

A Service of

ZBW

Leibniz-Informationszentrum Wirtschaft Leibniz Information Centre for Economics

Denderski, Piotr; Kaas, Leo; Schulz, Bastian; Siassi, Nawid

## Conference Paper Joint Labor Search and the Taxation of Couples

Beiträge zur Jahrestagung des Vereins für Socialpolitik 2024: Upcoming Labor Market Challenges

**Provided in Cooperation with:** Verein für Socialpolitik / German Economic Association

*Suggested Citation:* Denderski, Piotr; Kaas, Leo; Schulz, Bastian; Siassi, Nawid (2024) : Joint Labor Search and the Taxation of Couples, Beiträge zur Jahrestagung des Vereins für Socialpolitik 2024: Upcoming Labor Market Challenges, ZBW - Leibniz Information Centre for Economics, Kiel, Hamburg

This Version is available at: https://hdl.handle.net/10419/302388

#### Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

#### Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



# WWW.ECONSTOR.EU

# Joint Labor Search and the Taxation of Couples<sup>\*</sup>

Piotr Denderski<sup>†</sup>

Leo Kaas $^{\ddagger}$ 

Bastian Schulz<sup>§</sup>

Nawid Siassi<sup>¶</sup>

February 2024

#### Abstract

In many countries, income is taxed at the household level with a progressive tax schedule. This paper analyzes the impact of joint progressive taxation for employment and wages of dual-earner households in the presence of labor market frictions. We develop a directed search model in which firms offer wage contracts to workers in single and couple households, anticipating that workers may quit into other jobs or non-employment in response to spousal income and the tax system. The model is calibrated to replicate job-finding, job-to-job transition, layoff and quit rates of the U.S. labor market, and a progressive joint tax schedule and UI benefits at the individual level. When comparing the benchmark economy to a counterfactual scenario with individual taxation, we find that replacing the tax rules for couples with those for singles reduces the share of non-employed workers by one-tenth. Furthermore, it increases wages by about 6 percent.

**JEL classification:** E24; H24; J63; J64

**Keywords:** Search and matching; Job-to-job transitions; Dual-earner households; Income taxation

<sup>\*</sup>Preliminary and incomplete.

<sup>&</sup>lt;sup>†</sup>University of Leicester, piotr.denderski@le.ac.uk

<sup>&</sup>lt;sup>‡</sup>Goethe University Frankfurt, kaas@wiwi.uni-frankfurt.de

<sup>&</sup>lt;sup>§</sup>Aarhus University, bastian.schulz@econ.au.dk

<sup>&</sup>lt;sup>¶</sup>TU Wien, nawid.siassi@tuwien.ac.at

## 1 Introduction

Tax-transfer systems in many countries are organized at the level of the household rather than the individual. For example, in the current U.S. income tax system the household constitutes the unit of taxation, while social assistance transfers are conditional on household income not exceeding a specific limit. Due to tax progressivity, joint taxation imposes high marginal and participation tax rates on secondary earners. This has consequences for labor supply, human capital accumulation, savings, and gender inequality (e.g., Guner et al., 2012; Olivetti and Petrongolo, 2017; Bick and Fuchs-Schündeln, 2018; Borella et al., 2023; Holter et al., 2023). Notably, previous literature assumes the labor market to operate without frictions and abstracts from modeling the distribution of wages as an endogenous outcome implied by optimal firm choices. Our aim in this paper is to fill this gap and take a step towards gaining a better understanding of the labor market consequences of joint taxation of couples. We ask: how are couples' job-search strategies, their job mobility, and earnings dynamics shaped by the tax system? How do they interact with consumption-saving choices at the household level? And what are the aggregate and distributional consequences of reforming tax and transfer systems? Addressing these questions now is vital in light of salient trends in the partition of households into singles and couples.

To answer these questions, we build on the directed-search equilibrium model developed by Chaumont and Shi (2022), which we extend to an economy with dual-earner households. Single and couple households in our model are risk averse and can save in a risk-free asset subject to a borrowing limit. In addition to self-insurance through precautionary savings, workers in couple households share labor market risks within the household, jointly deciding their job search strategies. Homogeneous firms post wages, commit not to counter outside offers, and take into account workers' job quitting into other jobs or non-employment. The possibility for both household members to search off- and on-the-job, in conjunction with their current asset position, creates a rich set of labor market dynamics, which, in equilibrium, interact with firms' job-posting decisions. Despite its simplicity,<sup>1</sup> our model is well suited to analyze the consequences of public policy for employment, earnings, and savings of single and couple households.

The first goal of this paper is to use the model to analyze the effects of the joint progressive taxation of couples. Our framework has novel implications for employment and earnings dynamics in couple households compared to previous literature. In models with competitive

<sup>&</sup>lt;sup>1</sup>We gain tractability from the block-recursivity property of directed-search models and by assuming identical labor productivity in all jobs, so that the state vector of a single (couple) household includes only two (three) continuous variables: assets and the current wage (wages of both spouses). The model is set up in continuous time and solved with finite-difference method as in Achdou et al. (2021).

labor markets, the wage rate of a worker is determined by her/his current labor productivity. In contrast, in our model, it reflects past search behavior and the position on the job ladder. The joint search behavior of couples, in turn, is crucially influenced by the design of the tax code. Consider a couple in which one spouse earns a medium-high wage and the other earns a lower wage. Under individual-based taxation, a progressive tax code implies a high marginal tax rate for the primary earner, which lowers her/his incentive to quit into better-paid jobs. At the same time, the secondary earner directs search effort to better-paid jobs, which are easier to find (compared to the primary earner) due to the lower position on the wage ladder. As a result, this couple experiences higher wage growth for the secondary earner. With joint taxation, conversely, marginal tax rates will be relatively lower for the primary earner, who is thus more likely to climb the wage ladder. In contrast, the secondary earner is taxed at a relatively higher rate and hence has lower incentives to exert search effort to move to better-paid jobs. If the partner's earnings or the household's assets are sufficiently high, the secondary earner may even quit into non-employment. Against the backdrop of rising shares of dual-earner couples and persistent gender earnings gaps in many countries, these forces shape the career patterns of couples under different tax treatments. Our model allows us to quantify these effects and evaluate their implications for joint earnings dynamics, the consequences of job loss, aggregate unemployment, and earnings inequality within and across households.

As a preliminary illustration, we quantify how a hypothetical tax reform that abolishes the joint taxation of couples affects labor market dynamics and wage inequality in the U.S.. We calibrate our model to match key moments of U.S. labor market data, which we calculate based on the Survey of Income and Program Participation (SIPP) Our model can jointly explain unemployment, job-finding rates, job-to-job transition rates, and the fraction of separations that are voluntary quits. In line with the mechanisms outlined above, unemployment falls by approximately 0.5 percentage points upon the introduction of individual taxation. This example shows that the interplay of household structure and family composition with tax policy, which our model allows us to study, has rich macroeconomic implications.

The second goal of this paper is to examine the effects of unemployment insurance (UI) for couple households. In many countries, there is a two-tier transfer system where laid-off workers initially receive individual UI benefits that depend on the previous wage but not household characteristics. Upon expiration of UI, the worker potentially falls back on social assistance, where benefits are means-tested against household income and assets. Similar to joint taxation, little is known about the consequences of such transfer systems for the labor market outcomes of couple households. In standard (single-worker) models, higher UI

replacement rates induce workers to search for higher-paid jobs at lower job-finding rates. In a couple household, the strength of this effect depends on spousal earnings, household assets, and the effect that transitioning into employment has on the other spouse's jobsearch strategy. Higher UI benefits will likely induce a decline in dual-earner households and more unequal earnings within couples. Regarding social assistance, we expect that stricter means testing steers job search efforts of both spouses toward lower wages with potentially ambiguous effects on savings and welfare in equilibrium. Our model allows us to study the interplay between social insurance and within-household insurance, which has novel implications for UI policy and labor market dynamics.

Our work relates to literature that studies the role of household joint decision-making for job acceptance and quitting (Guler et al., 2012), gender pay gaps (Flabbi and Mabli, 2018), health insurance coverage (Dey and Flinn, 2008) and the marital wage premium (Pilossoph and Wee, 2021). While these models are set in partial equilibrium, Mankart and Oikonomou (2017) and Birinci (2021) analyze the cyclical properties of labor market participation of secondary earners with endogenous job creation, yet abstracting from search on-the-job and simplifying wage setting. Fang and Shephard (2019) study health care reforms in a rich quantitative random search model without savings. Our paper is the first to introduce household decision-making into a directed search equilibrium model to analyze joint tax-transfer policies. Furthermore, most of the existing literature takes household formation decisions as given. The tractability of the directed search framework allows us to explicitly consider demographic trends in household structure and family composition, either by endogenizing household formation or by studying transition paths between different steady states.

## 2 The Model

#### 2.1 Environment

We consider an economy populated by two types of infinitely-lived households: singles and couples, homogeneous firms, and a government. Time is continuous, and we consider a stationary equilibrium.

**Households.** There is a unit mass of households of which fraction  $\mu$  are couple households including two workers, and fraction  $1 - \mu$  are single households with one worker. Thus, there are  $1 + \mu$  workers in the economy. Workers can be either (full-time) employed or non-employed. Couples jointly decide about job search and job quitting of its employed and non-employed members. Households are risk averse, deriving utility from consumption

and disutility from work. A single household with flow consumption c enjoys flow utility  $u(c) - \zeta$  when employed and u(c) when non-employed. A couple household divides household consumption equally between the two worker members, enjoying flow utility  $2u(c/2)-n\zeta$  where n = 0, 1, 2 is the number of employed workers. Future utility streams are discounted exponentially with the rate of time preference  $\rho$ . We abstract from savings so household consumption is identical to income after taxes and transfers.

**Firms.** Firms operate a production technology that produces z units of flow output with every employed worker. To hire workers, firms post vacant jobs at a flow cost of k. A hiring firm posts a wage to which it is committed as long as the hired worker is employed. The firm also commits not to counter outside offers. Firms are risk-neutral and maximize the expected discounted profit value with the discount rate  $\rho_f$ .

Search and matching. Employed and non-employed workers in single and couple households direct their job search to wages posted by firms, so the labor market segments into submarkets that are indexed by the posted wage w and the current labor market state of the spouse. The latter is denoted  $(\hat{w}, \hat{s})$  and includes the labor market state  $\hat{s} \in \{0, 1\}$ of the spouse. We set s = 1 to indicate employment and s = 0 for non-employment. The spousal income  $\hat{w}$  is the current wage for an employed spouse, the last wage if the spouse is a benefit recipient, or zero if they are unemployed and ineligible for UI. For singles, submarkets are simply indexed by the posted wage. In every submarket, matching rates of workers and jobs depend on tightness  $\theta$  which is the ratio between vacancies and the number of searching workers in the submarket. A non-employed worker is matched with Poisson rate  $p(\theta)$  where p is an increasing and concave function satisfying p(0) = 0. An employed worker searches with probability  $\bar{x} \leq 1$  at a given instant so that this worker is matched with Poisson rate  $\bar{x}p(\theta)$ . To simplify notation below, we define  $x(s) = 1 - \bar{x}(1 - s)$  so that the matching probability of a worker in state s = 0, 1 is  $x(s)p(\theta)$ . Vacant jobs are matched with Poisson rate  $q(\theta) = p(\theta)/\theta$ .

**Separations.** Employed workers are laid off at Poisson rate  $\delta$  in which event they become non-employed. We further assume that opportunities to quit the job into non-employment arrive at Poisson rate  $\gamma$ . Such quits may be chosen by a member of a couple when the spouse has found a high-paid job.

**Government.** The government implements a tax-transfer policy and an unemployment insurance (UI) system. Taxation and transfers are organized at the household level. They are described by a joint tax-transfer schedule with a two-parameter function as in Benabou (2002) and Heathcote et al. (2017). Specifically, we assume that disposable household income (after taxes and transfers) is  $D(y) = \tau_0 y^{1-\tau_1}$  where household income before taxes and transfers is equal to y with level and progressivity parameters  $\tau_0$  and  $\tau_1$  that may differ between single and couple households. Workers that newly enter non-employment are entitled to UI benefits which are set to fraction  $\beta$  of the last wage, where  $\beta$  is the replacement rate. UI benefits expire at Poisson rate  $\xi$  in which case the state of the worker changes from (w, 0) to (0, 0), i.e. the worker remains non-employed while benefits (which are linked to the last wage w) drop to zero. To ensure that consumption does not drop to zero for a household without any wage or benefit income, we assume that the government provides in-kind transfers (such as food stamps or housing vouchers) equal to  $\bar{c}$ . Given this institutional setting, we can specify consumption (= disposable income) of a couple household as a function of the joint labor market state:

$$C((w_1, s_1), (w_2, s_2)) = \max\left[D\left(\sum_{i=1}^2 w_i[\beta + (1-\beta)s_i]\right), \bar{c}\right]$$

For single households, we apply separate tax-transfer schedule  $D^{s}(.)$  and in-kind benefits  $\bar{c}^{s}$ , so that consumption is

$$C^{s}(w,s) = \max\left[D^{s}\left(w[\beta + (1-\beta)s]\right), \bar{c}^{s}\right] .$$

The government maintains a balanced budget and finances UI benefits, transfers, and an exogenous flow spending on public goods G from tax revenues.

#### 2.2 Household Value Functions

Let  $v((w_1, s_1), (w_2, s_2))$  denote the value function of a **couple** whose workers are in labor market states  $(w_i, s_i)$ , i = 1, 2. The couple decides about the job search strategies of both workers. For worker 1, this entails the decision to search for a wage  $w_1^+$  in a submarket with tightness  $\theta = \Theta(w_1^+, (w_2, s_2))$  where  $\Theta(.)$  is the tightness function which is endogenously determined from households' search decisions and firms' job creation, as will be described below. We abbreviate the flow value of job search of worker 1 by

$$\sigma_1((w_1, s_1), (w_2, s_2)) \equiv \max_{w_1^+} x(s_1) p\big(\Theta(w_1^+, (w_2, s_2))\big) \big[ v((w_1^+, 1), (w_2, s_2)) - v((w_1, s_1), (w_2, s_2)) \big]$$

The maximization takes into account how job-finding rates vary with wages across submarkets in response to firms' job creation decisions. Note that non-participation (inactivity) can be an endogenous outcome of this decision when a non-employed worker decides to search for a wage that is equal (or higher) than labor productivity in which case tightness and the job-finding rate are zero.<sup>2</sup>

Symmetrically, worker 2 decides about job search with flow value

$$\sigma_2((w_1, s_1), (w_2, s_2)) \equiv \max_{w_2^+} x(s_2) p\big(\Theta(w_2^+, (w_1, s_1))\big) \big[v((w_1, s_1), (w_2^+, 1)) - v((w_1, s_1), (w_2, s_2))\big].$$

Using this notation, we can write the Bellman equation of a couple household as follows:

$$\rho v((w_1, s_1), (w_2, s_2)) = 2u(C((w_1, s_1), (w_2, s_2))/2) - \zeta \sum_{i=1}^2 s_i + \sum_{i=1}^2 \sigma_i((w_1, s_1), (w_2, s_2)) \quad (1) \\ + \delta s_1 [v((w_1, 0), (w_2, s_2)) - v((w_1, 1), (w_2, s_2))] \\ + \delta s_2 [v((w_1, s_1), (w_2, 0)) - v((w_1, s_1), (w_2, 1))] \\ + \gamma s_1 \max [0, v((w_1, 0), (w_2, s_2)) - v((w_1, 1), (w_2, s_2))] \\ + \gamma s_2 \max [0, v((w_1, s_1), (w_2, 0)) - v((w_1, s_1), (w_2, 1))] \\ + \xi (1 - s_1) [v((0, 0), (w_2, s_2)) - v((w_1, 0), (w_2, s_2))] \\ + \xi (1 - s_2) [v((w_1, s_1), (0, 0)) - v((w_1, s_1), (w_2, 0))] .$$

Here, the first line includes the current flow utility of the household and the flow values of job search of both workers. Lines two to five apply only when one of the workers is employed  $(s_i = 1)$  and express the change in household value due to a layoff (rate  $\delta$ ) or when a quit opportunity (rate  $\gamma$ ) is exercised. Lines six and seven apply only when one of the workers is non-employed  $(s_i = 0)$  and indicate the change in value due to UI benefit expiry at Poisson rate  $\xi$ .

Finally, consider the search decisions of a **single** in labor market state (w, s). When this worker searches for wage  $w^+$ , tightness relates to the wage according to  $\theta = \Theta(w^+)$  where again  $\Theta(.)$  endogenously responds to households' search decisions and firms' job creation. The value function of a single household satisfies the following Bellman equation, which takes into account changes in value due to job finding, layoff, quit or benefit expiry events:

$$\rho v(w,s) = u(C^{s}(w,s)) - \zeta s + \max_{w^{+}} \left\{ x(s)p(\Theta(w^{+})) \left[ v(w^{+},1) - v(w,s) \right] \right\} + \delta s \left[ v(w,0) - v(w,1) \right] + \gamma s \max \left[ 0, v(w,0) - v(w,1) \right] + \xi (1-s) \left[ v(0,0) - v(w,0) \right] .$$
(2)

For any worker, we use  $W^+(.)$  to denote the policy function describing the wage appli-

 $<sup>^{2}</sup>$ In labor force statistics, inactivity requires no active search in the last four weeks. Our model interprets these situations as a decision to "search" only for hypothetical high-wage jobs which do not exist in the economy.

cation strategy. For a single worker, we simply write  $W^+(w, s)$ , and for a couple worker we write  $W^+((w, s), (\hat{w}, \hat{s}))$  where  $(\hat{w}, \hat{s})$  is the labor market state of the spouse. We also write the policy function for job quitting of a couple worker as

$$Q(w, (\hat{w}, \hat{s})) = \begin{cases} 1 & \text{if } v((w, 0), (\hat{w}, \hat{s})) > v((w, 1), (\hat{w}, \hat{s})) \\ 0 & \text{else.} \end{cases}$$

Single workers do not quit in a stationary equilibrium of this economy so that we disregard this possibility.

#### 2.3 Firm Value Functions

Consider a firm employing a couple worker at wage w whose spouse is in labor market state  $(\hat{w}, \hat{s})$ . The firm's worker searches for jobs at wage  $W^+((w, s), (\hat{w}, \hat{s}))$  and hence quits to another job at Poisson rate

$$\pi(w, (\hat{w}, \hat{s})) \equiv x(1)p\left(\Theta\left(W^+((w, 1), (\hat{w}, \hat{s})), (\hat{w}, \hat{s})\right)\right) \ .$$

The job can also end with a layoff at Poisson rate  $\delta$  or with a quit into non-employment at Poisson rate  $\gamma Q(w, (\hat{w}, \hat{s}))$ . Finally, the job may continue but change its value when the spouse finds a (new) job which happens with Poisson rate

$$\hat{\pi}(w, (\hat{w}, \hat{s})) \equiv x(\hat{s}) p\left(\Theta\left(W^+((\hat{w}, \hat{s}), (w, 1)), (w, 1)\right)\right) ,$$

or when an employed spouse is laid off or quits the job which happens with Poisson rate  $\delta + \gamma Q(\hat{w}, (w, 1))$  if  $\hat{s} = 1$ . Taking all these events into account, the value function of a filled job, denoted  $J(w, (\hat{w}, \hat{s}))$ , satisfies the Bellman equation

$$\left[ \rho^{f} + \delta + \pi(w, (\hat{w}, \hat{s})) + \gamma Q(w, (\hat{w}, \hat{s})) \right] J(w, (\hat{w}, \hat{s})) = z - w + \hat{\pi}(w, (\hat{w}, \hat{s})) \left[ J(w, (W^{+}((\hat{w}, \hat{s}), (w, 1)), 1)) - J(w, (\hat{w}, \hat{s})) \right] + (\delta + \gamma Q(\hat{w}, (w, 1))) \hat{s} \left[ J(w, (\hat{w}, 0)) - J(w, (\hat{w}, \hat{s})) \right] .$$
(3)

For a firm employing a single worker, the Bellman equation for the job value J(w) is simply

$$\left[\rho^f + \delta + \pi(w)\right] J(w) = z - w , \qquad (4)$$

where  $\pi(w) = x(1)p(\Theta(W^+(w, 1)))$  is the job-to-job transition rate of this worker. Note that single workers never choose to quit into non-employment in this model.

Positive entry requires that the flow cost of a vacant job equals its expected discounted value, which pins down market tightness in all submarkets:

$$k = q(\Theta(w, (\hat{w}, \hat{s})))J(w, (\hat{w}, \hat{s})) , \qquad (5)$$

$$k = q(\Theta(w))J(w) . (6)$$

Submarkets at too high wages do not receive any entry in which case tightness falls to zero. This happens at wage w = z where J equals zero, but it may also happen at wages w < zwhen q(0) is finite and q(0)J < k.

### 2.4 Equilibrium

Given the competitive-search setup of our model, equilibrium is block-recursive as in Shi (2009) and Menzio and Shi (2010). That is, value functions of households and jobs do not depend on the distribution of workers over labor market states.

A stationary competitive search equilibrium is a collection of household value functions v, job value functions J, policy functions of job search and job quitting,  $W^+$  and Q, tightness function  $\Theta$ , distributions of couple and single households over labor market states,  $\Gamma^c$  and  $\Gamma^s$ , and tax parameter such that (i) single and couple households make optimal job search and job quitting decisions where value functions satisfy (1) and (2), (ii) job value functions satisfy (3) and (4), (iii) there is free entry of vacant jobs, equations (5) and (6), (iv) household distributions over labor market states are stationary, and (v) the government budget is balanced. The latter condition says that the difference between all taxes paid and transfers received by couple and single households is equal to the exogenous spending on public goods:

$$\mu \int \left[\sum_{i=1,2} w_i s_i - C((w_1, s_1), (w_2, s_2))\right] d\Gamma^c((w_1, s_1), (w_2, s_2)) + (1 - \mu) \int \left[ws - C^s(w, s)\right] d\Gamma^s(w, s) = G.$$
 (7)

## 3 Calibration and Model Fit

This section describes how we select parameter values for our benchmark model. We calibrate the model to the U.S. economy. Our main data source is the Survey on Income and Program Participation (SIPP).

#### 3.1 Data

The SIPP is a household survey that provides monthly data on, e.g., employment status, earnings, income and key demographic characteristics for all household members. The data are organized around a series of panel data sets (waves). Due to a major redesign in the early 90s, we focus our attention on the SIPP waves covering 1996–2013. Each wave surveys between 14,000 and 36,700 households every four months. The questionnaire refers to each of the past four months. The 1996 wave lasted through 2000, and the following waves cover 2001–2003, 2004–2007 and 2008–2013.

The SIPP has been designed to study the usage of social security programs. Therefore, it contains many questions regarding the use of government services. In addition to these "core" modules, there are "topical" modules that contain questions which are not asked in every survey round. The topical modules include information on, e.g., wealth, the usage of child care, school enrollment, and healthcare.

We prepare the SIPP data by merging the waves and performing basic data cleaning tasks (following Carrillo-Tudela and Visschers, 2023). We distinguish between employment (E) and non-employment (N). To calculate the labor market transition rates that we use as calibration targets, we first calculate the representative stocks of employed and non-employed individuals by calendar month using the SIPP's person weights. Second, we identify individuals who change their labor market state form one month to the next, either by moving between employment and non-employment or by switching employers, calculate the appropriately weighted sum of transitioning individuals, and divide by the respective stock.

We estimate a monthly NE rate of 30% and an EN of 1.6%, which includes both voluntary quits and layoffs (both to non-employment).<sup>3</sup> Approximately 18% of all job separations are voluntary. Moreover, the monthly job-to-job mobility rate is 8.2%. We will use these empirical estimates as targets in our calibration.

### 3.2 Calibration

A model period corresponds to one month. Table 1 below presents our calibration.

**Parameters set externally.** The utility function is parameterized as  $u(c) = \frac{c^{1-\eta}}{1-\eta}$ , and we set the coefficient of relative risk aversion to a standard value of  $\eta = 2$ . The rate of

<sup>&</sup>lt;sup>3</sup>We classify voluntary quits based on the "Main reason stopped working for employer" question. We define a quit as voluntary whenever the stated reason is either "slack work or business conditions", "unsatisfactory work conditions", "retirement or old age", "childcare problems", "other family/personal obligations", "own illness", "own injury", "school/training", or "left work for some other reason". We define transitions into non-employment with missing reason as involuntary.

Description	Param.	Value	Moment/Source	Target	Model
Time preference rate	ρ	0.003	Standard value	_	_
Firm's discount rate	$ ho^f$	0.003	Standard value	_	_
Risk aversion	$\eta$	2	Standard value	_	_
Matching elasticity	$\kappa_1$	0.5	Standard value	_	_
Matching scale	$\kappa_0$	1	Normalization	_	_
Share of singles in the population	$\mu$	0.46	US Census 2022	_	_
Replacement rate	$\beta$	0.4	Own estimate	_	_
Tax level (couples)	$ au_0$	1.01	Holter et al. $(2019)$	_	_
Tax progressivity (couples)	$ au_1$	0.20	Holter et al. $(2019)$	_	_
Tax level (singles)	$ au_0$	0.82	Holter et al. $(2019)$	_	_
Tax progressivity (singles)	$ au_1$	0.11	Holter et al. $(2019)$	_	_
In-kind transfer	$\bar{c}$	0.10	SNAP benefit size	_	_
Quit opportunity rate	$\gamma$	1	1-month term. notice	_	_
UI eligibility expiration	ξ	0.197	Chaumont and Shi $(2022)$	_	_
Flow output	z	1.48	Normalize earnings	1	1
Vacancy posting cost	k	20.48	NE rate $(\%)$	30	30
Search prob. empl.	$ar{x}$	0.46	EE rate $(\%)$	8.1	8.1
Layoff rate	$\delta$	0.014	EN rate $(\%)$	1.6	1.6
Disutility work	$\zeta$	0.1029	Share of quits $(\%)$	18	13

 Table 1: Benchmark calibration

time preference for a household and the firm's discount rate are set to a common value of  $\rho = \rho^f = 0.003$ , implying an annual discount rate of about 3.5%. The replacement rate of UI benefits is set to  $\beta = 0.4$ . Based on the US Census 2022, we set the share of couple households to  $\mu = 0.54$ . Turning to the tax function, we adopt the parameters values ( $\tau_0, \tau_1$ ) = (1.01, 0.20) as estimated by Holter et al. (2019) for married couples with two children. The income transfer for a couple where both members have lost eligibility for UI transfers is set at  $\bar{c} = 0.1$ , which roughly corresponds to the level of SNAP benefits (food stamps) for married couples with two children. Note that we will normalize average household earnings in our benchmark economy to one (see below), which allows us to set  $\tau_0$  and  $\bar{c}$  outside of the model. The matching function is parameterized as  $p(\theta) = \kappa_0 \theta^{\kappa_1}$ . We normalize the scale parameter  $\kappa_0$  to unity, and we set the elasticity to a standard value of  $\kappa_1 = 0.5$ . The quit opportunity rate  $\gamma$  is assumed to be  $\gamma = 1$ , proxying a 1-month termination notice period. Finally, we assume that flow spending on public goods *G* equals the residual of the government budget constraint in the benchmark economy.

Parameters calibrated internally. We normalize average household earnings in our

	Type of Household					
	Singles	Single-Earner Couples	Double-Nonemployed	Double-Employed		
NE rate	44%	13.6%	25.2%	_		
EE rate	10.7%	4.9%	—	7.6%		

Table 2: Non-Targeted Moments by Household Type

benchmark by scaling flow output z appropriately. The remaining parameters are calibrated jointly within the model to match selected data moments. The vacancy posting cost k and the search probability  $\bar{x}$  of employed workers are set to match the empirical NE and EE rates as estimated from the SIPP. The Poisson rate  $\delta$  and the disutility from working  $\zeta$  are chosen to match the overall EN rate and the share of quits into non-employment, respectively.

Model fit. As shown in Table 1, our internal estimation yields a set of parameter values that closely align the model-generated moments with their corresponding data targets. The overall gross flows between employment and non-employment imply a non-employment rate of approximately 5%. The employed workers search with the probability of roughly half of the non-employed. For singles, the non-employment rate is 3.1%, and for couples, it's about 6%. Workers in joint households earn approximately 10.2% higher wages than singles. The share of double-earner households among couples stands at about 0.96. This is so because there are relatively few *EE* transitions that prompt the quitting of the spouse. Instead, once a spouse is laid off and does not find a job for long enough for her partner to find a high-paying job, they start targeting the highest wage with zero job-finding probability.

The average flow values hide substantial heterogeneity regarding the household type. For example, the singles have the highest NE and EE rates. There is some selection in the single-earner couples along the primary earner's income which makes their members abandoning search (targeting a sub-market with zero tightness). For similar reasons, these households are changing jobs the least.

### **3.3** Policy Experiment

Equipped with our benchmark model, we now conduct a hypothetical policy reform that replaces the joint tax filing system for couple households with a separate tax filing system. We focus our analysis on the long-run effects of such a reform by comparing the stationary equilibrium in our benchmark economy with the one arising after the reform. Apart from the different definitions of the basis of taxation, the tax-transfer functions for singles and couples differ also with the level and progressivity parameters. In our illustrative numerical

	Baseline	Dropping jointness
Non-employment rate	0.051	0.046
Share of double-earner couples	0.96	0.98
NE rate	30%	31.1%
EE rate	8.1%	7.4%
Average gross wage	1	1.06

Table 3: Tax policy reform results for couples

experiment, we replace the joint tax system with the one imposed on the income of singles (that is, we decrease  $\tau_0$  for couples from 1.01 to 0.82 for singles, and we similarly adjust their  $\tau_1$  from 0.2 to 0.11). Then, we adjust G to balance the budget.<sup>4</sup>

The main takeaway from this exercise is that the non-employment rate decreased significantly from 5.1 percentage points to 4.6 under the new tax regime. This is driven by an increase in the overall NE rate (driven solely by the search of non-employed spouses) from about 30% to 31.1% and a decrease in the overall EN rate from about 1.6% per month to 1.5%. The couples where the spouse would otherwise remain non-employed climb the wage ladder, prompting the employed partner to target higher rungs. Overall, the tax reform's effect on the EE rate is negative. This is also reflected by the increase in average gross wage by 6 percentage points.

<sup>&</sup>lt;sup>4</sup>Thus, the results here can be considered isolated from the fiscal externality.

## References

- Achdou, Yves, Jiequn Han, Jean-Michel Lasry, Pierre-Louis Lions, and Benjamin Moll (2021)
  "Income and Wealth Distribution in Macroeconomics: A Continuous-Time Approach," The Review of Economic Studies, Vol. 89, pp. 45–86.
- Benabou, Roland (2002) "Tax and education policy in a heterogeneous-agent economy: What levels of redistribution maximize growth and efficiency?" *Econometrica*, Vol. 70, pp. 481– 517.
- Bick, Alexander and Nicola Fuchs-Schündeln (2018) "Taxation and labour supply of married couples across countries: A macroeconomic analysis," *The Review of Economic Studies*, Vol. 85, pp. 1543–1576.
- Birinci, Serdar (2021) "Spousal Labor Supply Response to Job Displacement and Implications for Optimal Transfers," Mimeo, Federal Reserve Bank of St. Louis.
- Borella, Margherita, Mariacristina De Nardi, and Fang Yang (2023) "Are Marriage-Related Taxes and Social Security Benefits Holding Back Female Labour Supply?" The Review of Economic Studies, Vol. 90, pp. 102–131.
- Carrillo-Tudela, Carlos and Ludo Visschers (2023) "Unemployment and endogenous reallocation over the business cycle," *Econometrica*, Vol. 91, pp. 1119–1153.
- Chaumont, Gaston and Shouyong Shi (2022) "Wealth accumulation, on-the-job search and inequality," *Journal of Monetary Economics*, Vol. 128, pp. 51–71.
- Dey, Matthew and Christopher Flinn (2008) "Household search and health insurance coverage," *Journal of Econometrics*, Vol. 145, pp. 43–63.
- Fang, Hanming and Andrew J Shephard (2019) "Household labor search, spousal insurance, and health care reform," NBER Working Paper No. 26350.
- Flabbi, Luca and James Mabli (2018) "Household search or individual search: Does it matter?" Journal of Labor Economics, Vol. 36, pp. 1–46.
- Guler, Bulent, Fatih Guvenen, and Giovanni L Violante (2012) "Joint-search theory: New opportunities and new frictions," *Journal of Monetary Economics*, Vol. 59, pp. 352–369.
- Guner, Nezih, Remzi Kaygusuz, and Gustavo Ventura (2012) "Taxation and household labour supply," *The Review of economic studies*, Vol. 79, pp. 1113–1149.

- Heathcote, Jonathan, Kjetil Storesletten, and Giovanni L Violante (2017) "Optimal tax progressivity: An analytical framework," *The Quarterly Journal of Economics*, Vol. 132, pp. 1693–1754.
- Holter, Hans A, Dirk Krueger, and Serhiy Stepanchuk (2023) "Until the IRS Do Us Part: (Optimal) Taxation of Households," Mimeo, University of Delaware.
- Holter, Hans, Dirk Krueger, and Serhiy Stepanchuk (2019) "How do tax progressivity and household heterogeneity affect Laffer curves?" *Quantitative Economics*, Vol. 10, pp. 1317– 1356.
- Mankart, Jochen and Rigas Oikonomou (2017) "Household search and the aggregate labour market," *The Review of Economic Studies*, Vol. 84, pp. 1735–1788.
- Menzio, Guido and Shouyong Shi (2010) "Block recursive equilibria for stochastic models of search on the job," *Journal of Economic Theory*, Vol. 145, pp. 1453–1494.
- Olivetti, Claudia and Barbara Petrongolo (2017) "The Economic Consequences of Family Policies: Lessons from a Century of Legislation in High-Income Countries," *Journal of Economic Perspectives*, Vol. 31, pp. 205–30.
- Pilossoph, Laura and Shu Lin Wee (2021) "Household search and the marital wage premium," American Economic Journal: Macroeconomics, Vol. 13, pp. 55–109.
- Shi, Shouyong (2009) "Directed search for equilibrium wage-tenure contracts," *Econometrica*, Vol. 77, pp. 561–584.