring to the ‘fair wage-effort hypothesis’ by Akerlof & Yellen (1990) and the findings of Gächter & Thöni (2010) and Greiner et al. (2010), we can assume effects are driven by perceptions of fairness. People who perceive an income situation as unfair reduce their work effort. Thus, we assume our participants will reduce work effort, when they are not satisfied with their personal income opportunities, compared to their partner’s income opportunities and therefore with the role of being the primary or secondary earner in the couple, they are assigned to.

Table 1 summarizes the effects we specifically expect for work effort to occur based on gender. For men who are unsatisfied with their relative wage we expect either a decrease when applying findings from identity economics or an increase in work effort when applying the effect of fairness perceptions. For women, who are satisfied with their relative wage we expect the same effects with inverse signs.

Table 1: Behavioral Prescriptions and (Dis)satisfaction

	Male Behavioral Prescriptions	Female Behavioral Prescriptions
Dissatisfaction	↓↑	↓↓
Satisfaction	↑↑	↑↓

<sup>1</sup>Fundamental critique on this approach can be found in Trzciński & Holst (2011).

When we assume male secondary earners to evaluate their personal situation as unsatisfying because their wife's income opportunities are higher, as Liebig et al. (2010) claims, these two effects work against each other: Men evaluate their situation as unfair, thus reducing their effort, but at the same time they increase their effort to comply with a social norm and fulfill the prescribed behavior. The same is true for women, who are possibly satisfied with their income opportunities as a secondary earner: Satisfaction should lead them to an increase in effort, while social norms tell them to avoid earning a higher income than their partners.

## Behavioral Responses to Taxes

Following the Intensity Model of Dickinson (1999), we assume that utility is a function of consumption ( $c$ ), productive hours of work ( $h_w$ ), and hours of on-the-job-leisure ( $h_l$ ) with  $U_c > 0, U_{h_l} > 0, U_{h_w} < 0$ . Hours of work can be denoted with  $h = h_l + h_w$ . Since we fix hours of work in our experiment, the subject's choice variable is  $h_w$ , the choice of work effort: The time participants spend on working on the compensated task within a given time.<sup>2</sup> Since 'there are two forces at play', the income and substitution effect, each leading to different behavioral responses to taxes, theory predicts labor supply to increase, decrease or to remain unchanged when tax rate changes (Manski, 2012). According to empirical findings listed above, we assume a positive substitution effect and an increase in work effort, when the net wage increases due to a lower marginal tax rate.<sup>3</sup>

## 4 Description of the experiment

Cohabiting, heterosexual couples who lived together for at least one year in the area of Frankfurt (Oder), Germany, were invited to participate in our experiment.<sup>4</sup> According to Harrison & List (2004) we conducted a "framed field experiment" with non-standard subjects participating in a lab experiment with field context. Contrary to Güth et al. (2004) who invited standard subjects (students) but in line with others conducting real couple experiments (Bateman & Munro, 2005, 2009; Palma et al., 2008)<sup>5</sup>, we used non-standard couples since our research question obviously requires the couple's context. All experiment sessions were carried out in the same room at the European University Viadrina in Frankfurt (Oder) in the evenings and on the weekends throughout the Summer and Autumn of 2012.<sup>6</sup>

### 4.1 Experimental protocol

After arriving in the classroom, participants were seated in pairs with partition screens that separated couples from each other to prevent interaction and produce privacy. Subjects only knew that they were taking part in a scientific study that consisted of two stages in which they could

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<sup>2</sup>Although Dickinson (1999) admits that caution is required when generalizing work effort to more traditional measures of labor supply, Doerrenberg & Duncan (2012) conclude that work effort is a good proxy for labor supply. Meghir & Phillips (2008) claim that 'hours of work is just one dimension of work effort' for many individuals, especially for workers with a high level of autonomy in the job.

<sup>3</sup>We are not able to observe income effects in our experiment (Sillamaa, 1999)

<sup>4</sup>We recruited subjects by distributing postcards, publishing a call for participation in the local press (newspaper and radio) and visiting parent's evenings in kindergartens and schools.

<sup>5</sup>We pass on naming more work, because it is not relevant for our context. For further information see <http://www3.grips.ac.jp/~munro/couples.htm#household> for a profound collection of couple experiments.

<sup>6</sup>We offered professional childcare possibilities during the experiment by cooperating with Viadrina Family representatives and local kindergarten teachers.

accumulate income by solving tasks (with an additional show-up fee of 2.50 €) but only one of the two stages (random selection) would be relevant for payoff. Immediately before each stage, subjects were informed about the type of the task they had to perform. All instructions were handed out and read aloud.<sup>7</sup>

In both stages, each partner's compensated task was to solve mazes<sup>8</sup> (using paper and pencil) within a period of 15 minutes. One person within each couple was assigned to be the secondary earner with easy level mazes and a lower wage rate (0.50 €) and the other one was assigned to be the primary earner with hard level mazes and a higher wage rate (1.50 €). Following Gneezy et al. (2003), Gupta et al. (2005), and Schmitt (2013) we ensured the maze tasks were gender neutral.

The couples income was taxed individually in one stage and jointly in the other. In both situations the same progressive tax function  $\tau$  applied. Under individual taxation both partners could gain from a basic allowance of 4.50 €, while under joint taxation the basic allowance (E) for both partners of 9 € was assigned to the primary earner. Thus, our tax scheme is designed as individual taxation in both cases, but with differences in basic allowances that lead to different marginal tax rates as shown in Table 2.<sup>9</sup>

Table 2: Net Wages

	Individual Taxation	Joint Taxation
Secondary Earner	$w_I^{SE} = w_g^{SE} - \tau(w_g^{SE} - E)$	$w_J^{SE} = w_g^{SE} - \tau(w_g^{SE})$
Primary Earner	$w_I^{PE} = w_g^{PE} - \tau(w_g^{PE} - E)$	$w_J^{PE} = w_g^{PE} - \tau(w_g^{PE} - 2E)$

The tax description sheets, which were handed out at the beginning of each stage, included an effort-income-table and a short explanation of the tax system. Following Fochmann & Weimann (2011), who emphasizes that complex tax environments may cause biases, we kept our experiment's tax schemes and the instructions as simple as possible: First, we made use of a tax function that is linear and progressive with increasing marginal tax rates (20%, 40%, 60%, 80%, 90%, 95%). Second, we represented net wages instead of a tax rate (Sillamaa, 1999). Third, we illustrated the tax burden per unit graphically in a pie chart (Fochmann & Weimann, 2011). In order to detail the tax system, a written tax description clearly indicated that "Both partner's income is taxed to the same degree" in the individual taxation stage. In the joint taxation stage, we stated to the participants that "Both partner's income is taxed to a different degree. The tax burden of the one with the lower wage rate is higher and the tax burden of the one with the higher wage is lower". To make sure that subjects became acquainted with both tax sheets and both income opportunities, they had to answer control questions concerning their own and their partner's potential income.

Additionally, in the compensated task, one partner had to fulfill an uncompensated and compulsory task<sup>10</sup>, which was is easy but reduced time for the compensated maze task from 15 to 12

<sup>7</sup>Instructions are translated and can be found in the Appendix.

<sup>8</sup>We used a collection of mazes from the web: <http://www.onebillionmazes.com>. "Easy" refers to mazes of a low difficulty level, "hard" to mazes of a slightly higher difficulty level.

<sup>9</sup>The idea of assigning the tax allowance to one partner of the couple is based on the income tax class combination III and V in Germany which is one of two possible tax class combinations for married couples in Germany. The one who falls under tax class III receives basic and lump-sum allowances while the one under tax class V can make no use of it (Stöwhase, 2009).

<sup>10</sup>In one stage subjects connected dots (paper and pencil) that should become a picture. In the other stage

minutes. The couple had to decide who takes over this task prior to following the performance part.

To allow for on-the-job leisure (Dickinson, 1999), we arranged a selection of magazines, a daily newspaper, sweets and drinks on each of the couple's desk.

After having performed in two stages, participants were asked to fill out a post-experimental questionnaire that contained questions about their individual socio-demographic characteristics, couple's information, their individual attitudes toward their perceived fairness of their potential income, their (dis)satisfaction with the assignment of the role and attitudes toward gender roles. To avoid communication and interaction while filling out the questionnaire we seated the partners apart from each other.

At the end, both partners received their accumulated income and their show-up fee in another room. To determine their payoff, one of them had to draw a ball from a jar with red and yellow balls that represented the potential income of each round.

## 4.2 Experimental Design

In our within-between-subjects design, we assigned types of mazes to create different roles within each couple for the duration of the experiment. The one who solved harder mazes at a higher piece rate wage was the primary earner (PE) and the other partner who was solving easier mazes at a lower piece rate wage was the secondary earner (SE).<sup>11</sup> In experiment groups 1.1. and 2.1, couples consisted of a male primary and a female secondary earner; in the other group (2.1. and 2.2.) we created couples with a female primary and a male secondary earner.

To control for range effects or biases, like boredom or learning that could occur when solving the same task in both stages, we varied the order of the tax conditions in the second treatment. We take the caution advice of Charness et al. (2012) seriously, who advocates that varying the order "might not be enough to remedy the problem", but this problem is limited to preference based experiments. Since subjects are asked to perform, as in our experiment, systematic bias seems to be unlikely (Charness et al., 2012).

Figure 1: Experimental Design

	Treatment 1		Treatment 2	
Group 1.1	Group 1.2		Group 2.1	Group 2.2
male PE & female SE	female PE & male SE			female PE & male SE
Stage 1	individual taxation		joint taxation	
Stage 2	joint taxation		individual taxation	
	post-experimental questionnaire, urn decision			

subjects were asked to decode numerical series into words by substituting the numbers with letters, using an encryption table, which assigned a number to each letter of the alphabet, similar to Erkal et al. (2009).

<sup>11</sup>Tasks with two difficulty levels justify different wages and avoid discriminatory feelings for one of them.

## 5 Results

We conducted 24 sessions with 116 participants (58 couples). Each session took about one hour and the average payment was 27.24 € per couple. Sample descriptions are presented in Table 3. The majority of couples are married and most of them have children. Female partners are slightly younger than male partners. Except for one women who is from Poland, all other participants were born in Germany or the former GDR. The participants' highest educational level differs between men and women: while a larger share of men have a university degree or a vocational education without A-level, the share of women having a vocational education with A-level is higher than men. The men are employed full time more often than women, while women are employed part time more often than men.

Table 3: Sample Descriptives

	Pooled (Std. Dev.)	Men (Std. Dev.)	Women (Std. Dev.)	P-value for gender differences
Age	44.09 (15.90)	45.48 (16.12)	42.71 (15.69)	.35
Married	0.74	0.74	0.74	1
Living together since	18.24 (15.84)	18.47 (15.99)	18.02 (15.83)	.88
Children	0.70	0.72	0.67	.54
Highest educational attainment	2.20 (0.91)	2.30 (0.89)	2.09 (0.93)	.22
Voc. edu. without A-level	0.31	0.29	0.33	
Voc. edu. with A-level	0.16	0.13	0.20	
University degree	0.52	0.59	0.45	
Full time employment	0.49	0.57	0.41	.1
Part time employment	0.11	0.05	0.17	.04
Marginal employment	0.09	0.10	0.69	.51
Personal gross income	3.28 (1.23)	3.40 (1.21)	3.16 (1.24)	.31
N	116	58	58	

'Age' denotes mean age in years, 'married' denotes the share of couples who are married, 'living together since' denotes mean years of living together, 'children' denotes the share of participants who have one or more children. 'Highest educational attainments' denotes mean of the highest educational attainment (0=none, 1=Vocational Education without A-level, 2=Vocational Education with A-level and University degree=3). Voc. Edu without A-level, Voc. edu. with A-level, and University degree denote the share of participants having this qualification. 'Full time employment' and 'part time employment' denote the share of participants with this employment status. Others are either in pension, unemployed, in maternity leave, in education programs or work in marginal employment. Gross domestic income denotes mean subjects personal gross income (1=0-500, 2=5001-1000, 3=1001-2000, 4=2001-3000, 5=>3001).

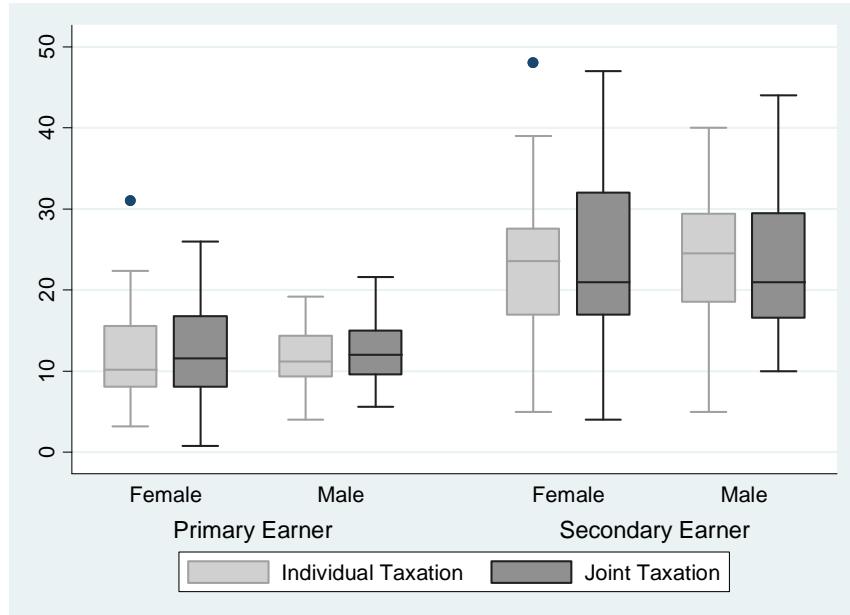
## 5.1 Inferential Statistics

When investigating work effort, we focus on leveled work effort. Leveled effort represents the number of solved mazes, the output of productive hours of work, and assumes that each participant's working time is fixed at 12 minutes, no matter if he or she takes the uncompensated task. Secondary earners solve on average 23.66 mazes ( $SD = 9.30$ ) and primary earner 12.16 mazes ( $SD = 5.42$ ). When not differentiating between tax systems no gender difference in effort levels can be detected: Female primary earners ( $Mn = 12.25$ ) do not solve a significantly different number of mazes ( $p = .87$ , t-test) than male primary earners ( $Mn = 12.07$ ). The same is true for secondary earners (t-test, ( $p = .98$ )): The women's effort ( $Mn = 23.68$ ) does not differ significantly from men's ( $Mn = 23.63$ ).

Figure 2 gives an overview of the work intensities by role, tax condition, and sex. Again, we cannot detect gender differences conditional on the tax system. The male secondary earners' effort ( $Mdn_{mSE}^I = 24.5$ ,  $Mdn_{mSE}^J = 21$ ) does not differ significantly from those of women ( $Mdn_{fSE}^I = 23.6$ ,  $Mdn_{fSE}^J = 21$ ) in cases of individual ( $p = .52$ , MW, two-sided) or joint taxation ( $p = .85$ , MW, two-sided). Additionally, we cannot detect gender differences between male ( $Mdn_{mPE}^I = 11.2$ ,  $Mdn_{mPE}^J = 12$ ) and female primary earners ( $Mdn_{fPE}^I = 10.2$ ,  $Mdn_{fPE}^J = 11.6$ ) where individual ( $p = .71$ , MW, two-sided) or joint taxation ( $p = .52$ , MW, two-sided) is considered.

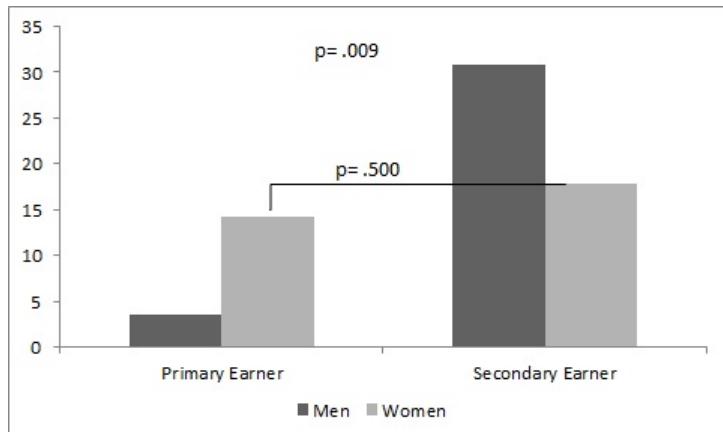
Comparing effort between the two tax systems by gender leads us to find tax effects but only for male secondary earners. Their effort differs significantly between the two tax systems: male secondary earners' effort is higher under individual than under joint taxation ( $p = .026$ , WSR, one-sided). For all other experimental groups, male primary earners' ( $p = .40$ , WSR, two-sided), female primary earners' ( $p = .84$ , WSR, two-sided), and female secondary earners' ( $p = .67$ , WSR, two-sided) work effort does not differ significantly between the two tax systems. Thus, male secondary earners might be more susceptible to changes in the tax scheme and consequently show larger labor supply elasticity in terms of work effort.

Figure 2: Work Effort by Role, Tax and Sex (Median)



In order to investigate subjects' satisfaction with the assigned role we asked the participants "Would you have liked to change the mazes (and hence the payment) with your partner?". This represents a good overall measure for satisfaction with the assigned role and the corresponding income opportunities. Satisfaction with the assigned role should lead them to answer 'No', dissatisfaction should be expressed by a willingness to change the role. We detected a significant (Pearson Chi(1)=4.6077,  $p = .032$ ) relationship between the role and the desire of one's willingness to change unconditionally based on gender: Secondary earners wanted to change their role more frequently. Differentiating between gender, this relationship is only significant for men: While male primary earners want to keep their roles, male secondary earners show a higher desire to change the assigned role (Fisher's Exact Test,  $p = .009$ , one-sided). Interestingly, we cannot detect this relationship for women (Fisher's Exact Test, one-sided,  $p = .500$ ).

Figure 3: Share of Primary Earner/Secondary Earners Who Wanted to Change the Role



The compulsory and uncompensated task works as our proxy for housework within the experiment. The majority of couples chose the secondary earner to take over this task (Pearson Chi(1)=52.0714,  $p = .000$ ). Furthermore, the allocation of the uncompensated task is more equal in cases where there is individual taxation compared to joint taxation (Pearson Chi(1)=7.8637,  $p = .005$ ).

## 5.2 Regression Results

Table 4 provides estimation results for work effort conditionally on the assigned role of primary and secondary earners using a pooled OLS. Again, we investigate leveled effort, the output of productive hours of work, and assume that each participant's working time is fixed at 12 minutes. To address the relatively large heterogeneity of our sample appropriately, we have to control for several characteristics that could influence the slope of learning curves (highest educational attainment, age). We also take into account the influence of their personal tax experiences (income statement) and other socio-demographic characteristics.

The results of the regression analysis (see Table 4) show that we cannot identify a tax effect, when we control for individual characteristics. We found that the tax system has no influence on the level of effort significantly, neither for secondary earners nor for primary earners. While the tax effect fades from the spotlight, effects from (dis)satisfaction and behavioral prescriptions emerge.

We found that dissatisfaction with the role assignment (willingness to change their role) affects

work effort for secondary earners significantly, but differently for men compared to women. We assume that if a person indicates the wish to change their role, it is an expression of being unsatisfied with their assigned role. We can show that willingness to change the role affects male secondary earners positively. Additionally, they even show more effort than change willing female secondary earners. Although they are dissatisfied with the assigned role and thus should reduce work effort the behavioral prescription of being the breadwinner leads male secondary earners to increase effort. Here, the identity effects seems to be stronger than the effect from dissatisfaction: Male secondary earners struggle to solve as many mazes as they could to fulfill the prescribed role of a male breadwinner.

On the contrary, female secondary earners who are willing to change the role decrease work effort. Their behavioral prescription, to avoid being the breadwinner, and the effect from dissatisfaction lead to this kind of reluctant performance behavior. But if female secondary earners are not willing to change the role and thus are apparently satisfied with their role assignment, they are even more productive than the corresponding group of male secondary earners. While this group of secondary earner men who are unwilling to change is less productive compared to the group of female secondary earners, once they want to change the role they struggle to solve as many mazes as they could.

Additionally, we can find the same interaction effect for the dissatisfaction with the net wage (fairness perception of their personal net piece rate in each round compared to their partner's net piece rate in the same round) and gender: While women's effort is affected negatively when they perceive the situation as unfair, men's effort is affected slightly positively. Again, the identity effects for male secondary earners seems to be stronger than the effect from fairness perception.

For both, secondary and primary earners, we can find significant effects from being married. Married men solve more mazes than male cohabiters and married women are less productive than female cohabiters. Possibly, behavioral prescriptions are stronger for married couples than for cohabiters.

Table 4: OLS Regressions on Work Effort for Primary and Secondary Earners

	SE Coef.	PE Coef.
Joint	-0.412 (0.618)	-0.202 (0.295)
Male	-7.642*** (2.781)	-4.405*** (1.382)
Joint * Male	0.116 (0.763)	0.473 (0.438)
Stage 1	-0.181 (0.428)	-0.894*** (0.246)
Joint * Stage 1	0.971 (0.809)	0.422 (0.441)
Male * Stage 1	0.328 (0.566)	0.710* (0.405)
Joint * Male * Stage 1	-1.080 (0.985)	-0.595 (0.648)
Dissatisfaction with role assignm.	-9.272*** (2.948)	2.237 (4.854)
Dissatisfaction with role assignm. * Male	12.550*** (3.639)	-0.474 (1.600)
Conservatism	-0.810* (0.419)	-0.530*** (0.181)
Dissatisfaction with role assignm. * Conservatism	2.174*** (0.606)	-0.420 (0.863)
Male * Conservatism	1.294** (0.581)	0.476* (0.263)
Dissatisfaction with role assignm. * Male * Conservatism	-2.706*** (0.756)	
Married	-1.686*** (0.483)	-0.811** (0.333)
Married * Male	1.771*** (0.550)	1.925*** (0.327)
Dissatisfaction with net wage	-0.913** (0.396)	-0.101 (0.205)
Dissatisfaction with net wage * Male	0.927* (0.516)	0.465 (0.302)
Uncompensated Task	0.013 (0.250)	-0.099 (0.167)
East	-1.114** (0.449)	-0.213 (0.230)
Age	-0.042*** (0.011)	-0.057*** (0.009)
Highest Educational Attainment	-0.150 (0.131)	0.425*** (0.114)
Personal Gross Income	0.214 (0.147)	0.037 (0.063)
Income Statement	-0.386 (0.365)	-0.572* (0.315)
Constant	12.814*** (2.179)	7.585*** (0.933)
Observations	103	99
R-squared	0.649	0.801
Adj. R-squared	0.546	0.744

Note: Robust standard errors in parentheses

\* p&lt;0.10, \*\* p&lt;0.05, \*\*\* p&lt;0.01

The dependent variable is leveled effort and we assume that each participant's working time is fixed at 12 minutes. 'Dissatisfaction with role assignment' takes on a value of 1 if the participant would have changed the role and 0 if not. 'Dissatisfaction with net wage' takes on a value of 1 if they perceive their own net wage as unfair comparing their partners net wage in the same round and 0 if they perceive the situation as fair. 'Conservatism' represents an index of attitudes towards gender roles. 'Uncompensated task' takes on a value of 1 when one took over the uncompensated ask and 0 if not. 'Income statement' takes on a value of 1 if they ever made a tax declaration.

## 6 Discussion

Besides the impact taxes have on work effort we also focus on factors that go beyond purely economic incentives: The effect that gender identities, satisfaction with income opportunities and fairness perceptions have. Therefore, we conducted a real effort experiment where real couples perform under a piece rate compensation scheme on real effort tasks (solving mazes) in two stages (individual and joint taxation) based on the number of solved mazes, i.e. the work effort, serving as our proxy for labor supply.

While women do not respond to changes in tax schemes, results from inferential statistics show that male secondary earners are more susceptible to changes in the tax scheme and are less productive when they are under joint taxation compared to individual taxation. These findings could limit the assumption of women having a higher labor supply elasticity (Bargain et al., 2011; Blau & Kahn, 2007) to labor supply elasticity in terms of hours worked. When focusing on labor supply in terms of work effort, our results indicate a stronger behavioral response from men with therefore having a higher labor supply elasticity. Furthermore, these findings could challenge the concept of a Gender-Based-Taxation (Alesina et al., 2011). According to this concept, men should face a generally higher tax rate due to their lower labor supply elasticity in terms of hours worked. Furthermore this could lead to a loss of work effort when men are in the position of being a secondary earner.

What seemed to be clear after looking at inferential statistics, does not hold true when we account for individual characteristics in the regression analysis: The tax system does not affect work effort significantly, neither for primary nor for secondary earners. Possibly arranging the experiment for couples was not suitable enough for investigating 'simple' gender differences in responses to tax systems and the effect of tax perception. Possibly the 'noise' within the experimental setting coming from this special subject group, i.e. a non-standard subject pool, could cause the tax effect to take a backseat. Since we are interested in two taxation alternatives that apply to couples in the real world, we invited couples instead of students.

Our findings yield important insights into aspects that are beyond purely economic incentives and drive the behaviors of individuals within a couple. First, there are effects coming from dissatisfaction and perceptions of fairness, which other real effort experiments have already shown. Second, the social norm of 'a man earning more than his wife' (Bertrand et al., 2013) and corresponding prescribed behavior leads to strong effects in our experiment. Although we did not ask for the existence of this social norm, we can assume it to exist. While most of German men are working full time, women's working hours differ strongly: On the one hand, 20% of all women in the labor force work less than 20 hours and two-thirds of all workers in (tax free) marginal employment called *Mini-Job* are female. On the other hand, at least 17% of all couples consist of two full-time working adults (OECD, 2012). Besides these empirical quantitative facts that could lead to this assumption, we can also report a qualitative observation during our experiment that we are not able to quantify: During the experiment, we recognized that a subject's behavior was different when we assigned potentially atypical roles (female primary and male secondary earner). The couples frequently asked whether anything went wrong when they recognized their role from reading the instructions or if the assignment was truly random. Some women asked if they could change their role and some men asked if they could help their female partner. In fact, one couple cheated by changing the mazes when the supervisor was out of sight (we dropped this observation). Remarkably, this kind of behavior did not appear in the other experimental group with couples

consisting of male primary earners and female secondary earners.

The interaction of these two effects can be supported by our regression analysis: We can show, that one's willingness to change their role and thus dissatisfaction with the assigned role affects male secondary earners positively while the women's effort is negatively affected by their dissatisfaction. The same is true for perceptions of fairness based on one's own net piece-rate compared to their partner's net piece rate in the same round. Perceiving the situation as unfair leads to positive effects on male's effort and negative effects on female's effort. Men's behavioral prescription to be the breadwinner seems to be stronger than the effect that their dissatisfaction should have in decreasing work effort. Women's behavioral prescription to avoid being the breadwinner does not exclude the effect from their dissatisfaction or perception of fairness and end up being less productive. Comparing male and female secondary earners and their effort, we can show that secondary earning men who are unwilling to change their role are less productive than female secondary earners, but once they are willing to change the role they struggle to solve as many mazes as they could. This finding of satisfied men being less productive than satisfied women seems to be strange. Also in this context, the behavioral prescription should have worked. One possible explanation is that these women, who are satisfied to be the secondary earner within the couple do not perceive their 'risk' earning potential more often than their male partners. Hence, the satisfaction effect is stronger for these women.

We interpret the effect of being married (married men solve more mazes than male cohabiters and married women are less productive than female cohabiters) as having a 'clear' identity effect. We assume social norms and thus behavioral prescriptions are stronger for married than for unmarried couples because the case of marriage is specifically regulated in Germany. Article 6 of the Basic Law for the Federal Republic of Germany states that 'Marriage and the family shall enjoy the special protection of the state' and many other regulations and norms refer to this basic law. Interestingly, these effects even succeed when we account for age, education, their personal income as a proxy for their labor market participation and attitudes towards gender roles.

Caution is required when applying experimental results to the real world. When conducting real effort experiments the subjects' task has to be "annoying and somewhat painful" (Doerrenberg & Duncan, 2012). Our data slightly indicates that this assumption is only true for secondary earners, where we can find more and stronger effects except from learning effects. While we can show that the tax did not affect work effort decisions in our experiment, we can confirm the idea of identity economics - that there are some factors close to sociology and social psychology that go beyond pure economic incentives that drive the behavior of individuals. This seems to be the case, especially within a heterosexual couple or family context where we can assume the gender identity more present. In this regard, we follow the idea of Katz (1997) who suggested that models of household decision making should be open to the idea of social gender norms in order 'to predict a significant proportion of collective and individual behavior without doing quite as much violence to lived reality (...) and thus to inform policy in meaningful ways'. Possibly the neoclassical concept of identity economics (Akerlof & Kranton, 2000) can help.

## 7 Conclusion

We show that gender identity and satisfaction with income opportunities dominated the effects from taxation on the subject's labor supply in the couple context. The dissatisfaction with the assigned role, expressed by a willingness to change the role, affects male secondary earners effort

positively while women's effort is negatively affected. These directions in the effects are also true for fairness perceptions of one's own net piece rate compared to the partner's net piece rate in the same round. Perceiving the situation as unfair leads to a decrease in female's effort and an increase in male's effort. This can be explained by an interaction of a gender identity effect and an effect from dissatisfaction. Men's behavioral prescription to be the breadwinner seems to be stronger than the effect from dissatisfaction that should lead to a decrease in work effort. Women's behavioral prescription to avoid being the breadwinner does not exclude the effect from dissatisfaction or fairness perception and thus leads them to be less productive. Comparing male and female secondary earners' effort, we can show that men who are satisfied are less productive than female secondary earners, but once they indicate that they would have changed the role if they could, they struggle to solve as many mazes as they could.

Interestingly, marriage affects work effort significantly, even when we control for age, education, personal income and attitudes towards gender roles: Married men solve more mazes than male cohabiters while married women are less productive than female cohabiters. Presumably, the institution of marriage with an exceptional position in Germany leads to stronger behavioral prescriptions for men and women within our experiment.

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## 8 Appendix

### 8.1 Instructions

#### Main Instructions

Welcome and thank you for participation!

You are an important part of our study which we are conducting with 250 people from the area of Frankfurt (Oder). You are participating as a couple because we are interested in how you two together make decisions. The study consists of two rounds and a questionnaire. In both rounds you will make decisions and solve tasks. Your decisions and the performance on these tasks determine your income. At the end you will receive the income of one round, which will be chosen randomly. The questionnaire is important for our analysis. Therefore, we please you to complete it carefully. After filling out the questionnaire, you receive a voucher from the supervisor that entitles you to collect your payoff in the next room.

It is essential that you read the instructions carefully. In case of any doubts or insecurities please address your questions to the supervisor. Please indicate your concern by hand rising. We will come to your seat in order to not to disturb the other participants. Your anonymity is assured during all times. As participant you will receive a code number that is written in the upper right corner of any paper.

#### Stage Instructions

##### Tax Description and Effort-Income Table

##### Decision on Unpaid Task

Before you can start, you are asked to decide jointly, if you by yourself or your partner by him/herself will solve an unpaid task. This task is not difficult at all and no special previous knowledge is required. Whoever you decide on will have to solve the task by him/herself alone. The solving takes 3 minutes. It thereby shortens the available total time on solving the mazes by 3 minutes. After finishing this task, also this person can start to solve the paid task and thus generate income.

Please check the box if you are the person solving this mandatory task.

## 8.2 Tax Scheme

Table 5: Tax Schedule

Income Bracket	Individual Taxation	Joint Taxation	
		SE	PE
0-4.50 €	0%	20%	0%
4.51 - 9.00 €	20%	40%	0%
9.01 - 13.50 €	40%	60%	20%
13.51 - 18.00 €	60%	80%	40%
18.01 - 22.50 €	80%	90%	60%
22.51 - 27.00 €	90%	95%	80%
27.01 - 31.51 €	95%	95%	90%
> 31,51 €	95%	95%	95%

This table represents the tax scheme that underlies the experimental design. Subjects received a colored table with pie charts indicating the increase in the tax burden per unit.