Dual Income Earners and Productivity*

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Abstract

U.S. labor productivity growth slowed in the 1980's and 1990's, to recover only in the 2010's. Over the same period, women employment rose and then plateaued, but conditional on employment, women - especially in joint households - have become increasingly likely to work in non-routine cognitive occupations. To understand the relationship between long run labor productivity trends and joint household dynamics, we develop a search model of the labor market in which households pool resources, direct their search towards jobs that offer heterogeneous career prospects, and choose hours after matching. Endogenous hours create an hours feedback' that links wage demands to vacancy creation for joint household, altering the equilibrium trade-off between pay and job finding and shifting job and hours choices primarily within employment. The model provides a new framework for interpreting how household structure shapes intensive labor supply, job upgrading, and the resulting labor productivity dynamics. We use a quantitative version of the model to derive counterfactual implications of secular changes in the cost of providing hours, and examine their macroeconomic implications - in particular, on labor productivity dynamics.

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1 Introduction

One of the most prominent common macroeconomic trends in advanced countries in the last decades has been a significant slowdown in labor productivity growth. Labor productivity growth in the United States slowed markedly after the 1970s, remained subdued through the 1990s and 2000s, and then recovered in the 2010s, with a further acceleration in the post pandemic period).

The exact causes of these trends are still unclear, but the literature has pointed out the correlation between labor productivity indicators and trends in females labor force participation Albanesi [2021]. Indeed, labor productivity growth slowed coinciding with the large inflow of women in the labor market, resulting in large increases in female Labor Force Participation (LFPR) and Employment-to-Population ratio (EPOP) during the 1990's. The argument is simple, and it is based on the idea that a large inflow of workers mechanically reduces labor productivity. In this paper, we argue that to understand the relationship between women labor market outcomes and aggregate productivity, we need to explore when and under which conditions women search for jobs that increase productivity, by favouring match-specific human capital accumulation.

Using CPS, we document three patterns. First, the rise and subsequent plateau in female employment to population is broadly similar for single women and women in joint households. Second, conditional on employment, hours and full time work intensify primarily among women in joint households, with a particularly large catch up for joint household women aged 30 to 39 in the post COVID period. Third, conditional on working, joint household women increasingly sort into full time non routine cognitive jobs, rather than entering employment at higher rates. Taken together, these patterns motivate the idea that to understand labor productivity trends and their relationship with female employment, we need to look at not only the extent to which women enter the labor market, but which jobs they take.

We develop a directed search model of the household in which spouses pool resources and choose hours after matching. Jobs are posted in wage share submarkets. In this environment, the household's desired wage share affects vacancy creation not only through the firm's residual share, but also through the hours supplied upon matching. This hours feedback is absent for singles under log utility but present for joint households because pooled resources break the cancellation between income and substitution effects. The feedback flattens the wage share versus job finding tradeoff for joint households, makes them more selective, and implies that selectivity rises with spouse income. As a result, the model can generate large changes in hours and job composition conditional on employment even when employment rates change little. In the extension with career jobs that offer match specific productivity

growth, small shifts in selectivity can translate into large changes in the share of workers who climb the job ladder, providing a mechanism linking household labor supply and job allocation to labor productivity dynamics.

Our framework offers a new perspective on the productivity slowdown. In our model, the initial rise of female employment into lower intensity jobs (due to high costs of hours or social norms) exerts downward pressure on productivity growth. However, as the cost of providing hours falls (e.g., childcare availability), joint households can leverage their insurance capabilities to sort aggressively into high productivity career tracks.. We use a quantitative version of the model to study the quantitative importance of this mechanism and to study how it can account for a significant portion of the observed long run productivity dynamics.

2 Literature Review

Our paper connects three distinct strands of the macroeconomic literature: the literature of family economics and labor supply, the analysis of structural transformation and labor productivity trends, and the theory of frictional labor markets with joint search.

First, we contribute to the family macroeconomics literature, which has long emphasized that labor supply decisions are often made jointly within households rather than by isolated individuals. Doepke and Tertilt [2016] provide a comprehensive review of this approach, arguing that accounting for family dynamics is crucial for understanding aggregate economic outcomes. Attanasio et al. [2008] and Heathcote et al. [2010] document the life-cycle profiles and secular trends of female labor supply. We contribute a model where the insurance effect of spousal income (also known as added worker effect in the busuness cycle literature that models joint households explicitly) influences not just whether women work, but *where* they work a margin that is critical for human capital accumulation.

Second, our work relates to the literature on structural transformation and gender. Ngai and Petrongolo [2017] and Olivetti and Petrongolo [2016] have documented how the rise of the service economy and the marketization of home production have fundamentally shifted the demand for female labor. Closely related is the work by Goldin [2014], who highlights how the convexity of pay with respect to hours in certain greedy professions creates a wedge between men and women, particularly those in joint households facing time constraints. Our model captures this dynamic through the distinction between career jobs (which reward intensity with growth) and dead-end jobs. Furthermore, Manning and Petrongolo [2008] provide empirical evidence of the pay penalty associated with part-time work, supporting our assumption that low-intensity jobs offer lower returns to experience. Motivated by this work, our contribution is to theoretically and quantitatively explore the implications of these

trends for the dynamics of labor productivity. The literature on business cycles (see below) has modeled the dynamics of joint housholds to study the cyclical implications. We study the long-term implications (over 40 years of so) of joint households search, with a particular emphasis on their long term productivity implications.

Third, we build on the theoretical literature on household search. The canonical framework by Guler et al. [2012] shows how joint income pooling creates dual search frictions that can lead to breadwinner cycles or hyper-selectivity. Mankart and Oikonomou [2017] and Pilossoph and Wee [2021] extend this to business cycles and wage premia. We depart from these frameworks by introducing an endogenous hours choice nd match-specific human capital. This connects our work to Jang and Yum [2022] and Erosa et al. [2022], who investigate the relationship between hours worked, occupation types, and aggregate productivity. Our model provides a mechanism that connects labor pductivity dynamics with household search, by showing how income pooling can translate into differential sorting into these high-intensity, high-return jobs.

Finally, we relate to the debate on the productivity slowdown and female employment. Albanesi [2021] and Albanesi and Prados [2022] analyze how the plateauing of female participation and rising inequality have shaped aggregate business cycles and productivity. Additionally, Alon et al. [2022] highlight the unique impact of the pandemic recession on women's employment. We contribute to this debate by highlighting that the *composition* of jobs held by women determined by the household search frictio is a key determinant of aggregate productivity growth, distinct from the pure extensive margin effect of entering the labor force.

3 Motivating Facts

Here we show the main facts motivating the analysis. We focus on three main facts. First, we present trends on labor productivity growth in US, whose slowdown (and sudden recovery) we aim to provide an explanation for. Second, we collect evidence on the behavior over time of US hours worked for female (vs males), focusing in particular on single females and females in joint households. The third set of facts relates to the *type* of job that females in joint (vs single) households choose over time.

Labor Productivity Trends The first fact we present relates to the behavior of labor productivity trends in the US over time, and is presented in Figure 1. Labor productivity growth in the US decline starting from the 1980's and remained well below the pre-1980 growth trend throughout the 1990's. Starting from the early 2000's, labor productivity growth increased

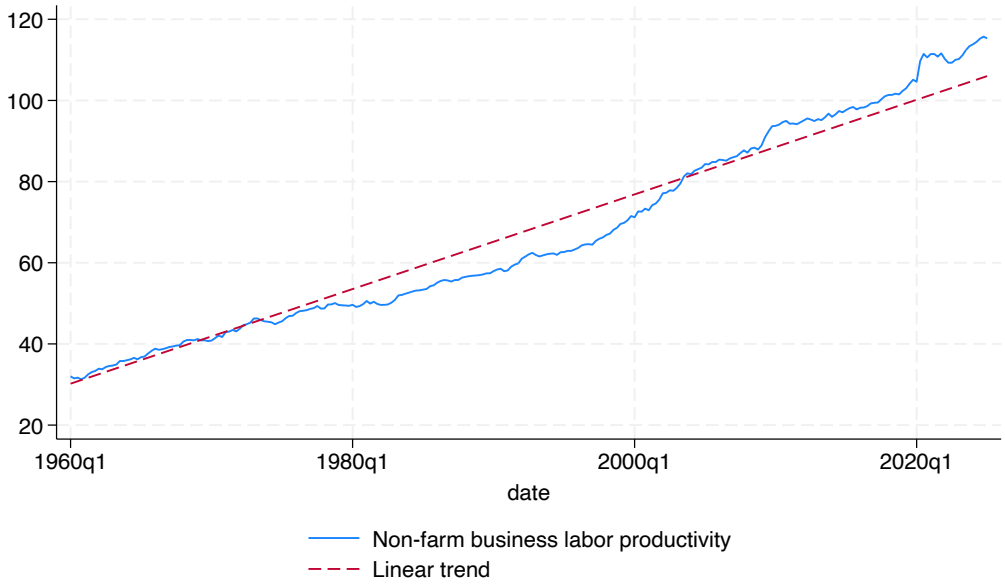

Figure 1: Labor Productivity Trend in the US.

Notes: Source: BLS and own calculations.

significntly and consistently, with a peak after the 2020 pandemic. As we show in the next paragraph, the literature has proposed explanation for the decline that are connected to the large inflow of women in the labor force during the same years. Of course, labor productivity trends are influenced by a number of factors not directly related to the gender composition of the workforce, but the timing of the slowdown (and sudden increase) is very suggestive that trends in labor productivity and female labor supply are related.

Labor Supply & Extensive Margin A second fact we want to highlight is the behavior of the extensive margin of women's labor supply over time. We look at the Employment-to-Population ratio (EPOP) since our model does not feature a participation decision explicitly, but the literature has highlighted similar trends in Labor Force Participation (LFPR) for women over the same time period (see e.g. Albanesi and Prados, 2022; Albanesi 2017). EPOP in US rises strongly over time, and then plateaus (and declines) in the 2000's, with only a recent uptick post-2020 (which, as we will show later, represents an important clue for our mechanism). See Figure 2.

While the rise in EPOP (mirrored by the rise in LFPR, not shown here) has been interpreted as an opening up of the labor market (and the opportunities it offers) for women, the causes for the decline are still debated. Perhaps the most prominent explanation has to do with mechanism that, at a baseline level, have to do with added worker effect: with rising income

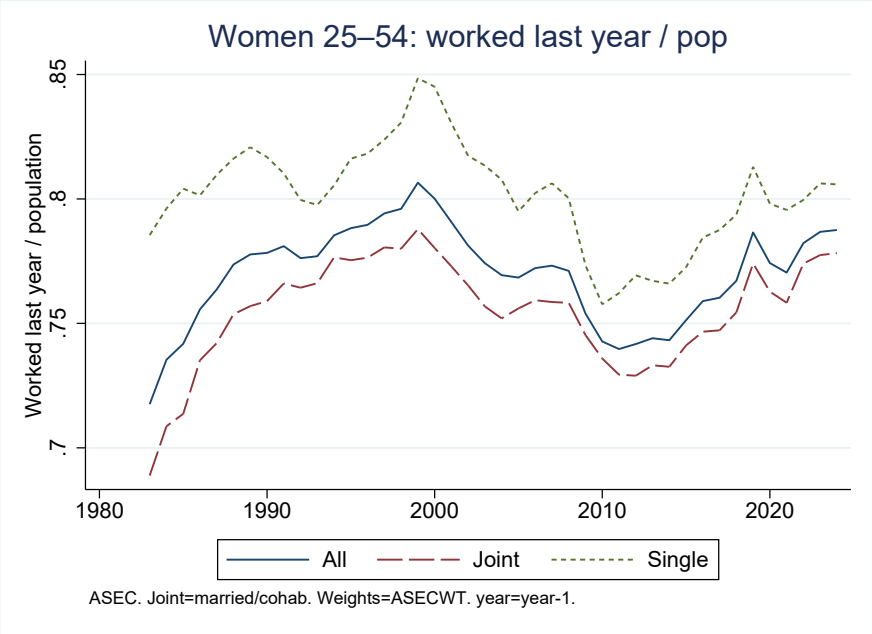

Figure 2: Female EPOP in the US, overall and by household status.

Notes: Source: CPS-ASEC.

for men, especially at the top of the income distribution, an income effect in women's labor supply predicts that women would supply less labor, thus potentially explaining the decline in EPOP for women following the 2000's (Albanesi and Prados, 2022). Interesingly, Figure 2 shows that trends in extensive labor supply (measured here by EPOP rate) are common across single and joint households. As we will show, this suggests there seems to be more to this story, since intensive margin supply (defined broadly) rises continuously for women, and even more importantly, intensive margin trends differ significantly between single and joint households, as we show next.

Intensive Margin & Job Allocation The third set of facts is perhaps the most overlooked in the literature, and relates to the qualitative characteristics of women's work (conditional on working). We look at women's intensive margin of work and how it moved over time. Moreover, we are also interested in a broader notion of how intensively women work; this notion is captured by the type of jobs women perform, conditional on working (full time vs part time, Non-Routine Cognitive vs all others). The motivation behind this is to go beyond extensive margin trends over time and look at what kind of jobs women perform over time, as well as how many hours they put in these jobs. This is what our set of facts in this section try to capture.

We look at trends on the intensive margin in Figure 3. The figure shows hours worked

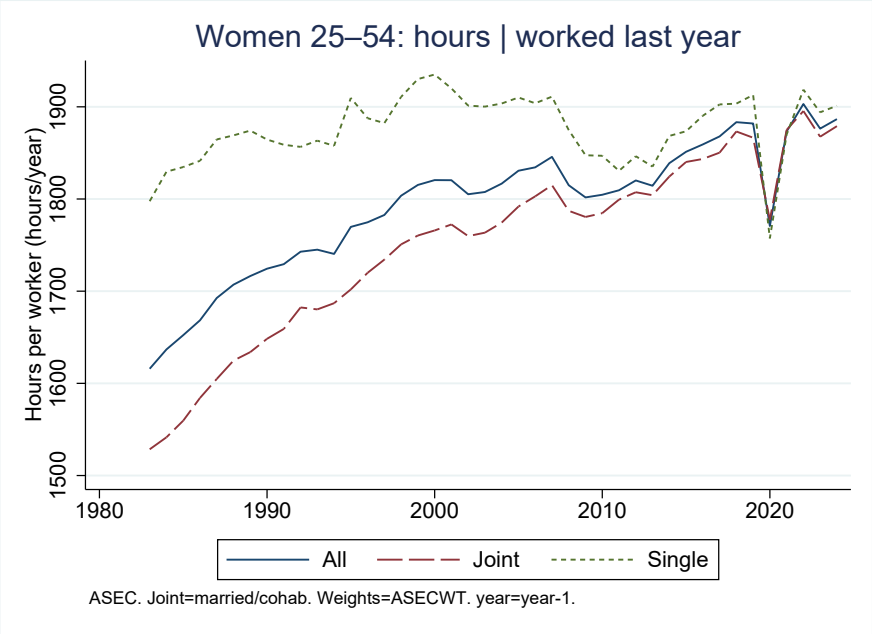

Figure 3: Female Hours Worked cond. on working (US), overall and by household status.

Notes: Source: CPS-ASEC.

conditional on working for prime age women (25-54) in US. The blue solid line shows that women in the US have increased hours worked, as phenomenon that has been noted elsewhere in the literature (Jang and Yum, 2022). Perhaps more surprisngly is that the increase in hours worked (so the intensive margin of womens' labor supply) is driven almost exclusively by women in joint households. Women in single households barely increased their hours since the 1980's. Women in joint households, on the other hand, increased their hours worked in a steady manner since the 1980's. The figure suggests that to understand trends in female labor supply, and in particular on the intensive margin, we need to look at women in joint households, which is what our model is meant to capture.

We explore next the proportion of prime-age women that are employed full-time (FT). Figure 4 shows that while females in both single and joint households observed similar trends in EPOP ratios, the fraction of females in joint household employed in full-time jobs severely lagged that of their single counterparts until the most recent post-COVID period.

Among employed women, the pre COVID shortfall in full-time work is concentrated among those in joint households aged 30 to 39, consistent with a higher (child-care related) opportunity cost of hours. If FT jobs build more productive human capital than part time (PT) jobs, this pattern could have contributed to weak labor productivity growth in the 1980s through the early 2000s.

To the best of our knowledge, the latter set of facts is new to the literature and we explore

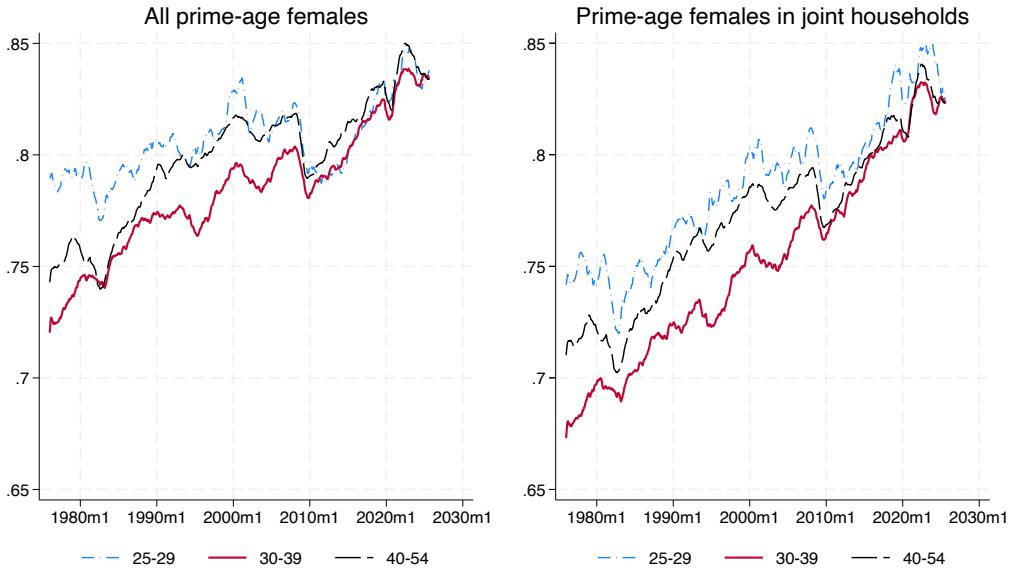

Figure 4: Fraction of employed females who are full-time employed (US).

Notes: Source: CPS.

it further. We look, in particular, at whether women take on more Non-Routine Cognitive Full-time jobs (NRCOGFT). This is motivated by the idea that women can accumulate human capital, and therefore build productivity, in these jobs more than in jobs that are performed part-time, or where knowledge and skills are slowly accumulated. Figure5 shows that the probability of working in these jobs (left panel) has increased over time for women, and in particular for women in joint households, The middle and left panel demonstrate that this is not due to more women participating in the labor market, but due to the fact that conditional on participating, more women are represented in NRCOGFT jobs. This is once again particularly true for women in joint households, mirroring the results in Figure 3.

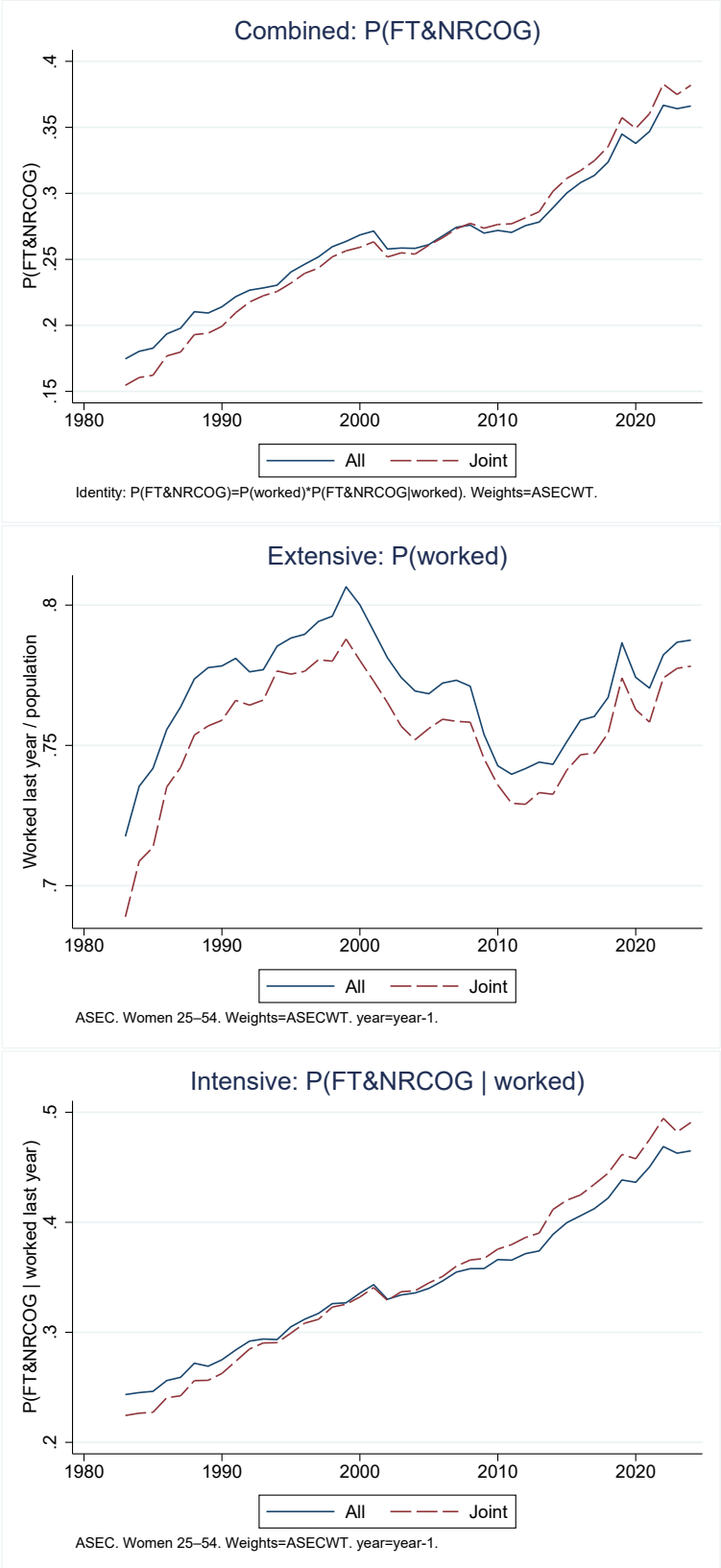

Figure 5: Female Hours Worked cond. on working (US), overall and by household status.

Notes: Source: CPS-ASEC.

4 A Simple Model

4.1 Directed search with household labor supply

Environment. Time is discrete and there are two periods, $t \in \{1, 2\}$. There is no savings and households consume contemporaneously. A continuum of workers is indexed by type $x \in \mathcal{X}$ drawn from a distribution F. Types govern the probability of accumulating match-specific human capital. Workers live either as singles or as members of a two-adult household ("joint household"). Within a joint household, one member is designated the primary earner ($i = p$) and the other the secondary earner ($i = s$); exogenous job destruction rates satisfy $\delta_s > \delta_p$. For tractability, at most one household member can form a new match within a period.

Production and learning. A filled job produces yh, where h denotes hours supplied and y denotes output per hour. New matches start at productivity y_L. If the match survives into period 2, the worker becomes skilled with probability $\gamma(x)$, in which case per-hour productivity becomes $y_H > y_L$. Human capital is match-specific: if the job is destroyed, productivity resets to y_L in the next match.

Preferences, home production, and household states. Non-employed adults produce a home good b. Joint households pool income (unitary model). In a given period, a joint household can be in state (U, U), (E, U), or (E, E). Household consumption is

$$C = b \cdot (\text{non-employed}) + \sum_{\ell \in \text{employed}} \eta_\ell y_\ell h_\ell,$$

where $\eta_\ell \in (0, 1)$ is the wage share received by employed member ℓ. Period utility is

$$u(C, \{h_\ell\}) = \log(C) - \sum_{\ell \in \text{employed}} \frac{\psi}{1+\varepsilon} h_\ell^{1+\varepsilon},$$

with discount factor $\beta \in (0, 1)$. The Frisch elasticity is $1/\varepsilon$.

Directed search and matching. Labor markets are segmented by promised wage share $\eta \in (0, 1)$ and (in period 1) by worker characteristics (x, i). Let $\theta \equiv v/u$ denote market tightness in a submarket. Matches are formed according to a Cobb–Douglas matching

function $M(u,v) = \xi u^{\alpha} v^{1-\alpha}$, implying the job-finding and vacancy-filling probabilities

$$p(\theta) = \frac{M(u,v)}{u} = \xi\theta^{1-\alpha}, \qquad q(\theta) = \frac{M(u,v)}{v} = \xi\theta^{-\alpha}.$$

Posting a vacancy costs κ. Free entry implies that, in any active submarket,

$$\kappa = q(\theta_t)\, J_t,$$

where J_t is the firm's value of a filled match in that submarket.

Timing. In each period: (i) firms post vacancies; (ii) existing matches are destroyed with probability δ_i; (iii) in period 1, surviving employed workers upgrade with probability $\gamma(x)$; (iv) unemployed workers direct their search by choosing a wage share η; (v) matching occurs; (vi) households choose hours; (vii) production and consumption occur.

Hours choice. Given a contract (η, y) and household resources, hours are chosen after matching. For a single employed worker, $C = \eta y h$ and the optimal hours satisfy

$$\frac{1}{h} = \psi h^{\varepsilon},$$

so hours depend only on (ψ, ε) and are independent of (η, y) under log utility. In a joint household with one employed adult, consumption is $C = b + \eta y h$ and optimal hours $h(\eta, y)$ satisfy

$$\frac{\eta y}{b + \eta y h} = \psi h^{\varepsilon}, \qquad \frac{\partial h(\eta, y)}{\partial \eta} > 0,$$

so hours increase with the wage share when there are pooled resources (here b). With two employed adults, (h_i, h_j) solve

$$\frac{\eta_i y_i}{C} = \psi h_i^{\varepsilon}, \qquad \frac{\eta_j y_j}{C} = \psi h_j^{\varepsilon}, \qquad C = \eta_i y_i h_i + \eta_j y_j h_j,$$

so hours depend on partner earnings through C.

Joint-household static problems in period 2. Because period 2 is terminal, the joint-household values are given by within-period optimization problems. In state (U, U), both adults are non-employed and consume home production,

$$U_2^{UU} = \log(2b).$$

In state (E, U), one adult is employed at contract (η, y) and the other produces b. The household chooses hours h and obtains

$$W_2^{EU}(\eta, y) = \max_{h \geq 0} \left\{ \log(b + \eta y h) - \psi \frac{h^{1+\varepsilon}}{1+\varepsilon} \right\}, \tag{1}$$

$$\text{s.t.} \qquad \frac{\eta y}{b + \eta y h} = \psi h^{\varepsilon}. \tag{2}$$

In state (E, E), both adults are employed at contracts (η_a, y_a) and (η_b, y_b) and the household chooses (h_a, h_b),

$$T_2^{EE}(\eta_a, y_a; \eta_b, y_b) = \max_{h_a, h_b \geq 0} \left\{ \log(\eta_a y_a h_a + \eta_b y_b h_b) - \psi_a \frac{h_a^{1+\varepsilon}}{1+\varepsilon} - \psi_b \frac{h_b^{1+\varepsilon}}{1+\varepsilon} \right\}, \tag{3}$$

$$\text{s.t.} \qquad \frac{\eta_a y_a}{C} = \psi_a h_a^{\varepsilon}, \qquad \frac{\eta_b y_b}{C} = \psi_b h_b^{\varepsilon}, \qquad C = \eta_a y_a h_a + \eta_b y_b h_b. \tag{4}$$

These period 2 values depend on productivity realizations through y (e.g. $y \in \{y_L, y_H\}$ for matches formed in period 1), but not directly on x beyond its effect on the distribution of y through learning.

Properties of joint-household hours. The worker–searcher problem (1)–(2) implies that hours respond to the wage share when there are pooled resources. Applying the implicit function theorem to (2) yields

$$\frac{\partial h(\eta, y)}{\partial \eta} > 0, \qquad \frac{\partial h(\eta, y)}{\partial b} < 0. \tag{5}$$

In the dual-employed problem (3)–(4), each spouse's hours are increasing in own wage share and decreasing in the partner's wage share (the latter through the household consumption aggregator C). In particular, holding $(y_a, y_b, \psi_a, \psi_b)$ fixed,

$$\frac{\partial h_a}{\partial \eta_a} > 0, \quad \frac{\partial h_a}{\partial \eta_b} < 0, \qquad \frac{\partial h_b}{\partial \eta_b} > 0, \quad \frac{\partial h_b}{\partial \eta_a} < 0. \tag{6}$$

These sign restrictions formalize that, in joint households, hours are an endogenous intensive margin that responds to contractual terms and household resources.

Regularity and gains from employment. Introducing disutility of hours implies that employment is not mechanically preferred to non-employment. We impose parameter restrictions such that, at the equilibrium wage shares, the gains from employment are positive:

$$W_2^{EU}(\eta, y) - U_2^{UU} > 0, \qquad T_2^{EE}(\eta_a, y_a; \eta_b, y_b) - W_2^{EU}(\eta_a, y_a) > 0, \tag{7}$$

and that the value of a match is increasing in the wage share, $\partial W_2^{EU}(\eta, y)/\partial \eta > 0$ and $\partial T_2^{EE}(\eta_a, y_a; \eta_b, y_b)/\partial \eta_\ell > 0$ for $\ell \in \{a, b\}$.

Wage-share choice and the Frisch elasticity. With endogenous hours, firm flow profit in period 2 is $(1-\eta)\, y\, h^*(\eta, \cdot)$, so free entry implies

$$\theta_2(\eta) \propto \left((1-\eta)\, y\, h^*(\eta, \cdot)\right)^{1/\alpha}.$$

A convenient sufficient condition for the directed-search problem over wage shares to be well behaved is that tightness is decreasing in η in the relevant household states, i.e.,

$$\frac{d \log \theta_2(\eta)}{d\eta} = \frac{1}{\alpha}\left(-\frac{1}{1-\eta} + \frac{d \log h^*(\eta, \cdot)}{d\eta}\right) < 0 \qquad \Longleftrightarrow \qquad \frac{d \log h^*(\eta, \cdot)}{d\eta} < \frac{1}{1-\eta}. \tag{8}$$

In the worker–searcher state (E, U), the hours elasticity can be bounded as

$$\frac{d \log h}{d\eta} \leq \frac{1}{\eta \varepsilon},$$

so (8) is ensured whenever

$$\eta > \frac{1}{1+\varepsilon}. \tag{9}$$

We therefore calibrate a low Frisch elasticity (large ε) so that hours respond to wage shares, but not so strongly as to overturn the basic job-finding versus pay tradeoff that pins down interior wage-share choices.

Firm values and tightness. In the last period, the firm obtains flow profit $(1-\eta) y h^*$, hence (suppressing state arguments for readability)

$$J_2(\eta, y) = (1-\eta) y\, h^*(\eta, y), \qquad \theta_2(\eta) = \left[\frac{\xi (1-\eta) y_L\, h^*(\eta, y_L)}{\kappa}\right]^{1/\alpha}.$$

In period 1, firm values incorporate survival, learning, and continuation into period 2:

$$J_1(\eta, x, i) = (1-\eta) y_L h^*(\eta, y_L) + \beta(1-\delta_i)\Big(J_2(\eta, y_L) + \gamma(x)\big[J_2(\eta, y_H) - J_2(\eta, y_L)\big]\Big),$$

where, in joint households, J_2 depends on whether the partner is employed because hours depend on household resources.

Household search. Let U_t denote the value of non-employment and $W_t(\eta, \cdot)$ the value upon matching at wage share η. At the search stage, the searching unit chooses η to maximize expected gains from employment:

$$R_t = \max_{\eta \in (0,1)} p\big(\theta_t(\eta)\big) \, \big[W_t(\eta) - U_t\big].$$

Hours feedback and the role of the Frisch elasticity. Differentiating the free-entry mapping in the last period yields

$$\frac{d \log \theta_2(\eta)}{d\eta} = \frac{1}{\alpha} \Bigg(- \frac{1}{1-\eta} + \underbrace{\frac{d \log h^*(\eta, y_L)}{d\eta}}_{\Omega(\eta) \text{ (hours feedback)}} \Bigg).$$

For singles, $\Omega(\eta) = 0$ under log utility, so tightness is strictly decreasing in η. For joint households, $\Omega(\eta) > 0$ because pooled resources make hours increase with the wage share; this flattens the η–tightness trade-off and increases optimal selectivity. We calibrate a low Frisch elasticity (large ε) to keep $\Omega(\eta)$ modest so that the directed-search problem remains well behaved and admits interior wage-share choices, while preserving the key state dependence of the search trade-off in joint households.

4.2 Introducing discrete job choice

This extension adds a discrete choice of job type at the search stage. The baseline environment is unchanged unless noted.

Job types. There are two job types, $k \in \{d, h\}$. A dead-end job ($k = d$) produces $y_D h$ each period and does not generate human-capital growth. A career job ($k = h$) starts at productivity y_L and, conditional on match survival into period 2, upgrades to $y_H > y_L$ with probability $\gamma(x)$. We allow $y_H > y_D > y_L$ to capture that dead-end jobs can pay more immediately than entry-level career jobs but lack growth.

Directed search by job type and wage share. Markets are now segmented by (k, η) and, in period 1, by (x, i). Let $\theta_{t,k}(\eta)$ denote tightness in submarket (k, η) at time t. Matching within each submarket is as in the baseline with meeting probabilities $p(\theta) = \xi \theta^{1-\alpha}$ and $q(\theta) = \xi \theta^{-\alpha}$. Free entry implies

$$\kappa = q\big(\theta_{t,k}(\eta)\big) \, J_{t,k}(\eta, \cdot), \qquad \theta_{t,k}(\eta) = \left[\frac{\xi \, J_{t,k}(\eta, \cdot)}{\kappa} \right]^{1/\alpha}.$$

Firm values. In period 2, a newly created match in submarket (k, η) yields

$$J_{2,k}(\eta) = (1-\eta)\, y_k\, h_k^*(\eta), \qquad y_k = \begin{cases} y_D, & k = d, \\ y_L, & k = h, \end{cases}$$

where $h_k^*(\eta)$ is the household's optimal hours choice given job type k and household resources. In period 1, the dead-end job has no learning option, while the career job includes match-specific upgrading:

$$J_{1,d}(\eta, i) = (1-\eta) y_D h_d^*(\eta) + \beta(1-\delta_i) J_{2,d}(\eta),$$

$$J_{1,h}(\eta, x, i) = (1-\eta) y_L h_h^*(\eta) + \beta(1-\delta_i)\Big(J_{2,h}(\eta) + \gamma(x)\big[J_{2,H}(\eta) - J_{2,h}(\eta)\big]\Big),$$

where $J_{2,H}(\eta)$ denotes the period 2 value of an incumbent career match that has upgraded to y_H.

Household values and search. Let U_t be the value of non-employment and $W_{t,k}(\eta)$ the value of matching in submarket (k, η). The search value associated with job type k is

$$R_{t,k} = \max_{\eta \in (0,1)} p\big(\theta_{t,k}(\eta)\big)\, \big[W_{t,k}(\eta) - U_t\big],$$

and the searching unit chooses the job type with the highest value:

$$R_t = \max\{R_{t,d}, R_{t,h}\}.$$

Type cutoff and interpretation. In period 1, $R_{1,h}$ is increasing in x through $\gamma(x)$, while $R_{1,d}$ is independent of x absent learning. Under standard regularity conditions, there exists a cutoff $\bar{x}_i$ such that workers with $x \geq \bar{x}_i$ search for career jobs and workers with $x < \bar{x}_i$ search for dead-end jobs. The cutoff depends on job destruction (δ_i) because a higher separation rate lowers the value of the career ladder.

Hours feedback and the Frisch elasticity. Within each job type k, hours enter tightness through free entry:

$$\theta_{2,k}(\eta) = \left[\frac{\xi(1-\eta) y_k\, h_k^*(\eta)}{\kappa}\right]^{1/\alpha}, \qquad \frac{d\log\theta_{2,k}(\eta)}{d\eta} = \frac{1}{\alpha}\left(-\frac{1}{1-\eta} + \frac{d\log h_k^*(\eta)}{d\eta}\right).$$

As in the baseline, singles have $d\log h_k^*(\eta)/d\eta = 0$ under log utility, whereas joint households have $d\log h_k^*(\eta)/d\eta > 0$ because pooled resources make hours increasing in the wage share.

We calibrate a low Frisch elasticity (large ε) to keep this feedback modest so that wage-share choices remain interior and tightness schedules remain well behaved. Even when the hours response is small, the discrete job choice can amplify its implications: small changes in search values induced by the hours feedback can shift the cutoff $\bar{x}_i$ and generate sizable changes in job composition conditional on employment.

4.3 The Role of Endogenous Hours

Endogenous hours are included for three reasons. First, they provide a direct mapping from the model to the intensive margin in the data: employment is an extensive-margin outcome generated by search and matching, while hours are chosen conditional on employment. This allows the model to speak to changes in full-time intensity and, in the extension, to changes in job composition among employed workers.

Second, hours generate a state-dependent feedback from wage-share demands to vacancy creation that differentiates singles from joint households. Under log utility, singles' optimal hours are independent of (η, y), so the standard competitive-search logic applies: higher η reduces firm surplus one-for-one through $(1-\eta)$ and tightness falls steeply with η. In joint households, pooled resources break this cancellation and imply $\partial h/\partial \eta > 0$; as a result, when a household targets a higher wage share it also supplies more hours upon matching, partially restoring firm surplus. This flattens the wage-share versus job-finding frontier for joint households relative to singles.

Third, endogenous hours create a "selection through search" channel that is absent if hours are fixed. Let z denote household resources (e.g. spouse income). Equilibrium hours satisfy $h^*(z) = h(\eta^*(z), z)$, so

$$\frac{dh^*}{dz} = \underbrace{\frac{\partial h}{\partial \eta}\frac{d\eta^*}{dz}}_{\text{selection through wage-share choice}} + \underbrace{\frac{\partial h}{\partial z}}_{\text{direct income effect}}.$$

The direct term is typically negative, but the selection term is positive in joint households because higher resources increase desired selectivity and $\partial h/\partial \eta > 0$. This is the key mechanism through which the model can generate sizable movements in intensive outcomes conditional on employment even when employment rates change little.

4.4 Equilibrium properties and comparative statics

In this subsection, we show the main equilibrium implications of the model, as well as some comparative statics in light of the quantitative section (in progress).

4.4.1 Properties

Tightness schedules and the sign of $d\theta/d\eta$. In period 2, free entry implies

$$\theta_2(\eta) = \left[\frac{\xi\, J_2(\eta)}{\kappa}\right]^{1/\alpha}, \qquad J_2(\eta) = (1-\eta)\, y\, h^*(\eta, \cdot),$$

where $h^*(\eta, \cdot)$ is the optimal hours choice given the household state. Differentiating yields

$$\frac{d\log\theta_2(\eta)}{d\eta} = \frac{1}{\alpha}\left(-\frac{1}{1-\eta} + \underbrace{\frac{d\log h^*(\eta,\cdot)}{d\eta}}_{\Omega(\eta)\ \text{hours feedback}} \right).$$

For singles under log utility, h^* is independent of (η, y) and $\Omega(\eta) = 0$, implying $d\theta_2/d\eta < 0$ everywhere. For joint households, pooled resources imply $\partial h/\partial\eta > 0$, hence $\Omega(\eta) > 0$, so $\theta_2(\eta)$ is flatter in η and may be locally increasing for small η when the hours feedback dominates. A sufficient condition for monotone decreasing tightness over the relevant domain is

$$\frac{d\log h^*(\eta,\cdot)}{d\eta} < \frac{1}{1-\eta},$$

which is ensured in the worker searcher state (E, U) whenever $\eta > 1/(1+\varepsilon)$ (as shown above). We can also show this numerically, see Figure 6.

Result 1 (search for singles vs households) For singles, $\Omega(\eta) = 0$ under log utility and $\theta_2(\eta)$ is strictly decreasing in the wage share. For joint households, $\Omega(\eta) > 0$, so $\theta_2(\eta)$ is less sensitive to η and can be hump shaped when hours are sufficiently elastic. A low Frisch elasticity makes $\Omega(\eta)$ modest and guarantees a monotone decreasing $\theta_2(\eta)$. [1]

Household selectivity and spouse resources. The key difference between singles and joint households is that in joint households the wage share affects both pay and hours upon matching. This generates an additional term in the wage share first order condition, which shifts the optimum toward higher wage shares for joint households relative to a fixed hours benchmark. Moreover, the strength of the feedback depends on household resources.

To illustrate, in period 2, consider the worker searcher state (E, U) where the employed member searches for a wage share η taking the partner's income as given. The optimality condition for η can be written as an equality between a job finding term and a marginal value term, where the latter includes an additional hours feedback component that is increasing

[1] This is a formalization of the discussion above.

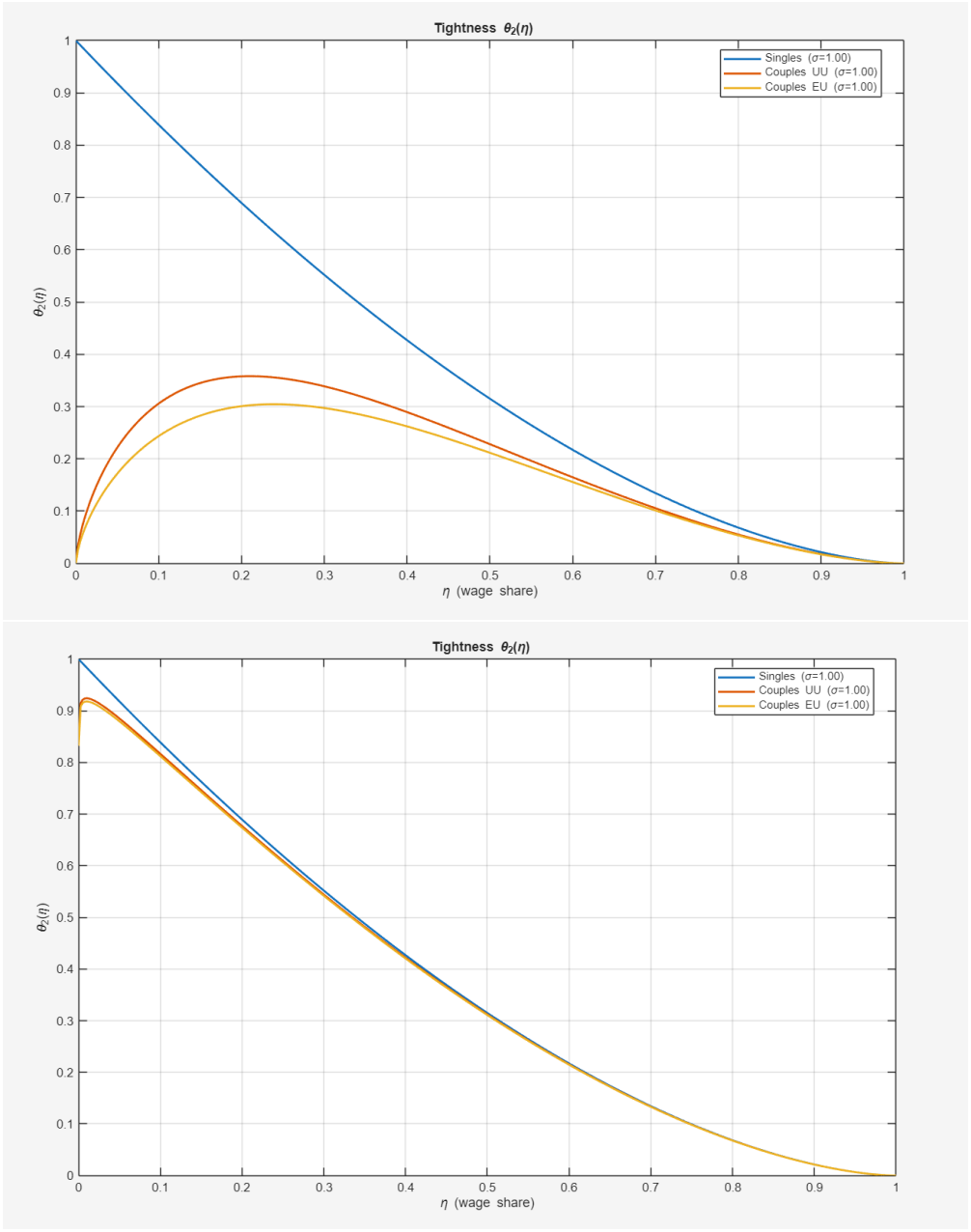

Figure 6: $d\theta/d\eta$ and Frisch elasticity: high Frisch elast. (top panel) vs low Frisch (bottom panel) - illustration.

in partner income. In particular, the worker searcher wage share choice loads on a term of the form

$$\frac{1}{\eta} \cdot \frac{(\eta_j y_j)^{1+\varepsilon}}{(y\,\eta)^{1+\varepsilon} + (\eta_j y_j)^{1+\varepsilon}},$$

so larger partner earnings $\eta_j y_j$ strengthen the feedback and increase the optimal η.

Result 2 (job search and spouses' income). Endogenous hours make joint households more selective: relative to a fixed hours benchmark, the optimal wage share is such that $\eta^*_{\text{HH}} > \eta^*_{\text{no hours}}$. In addition, in the worker searcher state (E, U), η^* is increasing in partner earnings $\eta_j y_j$, because higher partner income increases the magnitude of the hours feedback that flattens the wage share versus job finding frontier. This esult is illustrated in Figure 7.

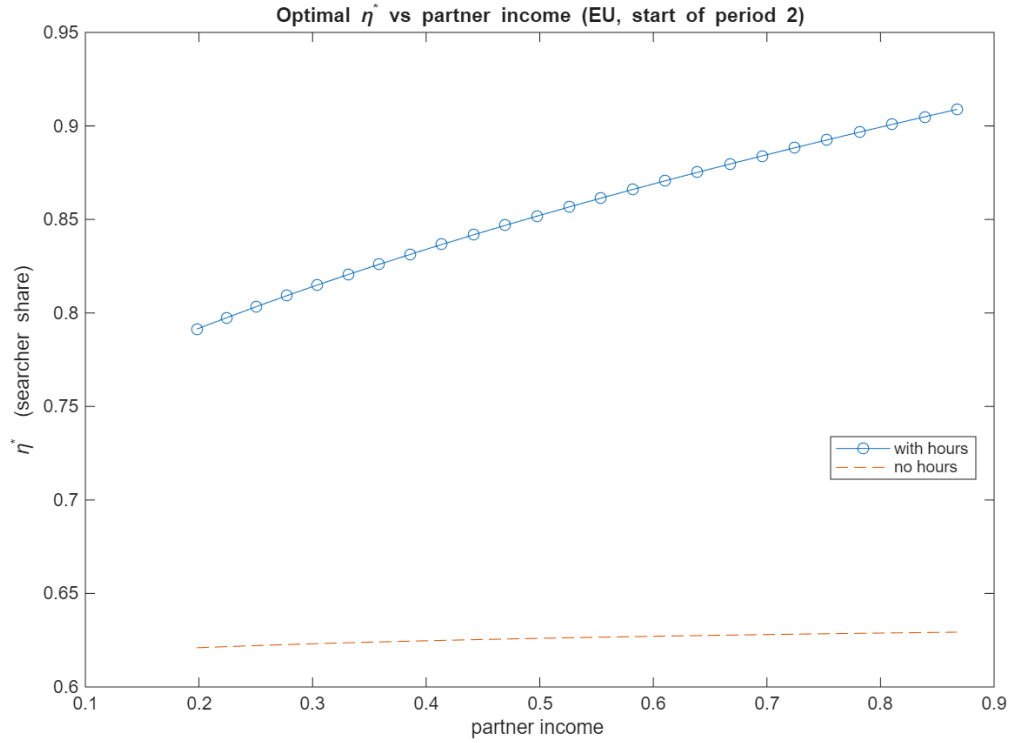

Figure 7: Optimal wage share in joint households as a function of partner income (illustration).

Wage share choice by skill and the sign of $d\eta^*/dx$. In period 1, learning generates an option value that is increasing in x through $\gamma(x)$. Let $W_1(\eta, x, i)$ denote the value of matching at wage share η for type x and role i, and let $U_1(x, i)$ denote the value of remaining unmatched. The directed search problem is

$$R_1(x, i) = \max_{\eta \in (0,1)} p\big(\theta_1(\eta, x, i)\big)\big[W_1(\eta, x, i) - U_1(x, i)\big].$$

When hours are independent of (η, y) for singles[2], the wage share first order condition can be rearranged into a simple tradeoff between job finding and pay. Since the surplus term $W_1 - U_1$ increases with x via the learning option value, the optimal policy $\eta^*(x, i)$ is decreasing in x: high x workers accept a lower wage share in exchange for higher tightness and faster matching, which is valuable because it increases the probability of reaching the high productivity state in period 2. In joint households, endogenous hours shift the level of η^* upward, and can steepen the decline of $\eta^*(x)$ at low x because the hours feedback is stronger when the expected productivity is low (and low x workers are more likely to remain at y_L). We summarize these results in Result 3:

Result 3 (selection). In the benchmark illustration, $\eta^*(x)$ is decreasing in skill x. Endogenous hours raise the level of η^* for joint households relative to singles and can make the mapping $x \mapsto \eta^*(x)$ more concave, with a steeper decline at low x when the hours feedback is strongest.

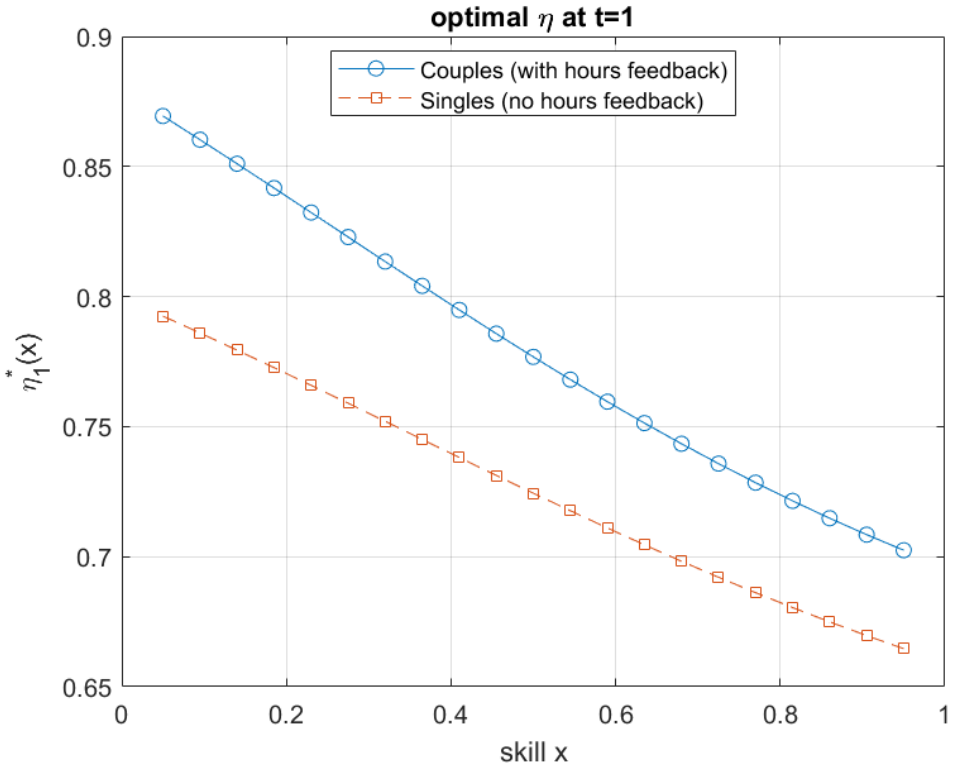

Figure 8: Optimal wage share in period 1 as a function of skill: singles versus joint households (illustration).

[2]This comes directly from assuming log utility

4.4.2 Comparative Statics: Opportunity Cost of hours

We now run some comparative statics with the model, once again in light of the quantitative estimation. In particular, we study what are the model implications of a decrease in the cost of working, capturing e.g. the availability of affordable childcare or, alternatively, the widespread increase in work from home policies and availability post-pandemic. The utlimate goal is to understand what are the macroeconomic implications, in particular for productivity growth, of these exogenous changes in the economic environment (from the model point of view).

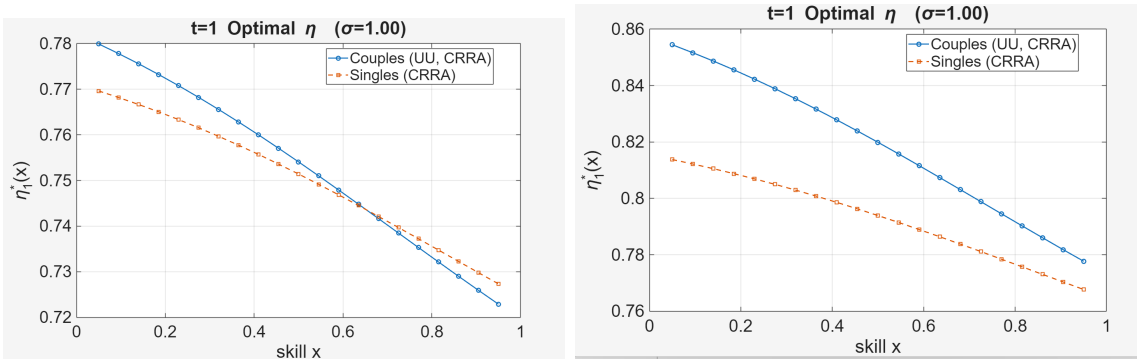

Figure 9: Optimal wage share in period 1 as a function of skill: singles versus joint households; low cost of hours ψ (left panel), high cost of hours ψ (right panel) - illustration.

Figure 9 show the comparative statics of changing the disutility cost of hours, captured by the parameter ψ. Decreasing ψ (from right to left panel) has a level effect on the optimal submarkets chosen by both singles and households, as well as a slope effect. With lower ψ workers choose lower η to take advantage of the lower cost of working, and hence the relatively more attractive job opportunities. Interesintly, though, the job search strategies of singles and couples become more similar by skill. In other words, when the cost of hours is high, low skill workers choose a much higher wage share (and therefore are pickier) than low skill single workers. This result is much attenuated and even reverses for high skill households when ψ is sufficiently low: high skill couples trade-off a higher probability of getting employed against a lower wage share. This is intuitive and is at the core of the model mechanism: when working is less costly, it is precisely high skill joint households who start searching more aggresively to take advantage of relatively more attractive job opportunities, and in particular those where finding a job and accumulating human capital is easier. This exercise shows that the cost of providing hours in this model (and its changes) can affect job search and selection by skill among single and joint households, with potentially interesting macroeconomic implications to the extent that - as we posit - some jobs provide more opportunities to accumulate human capital than others.

Summary The central implication for the empirical patterns is that the household state affects search selectivity primarily through the equilibrium mapping $\eta \mapsto \theta(\eta)$, while hours are chosen after matching. Therefore, the model naturally generates movements in hours and job composition *conditional on employment* without requiring large movements in employment rates. In particular, increases in spousal resources can raise desired selectivity and thereby dampen job finding, while simultaneously increasing intensive margin. The objective of the next section is to quantitatively evaluate these forces and their implication for labor productivity trends, the central question of the paper. The estimation is currently in progress and results will be available soon.

5 Quantitative

In progress, to be completed soon.

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