Wage Gaps, Earnings Gaps, and the Market Power of Employers

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February 2015

Abstract

Women are less mobile between firms than men which gives employers more market power over women and explains parts of the gender wage gap. I rationalize this observation as a consequence of different gender roles in the household. The higher a spouse's earnings, the more likely relative wage differences outweigh utility differences between jobs. About 87% of estimated differences in inter-firm mobility are attributed to this effect and are, thus, endogenous. This implies mutually enforcing cycles between wage gaps, earnings gaps, and employers' market power and has implications for labor-market and family policies.

Keywords: labor markets, monopsonistic competition, home production, gender, wage gap

JEL classification: J13, J16, J38, J42

1 Introduction

Recent contributions in labor economics stress the role of imperfect competition between firms on the labor market.[1] In such models, the elasticity of labor supply to the individual firm is the decisive measure of a firm's market power on the labor market. Empirical evidence (e.g., Ransom and Oaxaca 2005; Ransom and Oaxaca 2010; Hirsch, Schank, and Schnabel 2010) shows that this elasticity is considerably higher for men than for women. In other words, women are less mobile between different firms which gives employers more market power over women. If firms use their monopsony power to keep down wages and more so for women's wages, a part of the gender wage gap is a result of monopsonistic discrimination (e.g., Hirsch 2009 and Ransom and Oaxaca 2010).

Some authors (e.g., Manning 2011) have informally argued that the lower elasticity of female labor supply to individual firms is related to women's roles in home production. In this paper, I

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[1] For example, the Journal of Labor Economics has devoted a special issue to the topic in 2010.

argue that it is not women's longer home hours per se but their lower labor earnings which reduce their mobility between firms. For example, consider the reaction of quit rates to a percentage reduction in wage rates paid by a firm. A decision maker weighs the potential gain in labor income when working for a better paying firm against the discomfort associated with quitting. The larger are current labor earnings, the higher is the absolute difference in labor earnings implied by a percentage cut in the wage rate paid by the current employer. A couple acts to a joint budget constraint and, hence, values labor earnings of both spouses equally. Hence, for the spouse with the higher initial labor earnings (the primary earner), it is more likely that the difference in potential labor earnings between firms outweighs the disutility of quitting. This makes the primary earner more likely to accept better paying, but else less attractive, jobs and, in general, more mobile between different employers.

To study the determinants of women's and men's inter-firm mobility and firms' market power over them, I set up a formal model of household specialization, i.e., the joint determination of home and market hours in a partnership. In the model, there is a finite number of firms and a continuum of households with a male and a female member, each. Individuals have preferences over job characteristics and each firm offers jobs which are unique in terms of these characteristics (e.g., kind of tasks, personality of the manager, flexibility, location). This horizontal job differentiation (Boal and Ransom 1997; Bhashkar, Manning, and To 2002) gives employers some monopsony power whose degree depends on workers' inter-firm mobility. The key determinants for inter-firm mobility in the model are women's and men's different labor earnings. A couple is more willing to accept unattractive job characteristics (e.g., boredom or stress, a dislikeable manager, inflexible working times, distance from home) in return for a given relative premium in the wage rate over the most preferred employer for the spouse with the higher labor earnings (the primary earner). The simple reason is as stated above: a given relative difference in the wage rate translates into a higher absolute difference for the primary earner, which makes it more likely that the earnings difference between two employers outweighs the relative discomfort that can be associated with working for the better paying employer. As a consequence, a household supplies the primary earner's labor more elastically to individual firms than the secondary earner's.

Hence, the different elasticities of gender-specific labor supply can in fact be understood as a consequence of women's and men's different roles in the household since, statistically, women tend to be secondary earners in married couples.[2] But, it is not women's longer home hours per se but their lower labor earnings which reduce their inter-firm mobility. Further gender differences such as in the importance of flexible work hours or in job-specific preferences in general can magnify the effects of different labor earnings.[3] However, a quantitative evaluation of my model suggests that their role is small as differences in labor earnings explain already 87% of the differences in the elasticities of labor supply to individual firms. Further, since households *decide* on spouses' roles in the household and hence their relative earnings, an important part of differences in inter-firm mobility and market power of employers is endogenous.

This result implies a mutually enforcing cycle between the gender wage gap, the earnings gap, and employer's market power over women and men. An initial gender gap in wage rates is translated into an hours gap and a larger earnings gap by a couple that exploits spouses' comparative advantages.[4] The earnings gap then makes women's labor supply to individual firms less elastic than men's. This gives employers more market power of women than they have over men which they use to push down women's wage rates more than men's. This widens the wage gap which again impacts on the earnings gap and so on.

I study the quantitative importance of the different entries of this cycle with its inherent chicken-and-egg relation in counterfactual evaluations of my model. First, I shut off all gender differences in the economy's production technology such that there would be no gender wage gap if households would not decide to supply male and female labor in different quantities. This model variant still generates a gender wage rate gap of 5.4%. This is about a third of the current gap in the US and is, by construction of the counterfactual exercise, caused solely by the different roles of men and women in the household. To put it in drastic way, this result suggests that women earn lower wage rates than men on average partly because they are more productive in home

[2]In 2010, the husband earned more than the wife in 71% of US married couples where both spouses work (BLS Women in the Labor Force Databook 2014).

[3]Further potential explanations include higher concentration on the employer side of markets for female labor and exogenously lower job finding rates together with higher separation rates for women (Boal and Ransom 1997).

[4]Of course, it is possible that the absolute advantage of a higher wage rate still translates into a comparative disadvantage in market work due to even higher productivity differences in home production. However, this seems not relevant empirically in the aggregate where men's average wage rates are higher and women are argued to have absolute advantages biologically in certain aspects of home production such as child bearing and breast feeding.

production. The resulting specialization causes a gender gap in market hours and thus earnings, which reduces women's inter-firm mobility. Firms exploit this to keep down women's wages. A second counterfactual evaluation shuts off all exogenous gender differences on the household side of the economy, most importantly in home production. The resulting gender wage gap of about 15.4% results from gender differences in the production processes but is magnified by households' responses.

My results have important policy implications. The model implies that minimum wages, payroll subsidies for women, and subsidies that promote a more equal division of home hours between genders can be suited policies to reduce the gender gaps in wage rates and earnings. Further, the results imply that these policies are interdependent. The effects of minimum wages and payroll subsidies both depend on the elasticities of labor supply which are endogenous in my model and depend on the gender earnings gap. If family policies achieve greater gender equity in home hours, they also affect the effects which, e.g., minimum wages have on the earnings and employment of women. I demonstrate these points using the model for policy evaluations. These policy interdependencies are also stresses the importance of understanding the gender differences in the elasticities of labor supply to individual firms as endogenous. If we would attribute them solely to differences in preferences or other exogenous factors, we would mistake them as policy-invariant and therefore overlook the interdependence of family policies and labor-market policies.

The remainder of this paper is organized as follows. Section 2 presents the model and its qualitative results. Section 3 performs a quantitative analysis. Section 4 studies policy effects. Section 5 concludes.

2 The model

2.1 Set-up

The economy is populated by workers and firms. Each household and each firm have a predefined location on a unit circle. "Space" in the model is the job-characteristics space. The location of a firm marks the non-pay characteristics of jobs in this firm. Similarly, the location of a worker marks his or her most preferred job characteristics. A key model ingredient is that workers' utility is reduced by distance between their employer's characteristics and their most preferred job characteristics. The most illustrative component for this spatial dimension of the model is geographical distance where commuting reduces utility. However, broader interpretations are applicable and important since also job characteristics such as flexibility of working hours, the work climate, availability or proximity of child care, and other non-tangible characteristics affect the disutility of working for a certain firm. The importance of flexible working hours is, e.g., stressed in a recent contribution of Goldin (2014). The spatial dimension of the economy is illustrated in Figure 1 and described in detail below.

There is a finite and exogenous number V of firms which are arranged at equal distance on the unit circle. Workers are located on the same circle and their allocation to firms is determined endogenously. Firms are positioned at the following locations: $v = 0, \frac{1}{V}, \frac{2}{V}, ..., 1$ where one firm is located at the origin, hence has location zero and one. The uniqueness of job characteristics implies that jobs in different firms are imperfect substitutes. Since no firm offers jobs with the same characteristics, each firm acts a local monopsonist on the labor market. This monopsonistically competitive structure of the demand side of the labor market in the model is similar to Bhashkar, Manning, and To (2002). All other markets are perfectly competitive.

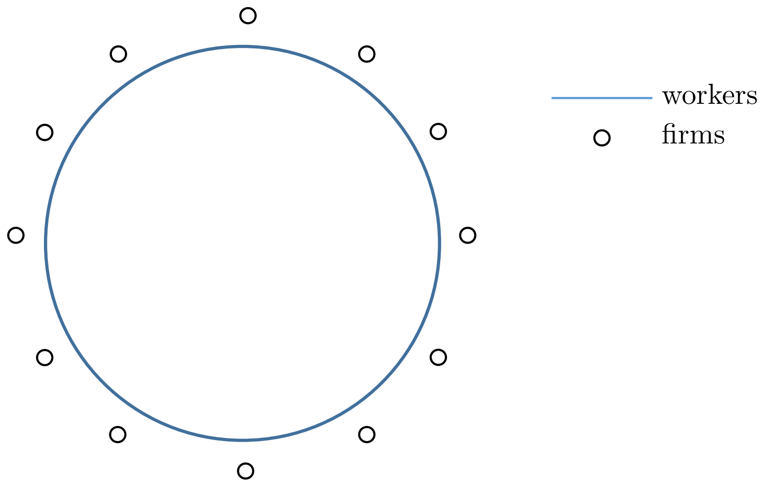
Next to location in the job-characteristics space, workers differ by gender denoted by $g = F, M$ for female and male, respectively. There is a continuum of mass one of workers of each gender with uniform distribution over the unit circle. Each worker lives in a couple with a spouse of the other gender such that there is a continuum of mass one of households. In every couple, the distance between the two spouses' most preferred job characteristics is at least $1/V$. This assumption reflects the importance of job characteristics other than geographical location and it implies that, in equilibrium, no individual works for the same firm as his or her spouse. As workers, men and women supply different services to firms, e.g., work in different occupations.[5] For simplicity, provided services are the same within gender.

2.2 Firms

Firms produce consumption goods, maximize profits, and are owned by all households equally. Firms use female and male labor as separate inputs in the increasing and concave production

[5]Empirically, there is strong gender segregation with respect to occupations. While men are over-represented in traditional blue-collar occupations such as manufacturing and constructions workers, women constitute the majority of workers in personal-service oriented occupations such as teaching and nursing.

Figure 1: Location of workers and firms.



Note: The number of firms, $V = 12$, is solely an example in this figure.

function f. Consequently, a firm can pay different wage rates to women and men. However, a firm is not allowed to discriminate between workers who provide the same services, i.e., to pay different wage rates to workers of the same gender. Due to their local monopsonies, firms do not act as wage-takers in this model but the wage rates they pay depend on their labor inputs. In particular, every firm faces upward-sloping supply functions of labor of both genders which are determined on the household side of the economy. A firm is assumed to know this function.

The firm at location v maximizes its discounted stream of profits

$$\sum_{s=0}^{\infty} \phi_{t,t+s} \begin{pmatrix} f\left(n^{total}_{F,v,t+s}, n^{total}_{M,v,t+s}\right) - w_{F,v,t+s}\left(n^{total}_{F,v,t+s}, \bullet\right) \cdot n^{total}_{F,v,t+s} \\ -w_{M,v,t+s}\left(n^{total}_{M,v,t+s}, \bullet\right) \cdot n^{total}_{M,v,t+s} - \tau^{frm}_{t+s} \end{pmatrix}, \tag{1}$$

where ϕ denote firms' discount factors. $n^{total}_{g,v,t}$ is total hours worked of gender $g = F, M$ demanded by firm the firm in period t and combines the extensive margin and the intensive margin, $n^{total}_{g,v,t} = n^{ext}_{g,v,t} \cdot n^{int}_{g,v,t}$. $w_{g,v,t}(n^{total}_{g,v,t}, \bullet)$ denotes the inverse labor supply function of gender g faced by the firm. I.e. it gives the wage rate which the firm has to pay to workers of gender g in period t in order to attract a labor supply of $n^{total}_{g,v,t}$. Next to the amount of work, the inverse labor supply function also depends on other things which are determined at the household side and are here captured by "$\bullet$" for brevity. In each period, the government taxes firms in a lump-sum way where the level τ^{frm}_t of the tax is set such that equilibrium profits are zero. The government uses all of its tax revenues to finance expenditures.

The first-order conditions for the profit-maximizing labor demands, $n_{g,v,t}$, $g = F, M$, are

$$MPL_{g,v,t} = w_{g,v,t} + \frac{\partial w_{g,v,t}}{\partial n_{g,v,t}} \cdot n_{g,v,t} = w_{g,v,t} \cdot \left(1 + 1/\varepsilon^{frm}_{g,v,t}\right), \tag{2}$$

where $MPL_{g,v,t}$ denote the marginal product of labor of gender g in the firm at location v in period t and $\varepsilon^{frm}_{g,v,t} = \partial n_{g,v,t}/\partial w_{g,v,t} \cdot w_{g,v,t}/n_{g,v,t}$ is the elasticity of labor supply to the individual firm. I.e. $\varepsilon^{frm}_{g,v,t}$ measures the percentage change in labor supplied to the firm by gender g if the firm changes its wage rate paid to gender g by one percent. On a perfectly competitive market, $\varepsilon^{frm}_{g,v,t}$ is infinite and firms pay real wage rates which equal marginal products. Here, however, employers can exploit workers' imperfect inter-firm mobility to keep wage rates below marginal products. So, firms extract rents from the fact that they are indifferent between workers of the same gender but workers are not indifferent between firms and are willing to accept lower wage rates paid by more preferred employers.

One can already anticipate here that the gender wage rate gap depends on the inter-firm mobility of workers of different genders. For any given relative differences in marginal productivities, the gender wage rate gap in a firm widens in men's inter-firm mobility $\varepsilon_{M,v,t}$ and closes in women's inter-firm mobility $\varepsilon_{F,v,t}$,

$$\frac{w_{F,v,t}}{w_{M,v,t}} = \frac{MPL_{F,v,t}}{MPL_{M,v,t}} \cdot \frac{1 + 1/\varepsilon^{frm}_{M,v,t}}{1 + 1/\varepsilon^{frm}_{F,v,t}}. \tag{3}$$

2.3 Household problem

A household is a group of individuals with potentially different interests. To model the behavior of such household, I use a dynamic version of Chiappori's (1998, 1992) collective framework. The collective approach assumes cooperative behavior within a couple such that a Pareto-efficient allocation will be reached. This can be modelled as the household maximizing a weighted sum of spouses' utilities with the weights μ reflecting relative bargaining positions.

A household produces home goods and can specialize, i.e. exploit spouses' comparative advantages in market work n and home work h. Individuals enjoy consuming market goods c and home goods but dislike working market hours n and working home hours h. Further, individuals obtain utility from job characteristics which is reduced proportionally by the distance of one's actual workplace to one's ideal workplace in the job-characteristics space. Both consumption goods are public within the household. Individual utility is given by

$$u_g\left(c_{j,t}, d_{j,t}, n_{g,j,t}, h_{g,j,t}, v_{g,j,t}, j\right) = \widetilde{u}_g\left(c_{j,t}, d_{j,t}, n_{g,j,t}, h_{g,j,t}\right) + \frac{1}{\Upsilon_g} \cdot \left(1 - |k_{g,j} - v_{g,j,t}|\right), \tag{4}$$

where g, j denotes household j's member of gender g. Further, Υ_g is a preference parameter measuring inverse importance of job characteristics, $v_{g,j,t}$ denotes the location of the firm which individual g, j works for in period t, and $k_{g,j}$ gives the individual's most preferred job characteristics. Utility from job characteristics depends on the absolute deviation between $v_{g,j,t}$ and $k_{g,j}$ and it is additively separable from utility in other dimensions, $\widetilde{u}_g$.[6] The parameter Υ is allowed to differ by gender in order to be able to capture exogenous differences in inter-firm mobility. However, the results suggest that the role of such exogenous differences is small. The subutility function $\widetilde{u}_g$ is strictly increasing and concave in c and d and decreasing in n and h, For the paper's main points, it is not necessary to formulate an explicit functional form for $\widetilde{u}_g$.

The couple household maximizes a weighted sum of spouses' utilities subject to a joint budget constraint and a joint home production technology. The latter is summarized by the increasing and concave home production function $f^h(h_{F,j,t}, h_{M,j,t})$. Household decisions can be obtained from the following Lagrangean:

$$\begin{aligned}\mathcal{L} = E_t \sum_{s=0}^{\infty} \beta^s \Bigg(& \sum_{g=M,F} \mu_{g,j,t+s} \cdot u_g\left(c_{j,t+s}, d_{j,t+s}, n_{g,j,t+s}, h_{g,j,t+s}, v_{g,j,t}, k_{g,j}\right) \\ & + \lambda_{j,t+s} \cdot \begin{bmatrix} w_{F,j,t+s} \cdot n_{F,j,t+s} + w_{M,j,t+s} \cdot n_{M,j,t+s} \\ + (1 + r_{t+s}) \cdot b_{j,t+s} - c_{j,t+s} - b_{j,t+s+1} \end{bmatrix} \\ & + \chi_{j,t+s} \cdot \left[f^h\left(h_{F,j,t+s}, h_{M,j,t+s}\right) - d_{j,t+s} \right] \Bigg)\end{aligned} \tag{5}$$

where β is the rate of time preference and λ and χ are the Lagrange multipliers on budget constraints and home production constraints, respectively. For every period $t + s$, the couple chooses $c_{j,t+s}$, $d_{j,t+s}$, and $b_{j,t+s}$ as well as $n_{g,j,t+s}$, $h_{g,j,t+s}$ and $v_{g,j,t+s}$ for both genders $g = F, M$.

2.4 The choice of employer

The choice of workplace $v_{g,j,t}$ is a discrete and static problem which can be separated from the continuous and dynamic decision over the quantities due to the separability of u_g. By choosing

[6] The assumption that utility from job characteristics is independent of working time is a simplification. The qualitative point survives as long as utility from job characteristics rises less than proportionately with labor earnings. Hence, it could even be modelled as proportionate to working time as, in a representative couple, the earnings gap exceeds the hours gap.

$v_{g,j,t}$, the household chooses a wage rate $w_{g,j,t} = w_{g,v_{g,j,t},t}$ and then faces a standard labor-supply problem at the intensive margin which is similar to the one in Bredemeier and Juessen (2013).

The household $j^*_{g,v,v+1/V,t}$ where the member of gender g is indifferent between two neighboring firms with positions v and $v+1/V$ in period t is implicitly identified by

$$J^*_{g,v,v+1/V} = \mathcal{L}|_{\{v_{g,j,t}=v,\ w_{g,j,t}=w_{i,g,t},\ j^*_{g,v,i+1}\}} - \mathcal{L}|_{\{v_{g,j,t}=v+1/V,\ w_{g,j,t}=w_{g,v+1/V,t},\ j^*_{g,i,i+1}\}} = 0. \tag{6}$$

In equilibrium, every worker works for one of the two firms closest to him. Consequently, extensive-margin labor supply of gender g to the firm at location v, i.e. the mass of workers of gender g that work for the firm at location v, is given by

$$n^{ext}_{g,v,t}\left(w_{g,v-1/V,t}, w_{g,v,t}, w_{g,v+1/V,t}\right) = j^*_{g,v,v+1/V,t} - j^*_{g,v-1/V,v,t}. \tag{7}$$

2.5 The elasticity of labor supply to individual firms

Consider a symmetric situation where all firms pay the same wage rate to all workers of gender g, $w_{g,v,t} = w_{g,t}$. From this situation, a unilateral marginal wage increase of the firm at location v for period t affects labor supplied to this firm at two margins: First, workers who work for the firm already initially change their labor supply at the intensive margin. This adjustment is governed by the Frisch elasticity of labor supply to the market, $\varepsilon^{mkt,Frisch}_{g,t}$. Second, some workers now decide to supply labor to the firm who previously did not. This adjustment at the extensive margin can be analyzed using the indifference condition (6) above.

The extensive-margin reaction to a change in $w_{g,v,t}$ is the sum of the changes in the locations of the indifferent workers between the firm at location v and its two neighboring firms,

$$\frac{\partial n^{ext}_{g,v,t}}{\partial w_{g,v,t}} = \frac{\partial j^*_{g,v,v+1/V,t}}{\partial w_{g,v,t}} - \frac{\partial j^*_{g,v-1/V,v,t}}{\partial w_{g,v,t}}. \tag{8}$$

By applying the implicit-function theorem to condition (6) above, I can determine $\partial j^*_{g,v,v+1/V,t}/\partial w_{g,v,t}$ as

$$\frac{\partial j^*_{g,v,v+1/V,t}}{\partial w_{g,v,t}} = -\frac{\partial J^*_{g,v,v+1/V}/\partial w_{g,v,t}}{\partial J^*_{g,v,v+1/V}/\partial j^*_{g,v,v+1/V,t}} = -\frac{\lambda_{j^*,t}\cdot n_{g,j^*,t}}{-2/\Upsilon_g} = \frac{1}{2}\cdot\Upsilon_g\cdot\lambda_{j^*,t}\cdot n_{g,j^*,t}. \tag{9}$$

Intuitively, how many workers change employers in response to a wage change depends negatively on the importance of job characteristics $1/\Upsilon_g$. The two other elements of the expression above,

$\lambda_{j^*,t} \cdot n_{g,j^*,t}$, translate the marginal wage change into utility terms: A unit change in the wage rate is equivalent to $n_{g,j^*,t}$ units change in labor earnings, each of which the household values by the marginal valuation of wealth, $\lambda_{j^*,t}$.

Symmetry implies $\partial j^*_{g,v-1/V,v,t}/\partial w_{g,v,t} = -\partial j^*_{g,v,v+1/V,t}/\partial w_{g,v,t}$, which gives $\partial n^{ext}_{g,v,t}/\partial w_{g,v,t} = \Upsilon_g \cdot \lambda_{j^*,t} \cdot n_{g,j^*,t}$, and, expressed as an elasticity

$$\varepsilon^{ext,frm}_{g,v,t} = \frac{\partial n^{ext}_{g,v,t}}{\partial w_{g,v,t}} \cdot \frac{w_{g,v,t}}{n^{ext}_{g,v,t}} = \Upsilon_g \cdot \lambda_{j^*,t} \cdot w_{g,v,t} \cdot n_{g,j^*,t}/n^{ext}_{g,v,t}. \tag{10}$$

Again using symmetry, $\lambda_{j^*,t} = \lambda_t$, $w_{g,v,t} = w_{g,t}$, $n_{g,j^*,t} = n_{g,t}$, $n^{ext}_{g,v,t} = 1/V$, gives

$$\varepsilon^{ext,frm}_{g,t} = \Upsilon_g \cdot \lambda_t \cdot w_{g,t} \cdot n_{g,t} \cdot V. \tag{11}$$

$\varepsilon^{ext,frm}_{g,t}$ contains the terms of equation (9) above, which have the same intuition here. Particularly, wage changes cause strong changes in labor supply in situations where they imply large changes in earnings (high n) and where such changes are valued much (high λ). Additionally, the terms $w_{g,t}$ and $1/V$ appear which translate the absolute changes in wages and workforce into relative changes. The factor 1/2 disappeared as a firm which raises pay gains workers from both neighboring firms.

Finally, the elasticity of total labor supply to the firm at location v, which determines market power and wage mark-downs, see equation (2), is the sum of the elasticities at the extensive margin and at the intensive margin and reads

$$\varepsilon^{frm}_{g,t} = \Upsilon_g \cdot \lambda_t \cdot w_{g,t} \cdot n_{g,t} \cdot V + \varepsilon^{mkt,Frisch}_{g,t}. \tag{12}$$

Together, with the labor-demand functions (2) and workers' labor-supply functions to the market, $\varepsilon^{frm}_{g,t}$ determine the model's labor-market equilibrium. A full list of equilibrium conditions can be found in the Appendix.

Gender ratio of the elasticity of labor supply to individual firms. The model allows a very simple expression for the gender ratio of the elasticity of labor supply to individual firms at the extensive margin:

$$\frac{\varepsilon^{ext,frm}_{F,t}}{\varepsilon^{ext,frm}_{M,t}} = \frac{\Upsilon_g \cdot \lambda_t \cdot w_{F,t} \cdot n_{F,t} \cdot V}{\Upsilon_g \cdot \lambda_t \cdot w_{M,t} \cdot n_{M,t} \cdot V} = \frac{\Upsilon_M}{\Upsilon_F} \cdot \frac{w_{F,t} \cdot n_{F,t}}{w_{M,t} \cdot n_{M,t}} \tag{13}$$

The gender ratio of the elasticity of labor supply to individual firms is equal to the ratio of labor earnings by gender, potentially magnified by exogenous differences.[7] The intuition behind the role of the earnings gap is that the ratio of labor incomes exactly determines the ratio of utility gains associated by a percentage wage rise for either spouse. A household values any increase in income by the same amount, specifically by the marginal valuation of wealth, $\lambda_{j,t}$. This is the reason for why the direct effect of higher labor earnings is not counteracted by lower marginal utility of income. I.e., households are more willing to accept some less preferred job characteristics for the primary earner than for the secondary earner in return for a given relative wage rise.

This translates into a lower elasticity of the secondary earner's labor supply to individual firms. Empirically, this is the wife in most married couples. Consequently, the model can explain the empirical observation of lower elasticities of female labor supply to individual firms. This result implies a mutually enforcing cycle between the gender wage gap, the earnings gap, and the elasticities of gender-specific labor supply which determines employers' market power. An initial gender gap in wage rates leads to an hours gap and a larger earnings gap because couples exploit spouses' comparative advantages. The earnings gap then makes women's labor supply to individual firms less elastic than men's. This gives employers more market power of women than they have over men. Firms use this market power to keep down women's wage rates more than men's. This widens the wage gap which again impacts on the earnings gap and so on. Likewise, the cycle can be started by an hours gap resulting from women's absolute advantages in home productions.

How important the endogenous component of different inter-firm mobilities and market powers is quantitatively, I address in the next section. Before, it is insightful to consider the sources of the gender wage rate gap in this model. It can be decomposed into the effects of different marginal productivities and different inter-firm mobilities, see equation (3). In a way, the latter part is a combination of monopsonistic discrimination and statistical discrimination. A firm is not allowed to discriminate along preferred job characteristics or, likewise, can not observe an agent's job-specific preferences $k_{g,j}$. So, the firm cannot pay lower wage rate to workers who are less likely to leave the firm in response to wage cuts. However, a firm knows that women are, on average, less

[7] Next to difference in the importance of job-specific characteristics, one can easily include differences in concentration of relevant firms, v.e. in V. Such differences would simply appear multiplicatively to Υ, see (11).

Table 1: Average point estimates of elasticities gender-specific labor supply at the extensive margin to individual firms, $\varepsilon_g^{ext,frm}$.

	Men	Women	Gender ratio	Log diff.
Hirsch et al. (2010)	2.42	1.32	1.83	0.60
Ransom and Oaxaca (2005)	3.50	2.70	1.30	0.26
Ransom and Oaxaca (2010)	2.74	1.95	1.41	0.34
Average estimate	2.89	1.99	1.45	0.37

Notes: 'Gender Ratio' is female estimate divided by male estimate. 'Log diff' is log male estimate minus log female estimate.

likely to leave the firm in response to a wage cut and pay lower wage rates to all women.[8]

3 Quantitative Evaluation

Table 1 summarizes point estimates for elasticities of gender-specific labor supply to individual firms at the extensive margin. The cited papers estimate the relation between quit rates by gender and wage changes to deduct the respective gender-specific elasticities. Each study documents an estimated elasticity of male labor supply to individual firms that exceeds the female counterpart by at least 30%. On average, men's labor supply is estimated to be about 50% more elastic between firms than women's.[9] In the following, I calibrate the model to match these and other statistics in order to decompose the gender differences in Table 1. Later, I use the calibrated model to erode the relation between household specialization, monopsnonistic discrimination, and the gender wage gap quantitatively.

3.1 Calibration

First, I describe the functional forms chosen for utility and technology in this quantitative model evaluation. I use the following functional form for $\widetilde{u}_g$:

$$\widetilde{u}_g\left(c_{j,t}, d_{j,t}, n_{g,j,t}, h_{g,j,t}\right) = \frac{c_t^{1-\sigma}}{1-\sigma} + \nu_d \cdot \frac{d_t^{1-\kappa}}{1-\kappa} - \nu_l \cdot \frac{\left(n_{g,t} + h_{g,t}\right)^{1+1/\eta_g}}{1+1/\eta_g}, \tag{14}$$

[8] Going one step further, even if wage differentiation by gender is forbidden, a firm can make use of gender segregation by occupation and pay lower wage rates to workers in occupations where there are statistically more women such that these workers are statistically less likely to leave the firm in response to a wage cut.

[9] Next to these estimation results, there is also some indirect evidence that women's labor supply to individual firms is less elastic than men's, see Boal and Ransom (1997) for a summary.

Table 2: Parameter values with calibration targets.

Symbol	Interpretation	Parameter value			set/cal	reason/target
σ	Risk aversion c	1.0000			set	balanced growth
κ	Risk aversion d	1.0000			set	balanced growth
ν_d	utility weight d	0.3030			cal.	h_g/n_g
ν_l	utility weight $n+h$	12.1473			cal.	h_g+n_g
		male	female	ratio		
μ	Pareto weight	0.7349	0.2651	2.7716	cal.	$(h_F+n_F)/(h_M+n_M)$
η	curvature labor disut.	0.5133	0.9865	0.5203	cal.	Keane (2011)
Υ	inv. imp. job charact.	4.9759	4.7471	1.0482	cal.	Table 1
θ	elasticities home prod.	0.4265	0.5735	0.7437	cal.	h_F/h_M
ε^D	Labor-dem elast.	0.3240	0.4970	0.6519	set	Lichter et al. (2014)
a	productivity parameter	0.0482	0.0950	0.5067	cal.	wage rate gap

Notes: 'Ratio' is male parameter value divided by female parameter value. V has been normalized to 1 as only $\Upsilon_g \cdot V$ is identified in the model. ϕ and β are irrelevant for the steady state.

where σ, κ, and η_g, $g = F, M$ are exogenous parameters. The home production function is of Cobb-Douglas type,

$$f^h\left(h_{F,j,t}, h_{M,j,t}\right) = h_{F,j,t}^{\theta_F} \cdot h_{M,j,t}^{\theta_M}, \tag{15}$$

where $\theta_g \in (0,1)$ and $\theta_F + \theta_M = 1$. Finally, technology is described by the following functional form for marginal productivity,

$$MPL_g = a_g \cdot n_g^{-1/\varepsilon_g^D}, \tag{16}$$

where $\varepsilon_g^D > 0$ is the labor demand elasticity for gender g.

My calibration targets stem from empirical estimates for labor-supply elasticities by gender, observable time use by gender, and the gender wage rate gap. All observations are targeted to apply in the model's steady state. For the elasticity of labor supply to individual firms at the extensive margin, I target the values in the final row of Table 1. For Frisch elasticities of labor supply to the market, I target the average point estimates by gender from the survey of Keane (2011), 0.85 for men and 1.81 for women. See Bredemeier (2015) for details on the Frisch elasticity of labor supply to the market in this class of models. I take time use information from the BLS as targets for home hours and market hours: 14.9 and 36.0, respectively, hours per week for women as well as 9.1 and 40.9, respectively, for men. Finally, I target the BLS' most recent estimates for the gender wage rate gap, 18%.[10] I need to set $\kappa = \sigma = 1$ in order to ensure balanced growth

[10]Data sources: BLS factbook 'Women in the Labor Force', and BLS Table 1 of the American Time Use Survey. I understand hours in both activities as a fraction of a weekly endowment of 118 hours (7×24 hours $-$ 50 hours for

Table 3: Decomposition of the observed differences in the elasticity of gender-specific labor supply to individual firms.

	data	model	fraction (%) explained
$\ln(\varepsilon_M^{ext,frm}/\varepsilon_F^{ext,frm})$	0.3731	0.3731	100.0
$\ln(\Upsilon_M/\Upsilon_F)$		0.0471	12.6
$\ln((w_M \cdot n_M)/(w_F \cdot n_F))$		0.3261	87.4
$\ln(n_M/n_F)$		0.1985	53.2
$\ln(w_M/w_F)$		0.1276	34.2

and I set the labor demand elasticities to the point estimate (administrative data) for long-run labor demand elasticities by gender from the survey of Lichter, Peichl, and Siegloch (2014). All remaining parameters are calibrated and summarized in Table 2. Importantly, the key parameter Υ_g differs between genders by only 5 percent.

3.2 Gender ratio of the elasticity of labor supply to individual firms

To which degree can the model presented in Section 2 explain these quantitative difference in the elasticities of gender-specific labor supply to individual firms in Table 1 as a consequence of the different labor earnings of women and men in the household? Condition (13) implies that the steady-state gender ratio in $\varepsilon^{ext,frm}$ can be decomposed into

$$\ln \frac{\varepsilon_M^{ext,frm}}{\varepsilon_F^{ext,frm}} = \ln \frac{\Upsilon_M}{\Upsilon_F} + \ln \frac{w_M \cdot n_M}{w_F \cdot n_F} = \ln \frac{\Upsilon_M}{\Upsilon_F} + \ln \frac{n_M}{n_F} + \ln \frac{w_M}{w_F} \tag{17}$$

Table 3 shows the results of such decomposition in the calibrated model. Please note that the calibration matters only so far for the results in Table 3 as it allows the model to match n_M/n_F and w_M/w_F which are both observable. The analysis reveals that the model explains more than 87% of the gender differences in the elasticities of labor supply between firms endogenously as a consequence of the gender earnings gap which results from both, the wage rate gap and households' specialization response. Only about 13% of the total difference have to be attributed to gender differences in preferences. This shows the quantitative importance of endogenous gender differences in labor-supply elasticities.

Going one step further, the bottom part of Table 3 documents the importance of the endogenous magnification of wage differences through households' specialization responses. About three fifth

sleep and personal care) of discretionary time, v.e. $h_M = 0.0771$, $h_F = 0.1265$, $n_M = 0.3466$, and $n_F = 0.3051$.

Table 4: Equilibrium wage rates by gender and gender wage rate gap in different model simulations (steady state).

	gender differences in					fraction (%)
	households	firms	w_M	w_F	gap	explained
1	yes	yes	1.0000	0.8200	0.1800	100.0
2	yes	no	0.7089	0.6679	0.0579	32.2
3	no	yes	1.8893	1.5984	0.1539	85.5

Notes: 'gap' is $(w_M - w_F)/w_M$. No gender difference means that male parameters are set to the female values. Gender differences in household concern η_g, Υ_g, θ_g, and μ_g, gender differences in firms concern a_g and ε_g^D. All wage rates normalized to w_M in simulation 1.

of the explained portion can be traced back to the differences in working time by which households react to, i.a., differences in wage rates.

The results of this exercise reveal that the gender earnings gap is actually an important determinant of the gender differences in in inter-firm mobility and that a rather small portion is to be attributed to exogenous differences. This implies that the mutually enforcing cycle between wage gaps, earnings gaps, and monopsonistic discrimination is of first-order importance quantitatively.

3.3 Gender wage gap

The discussed cycle also implies that wage gaps, earnings gaps, and differences in inter-firm mobility can be caused by gender differences on the production side of the economy, by gender differences within households, or both. In order to evaluate the quantitative importance of the different entries in this mutually enforcing cycle, I perform three simulations of my model with different sets of parameters. In all simulations, I calculate the steady-state gap between women's and men's wage rates, $(w_M - w_F)/w_M$. Table 4 reports the results.

The first simulation uses the parameter values reported in Table 2. The gender wage gap in this simulation is 18% which is not surprising since this gap was a targeted moment in the calibration.

Simulation 2 shuts off all gender differences within firms. Precisely, I set productivity and the labor-demand elasticity to their female values also for men. Hence, the only exogenous gender differences in this model variant lie within households, specifically in preferences and most importantly in home production technology. Despite the absence of deep gender differences in the technology used by firms or anywhere on the demand side of the labor market, this model variant still features a gender wage gap of 5.8 percentage points. This is about a third of the empirical gap.

Put differently, this model evaluation suggests that a considerable portion of the gender wage gap has nothing to do with exogenous differences in productivity but is a result of firms' monopsonistic exploitation of women's less elastic labor supply to individual firms. The latter is a consequence mainly of women's higher productivity in home production.

Simulation 3 is the reverse experiment where I shut off all gender differences within the household and set all male preference parameters to their female values as well as Pareto weights μ_g and home production shares θ_g to 1/2. Here, there would be gender equity in all time uses and elasticities if genders faced the same labor demand by firms. This model variant generates a substantial gender wage gap of 15.4 percentage points which is a result of the different marginal productivity functions. Explained fractions of the wage gap in simulations 2 and 3 do not add up to 100% due to the non-linearity of the model.

The results of these experiments suggest that the empirical gender wage rate gap is caused by gender differences on both sides on the labor market. A part of the gender gap causally originates in the incentives for couples to specialize caused by differences in spouses' abilities in home production. To put it in drastic way, the results suggest that women, on average, earn lower wage rates than men partly because they are more productive in home production. The resulting specialization causes a gender gap in earnings which reduces women's inter-firm mobility. Firms exploit this to keep down women's wages causing a gender gap in wage rate. This way, women's absolute advantage in home production turns into an absolute disadvantage in generating earnings magnifying the comparative advantages of spouses.

4 Policy Analysis

In this section, I use the model to analyze policy. I choose three policy measures which are either directly meant to or potentially able to foster women's average wage rates, earnings, and labor supply as well as to promote gender equity on the labor market and in the household. First, I consider direct wage subsidies for women which I model as payroll subsidies. Second, as women's wage rates are lower than men's, minimum wages are also likely to affect gender differences in the labor market. Finally, I study the effects of home hours subsidies. While such policies are widely targeted at fostering fertility, their labor-market effects and their impact on gender equity are also of major importance. For example, the German government subsidizes parental leaves by replacing up to two thirds of foregone earnings for up to 14 months per child and, thereafter, pays transfers to families who do not use publicly provided child care facilities. While the latter policy is heatedly blamed for its negative impact on women's labor-market attachment, the former policy explicitly includes a gender equity component: the full subsidy is paid only to those parents who share the parental leave in a sufficiently equal way.

The model presented in this paper is suited to analyze the effects of labor-market policies and family policies on both, labor-market outcomes and the decisions on home hours including their gender division. I am particularly interested in whether a policy promotes women's earnings and labor supply as well as its effects on gender equity on the labor market and in the household. I first study policies separately and then analyze their interaction.

4.1 Labor-market policies

The labor-market policies introduced here alter the profit maximization problem of firms as follows. Firms obtain a subsidy which is proportional at rate s_g to gender-specific labor costs $w_{g,v,t} \cdot n_{g,v,t}$. Further, firms are not allowed to pay wage rates below a minimum level w_{min} which is completely enforced by the government. The government adjusts the lump-sum tax such that equilibrium profits are zero. Formally, the firm at location v now maximizes

$$\sum_{s=0}^{\infty} \phi_{t,t+s} \begin{pmatrix} f\left(n_{F,v,t+s}, n_{M,v,t+s}\right) - (1-s_F) \cdot w_{F,v,t+s} \cdot n_{F,v,t+s} \\ -(1-s_M) \cdot w_{M,v,t+s} \cdot n_{M,v,t+s} - \tau_{t+s}^{frm} \\ +\zeta_{F,v,t+s} \cdot (w_{F,v,t+s} - w_{min}) + \zeta_{M,v,t+s} \cdot (w_{M,v,t+s} - w_{min}) \\ +\xi_{F,v,t+s} \cdot \left(w_{F,v,t+s} - \widetilde{w}_{F,v,t+s}\left(n_{F,v,t+s}, \bullet\right)\right) \\ +\xi_{M,v,t+s} \cdot \left(w_{M,v,t+s} - \widetilde{w}_{M,v,t+s}\left(n_{M,v,t+s}, \bullet\right)\right) \end{pmatrix}, \tag{18}$$

where w are the wage rates actually paid by the firm and $\widetilde{w}(n, \bullet)$ are the inverse labor supply functions. ζ and ξ are the Kuhn-Tucker multipliers on the minimum wage constraints and the labor-supply constraints. Here, the inverse labor supply functions enter as true inequality constraints as the firm may (because of the minimum wage legislation) have to pay more to workers than necessary to attract the desired number of hours worked.

Combining the first-order conditions for $n_{g,v,t}$ and $w_{g,v,t}$ gives the firm's demand for labor of gender g as[11]

$$MPL_{g,v,t} = (1 - s_g) \cdot w_{g,v,t} \cdot \left(1 + \varepsilon_{g,v,t}^{frm} \cdot \left(1 - \frac{\zeta_{g,v,t}}{(1 - s_g) \cdot n_{g,v,t}}\right)\right). \tag{19}$$

Both policy measures, s_g and w_{min} are able to raise labor demand. Naturally, payroll subsidies reduce effective labor costs and raise firms' demand for labor. Minimum wages can counteract the monopsonistic labor demand behavior of firms which tend to demand less labor to reduce wage rates. A binding minimum wage takes from a firm its wage setting power and the firm is willing to hire up to the point where effective wage rates $(1 - s_g) \cdot w_{g,v,t}$ equal marginal products. Formally, a binding minimum wage and a slack labor supply condition imply $\zeta_{g,v,t} = (1 - s_g) \cdot n_{g,v,t}$. Of course, ever rising minimum wages eventually lower labor demand when marginal productivity can only be brought up to the level of the minimum wage by less labor input than in the initial situation. For the general effects of minimum wages on monopsonistic labor markets, see, e.g., Bhashkar et al. (2002).

Both policies are also capable to affect the gender wage gap. With the above, the equilibrium gender ratio in wage rates can be decomposed to

$$\ln \frac{w_{F,t}}{w_{M,t}} = \ln \frac{MPL_{F,t}}{MPL_{M,t}} + \ln \frac{1 - s_M}{1 - s_F} + \ln \frac{1 + \varepsilon_{M,t}^{frm} \cdot \left(1 - \frac{\zeta_{M,t}}{(1-s_M) \cdot n_{M,t}}\right)}{1 + \varepsilon_{F,t}^{frm} \cdot \left(1 - \frac{\zeta_{F,t}}{(1-s_F) \cdot n_{F,t}}\right)} \tag{20}$$

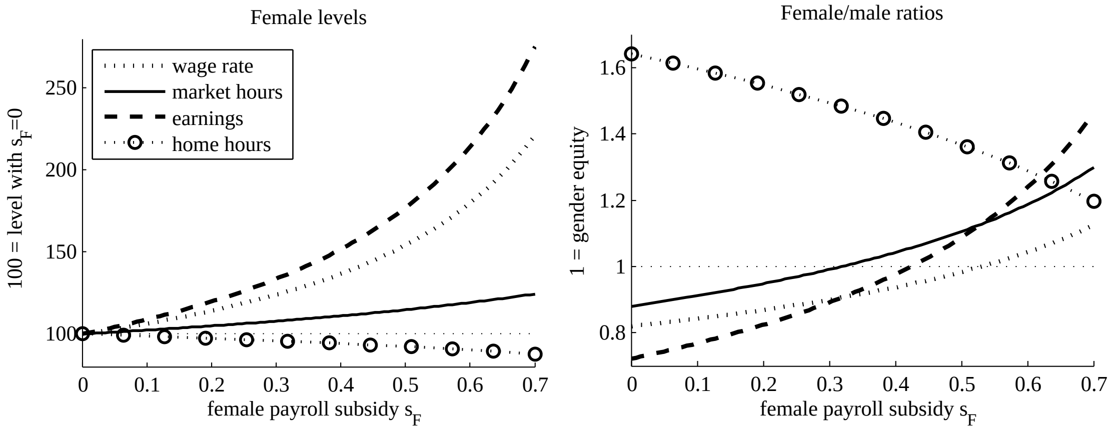
For any given marginal productivities, the ratio of women's to men's wage rates rises if female labor is more strongly subsidized than men's ($s_F > s_M$). Further, women also catch up to men in terms of wage rates if a minimum wage is binding for women but not for men. Then, the denominator of the last term in equation (20) is one while the numerator exceeds one. Further, if $\varepsilon_F^{frm} < \varepsilon_M^{frm}$, minimum wages also close the wage gap if they are binding for both genders since they take from firms all market power, which they would use to keep down women's wages more than men's.

In light of the results of this paper, changes in the gender wage gap will affect households' specialization decisions and set in motion the discussed cycle between the wage gap, the earnings gap, and employers' market power. For this reason, I study the general-equilibrium effects of these policies in the following evaluations using the calibration from Section 3.

[11] All equilibrium conditions of the extended model can be found in the Appendix.

Figure 2: Effects of labor-market policies.

(a) Payroll subsidies



(b) Minimum wages

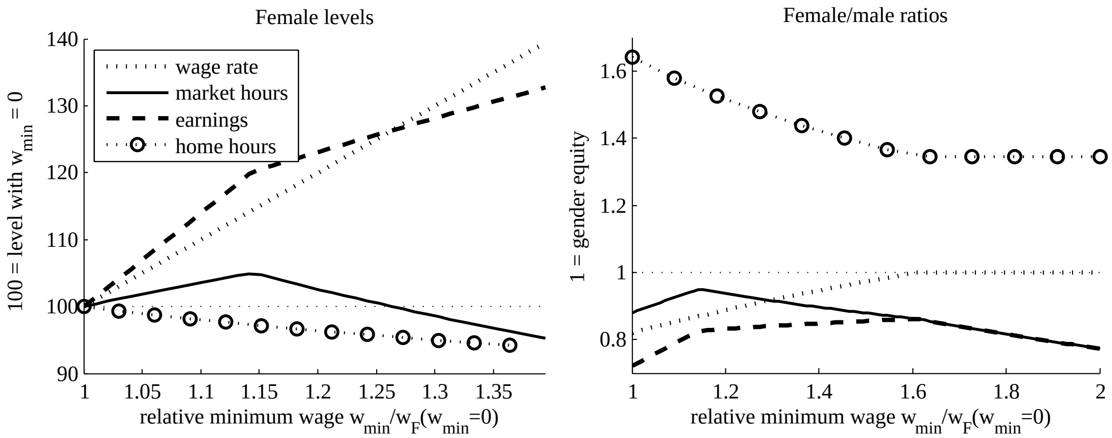


Figure 2 shows the results of the quantitative analysis of labor-market policies. The left panels show female steady-state wage rates w_F, market hours n_F, earnings $w_F \cdot n_F$, and home hours h_F relative to the baseline scenario where all policy instruments (s_F, s_M, w_{min}) are zero. The right panels show the gender ratio in these quantities where a value of 1 refers to gender equity.

Figure 2(a) refers to different values of the female payroll subsidy s_F.Both other policy instruments (s_M, w_{min}) are zero in these evaluations. The results show that female payroll subsidies raise women's wage rates, market hours, and earnings and reduce women's home hours. However, wage rates rise less than proportionate to the fall in $1 - s_F$. This is a consequence of higher labor supply which reduces marginal productivity and of changes in inter-firm mobility which impact on relative wage mark-downs.

Concerning the relative outcomes of genders, the right panel of Figure 2(a) shows that women's relative wage rates, market hours, and earnings, increase as the female payroll subsidy is raised. Further, this labor-market policy also impacts on the gender division of home hours. Raising the subsidy, women's share of home hours declines.[12] However, even with highly subsidized female market work, women still do the lion's share of home hours - a result of their higher productivity in this activity which is needed to rationalize the status quo division of home hours.

Figure 2(b) refers to different values of a minimum wage w_{min}. Both other policy instruments (s_F, s_M) are zero in these evaluations. Trivially, a minimum wage which is binding for women raises female wage rates one for one. For moderate levels, raising the minimum wage also fosters female market hours along the female labor supply curve. At a level about 15% above women's initial wage rate, labor demand starts to restrict female market hours which are falling in the minimum wage from this point on. At levels of about 27% above women's initial wage rate, the employment effects of the minimum wage turn negative. Nevertheless, the minimum wage raises women's earnings and reduces their home hours for all levels considered.

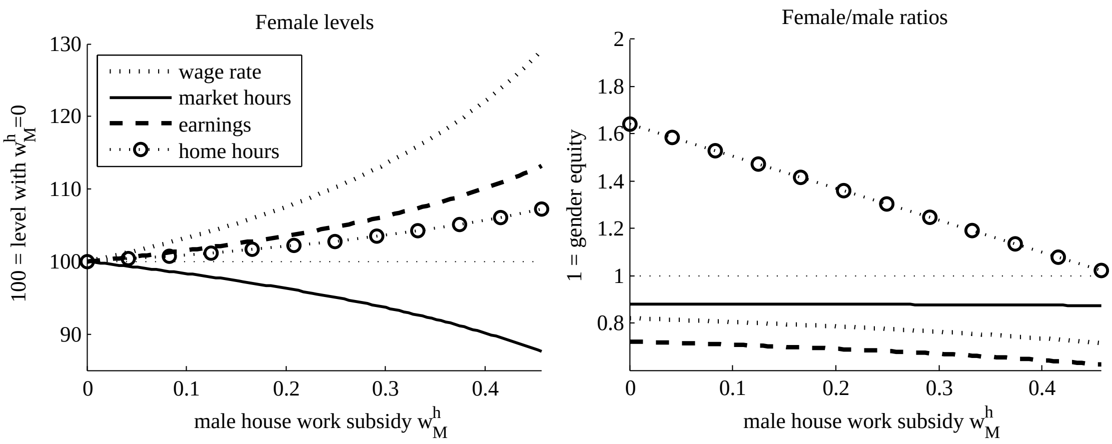
The distributional effects of a minimum wage are also interesting. For moderate levels, minimum wages raise women's wage rates, market hours, and earnings relative to men's. However, as soon as women's market hours start to fall, they also do so relative to men's. The wage rate gap closes until it diminishes completely at the point where the minimum wage is also binding for men (about 60% above women's initial wage rate). From this point on, women also loose in terms of earnings relative to men since their employment is falling in the level of the minimum wage while men's employment is still rising at levels moderately above their initial wage rate. Minimum wages initially lead to declining female shares in home hours reflecting the higher opportunity costs of female time.

4.2 Family policies

In this section, I analyze subsidies for home hours, in particular a programm in which the government replaces parts of the labor earnings foregone during home hours. The replacement rates are denoted s^h_F for women and s^h_M for men. At the same time, the government collects a lump-sum tax

[12] This also explains why women's relative wage rates rise by less than their absolute ones. Men withdraw from paid work to participate more in the household which raises male marginal productivity and wage rates.

Figure 3: Effects of home hours subsidies.



τ^h_t from households whose level is determined to equal the equilibrium level of home hours subsidy payments. With these policies in place, household j's period budget constraints read

$$\begin{aligned} c_{j,t+s} + b_{j,t+s+1} \leq & w_{F,j,t+s} \cdot n_{F,j,t+s} + w_{M,j,t+s} \cdot n_{M,j,t+s} + (1 + r_{t+s}) \cdot b_{j,t+s} \\ & + s^h_F \cdot w_{F,j,t+s} \cdot h_{F,j,t+s} + s^h_M \cdot w_{M,j,t+s} \cdot h_{M,j,t+s} - \tau^h_{t+s} \end{aligned} \tag{21}$$

With these constraints and the preferences and technology from Section 3.1, equalizing marginal benefits and marginal costs of home hours of the household member of gender g gives

$$\theta_g \cdot \frac{d_{j,t}}{h_{g,j,t}} \cdot \chi_{j,t} = (1 - s_g) \cdot w_{g,j,t} \cdot \lambda_{j,t} \tag{22}$$

such that the ratio of optimal home hours is

$$\frac{h_{F,j,t}}{h_{M,j,t}} = \frac{\theta_F}{\theta_M} \cdot \frac{1 - s_M}{1 - s_F} \cdot \frac{w_{M,j,t}}{w_{F,j,t}}. \tag{23}$$

Hence, home hours are split more equally across genders if males' home hours are more heavily subsidized than females'.

In light of the results of this paper, this stronger gender equity in roles within the household also impacts on inter-firm mobility and wage mark-downs and sets in motion the discussed cycle between wage gaps, earnings gaps, and market power. This motivates to study the general-equilibrium effects of this family policy in numerical evaluations. I focus on variations of the male home hours subsidy s^h_M since raising it can achieve more gender equity in home hours.

Figure 3 refers to different values of the male home hours subsidy s^h_M which I vary from zero to 50%. The left panel again shows female wage rates, market hours, earnings, and home hours relative to the baseline case without subsidies. The subsidy of men's home hours raises also women's home hours due to the complementarities in f^h. Women compensate this by reducing market hours which raises their marginal product, wage rates, and earnings.

Considering women's outcomes relative to men's in the right panel of Figure 3, one can see that subsidizing male home hours indeed promotes gender equity in this domain which is eventually reached by a subsidy of somewhat above 45%. Interestingly, this family policy does not have strong distributional impacts on the labor market, which is also a consequence of the complementarities in home production. Women's relative hours are virtually unchanged while their relative wage rates and relative earnings slightly fall which reflects scarcer male labor.

4.3 Policy interdependence

Since labor-market policies impact also into the household and family polices also have effects on the labor market, it is worthwhile to study their interactions. In particular, the analysis so far has shown that labor-supply elasticities, which are important determinants of labor-market policy effects, depend on the earnings gap which which in turn can be affected by policies. The theoretical results from Section 2 show that the elasticity of female labor supply to individual firms rises when women's market hours and labor incomes rise. Further, the results of Bredemeier (2015) suggest that also the elasticity of female labor supply to the market rises if policy promotes gender equity in home hours because women spend relatively less of their working time at home. This motivates the following two evaluations which analyze the effects of labor-market policies when family policies are used to achieve gender equity in home hours.

I start with a situation where I set the home hours subsidies s_F^h and s_M^h as well as the male payroll subsidy s_H in a way to achieve three goals: male wage rates and total home hours are the same as in the baseline situation without any policy intervention but spouses split home hours equally. This implies $s_M = -0.157$, $s_M^h = 0.2638$, and $s_F^h = -0.2762$. Starting from this situation, I again vary the two remaining policy instruments: the female payroll subsidy s_F and the minimum wage w_{min}, basically repeating the policy experiments from Section 4.1. But here, every time I change a policy parameter, I adjust the male home hours subsidy s_M^h in a way that ensures that gender equity in home hours prevails.

Figure 4 shows the results of these policy experiments. Here, the left panels show the female levels of wage rates, market hours, earnings, and home hours *relative to the scenario without active family policy*, i.e. relative to the results shown in Figure 2. The right panels are formatted in the same way as in Figures 2 and 3 Figure 4(a) refers to the female payroll subsidy s_F. The left panel shows that the reaction of female market hours is stronger but those of wage rates and earnings are weaker than in the case without active family policy reflecting the higher elasticity of women's labor supply to the market. Further, women's home hours fall more strongly in this scenario.

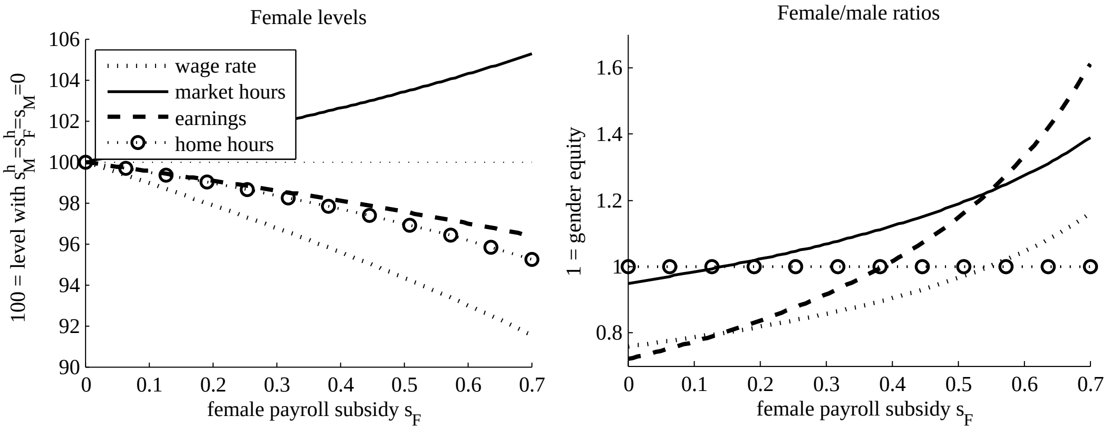
The effects of female payroll subsidies on women's relative labor-market outcomes (right panel) are strengthened by the use of family policies that ensure gender equity in home hours. To illustrate this point, consider for example $s_F = 0.5$ where the government effectively pays half the female payroll. Without active family policies, this raises women's wage rates by 16.1 percentage points relative to men's. With active family policies, by contrast, the same subsidy achieves a catching up of about 20.3 percentage points. Also the effect on relative market hours and, consequently, relative earnings in somewhat stronger if policy offset the incentives for household specialization.

Figure 4(b) shows the effects of minimum wages when the government subsidizes men's home hours. Considering the left panel, we see that initial positive effects of minimum wages on female market hours are strengthened by the use of the home hours subsidy, again reflecting the increased elasticity of female labor supply to the market. By contrast, the turning point where female employment starts to fall is now at lower relative levels of the minimum wage. While employment rises until the minimum wage is about 15% above the initial female wage rate if this policy is used alone, the use of equalizing family policies reduces this number to 13%. This reflects lower initial mark-downs as a result of a higher elasticity of female labor supply to individual firms. Naturally, wage rates are affected in the same way in both experiments such that differences in hours translate proportionally into differences in earnings. Further, female home hours fall more strongly in the scenario with subsidized male home hours.

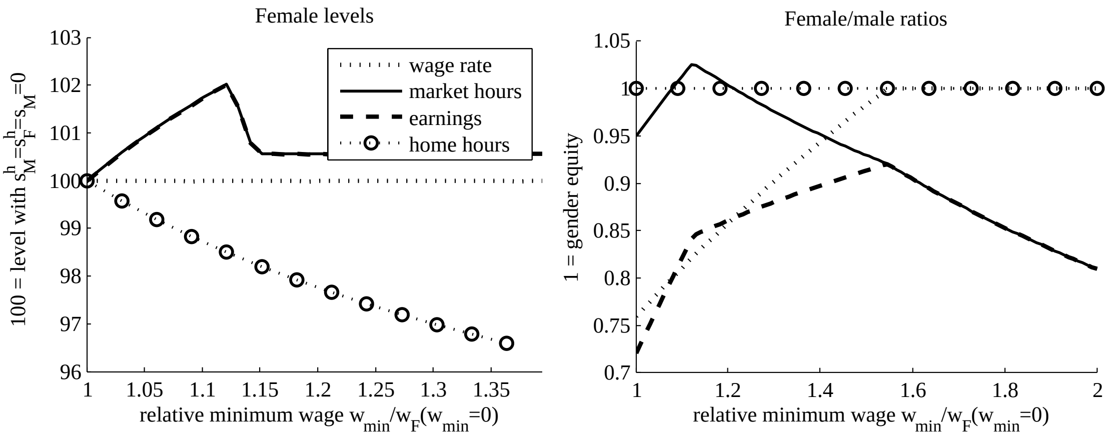
Concerning women's relative outcomes (right panel), minimum wages can achieve gender equity in hours if used in a policy mix. Further, a complete closure of the gender wage gap is achieved at lower relative levels of the minimum wage if this policy is combined with equalizing family policies because the minimum wage is binding sooner for men in terms of women's initial wage rates.

Figure 4: Effects of labor-market policies when family policies are used to achieve equal division of home hours.

(a) Payroll subsidies



(b) Minimum wages



5 Conclusion

Empirical estimates document that women's labor supply to individual firms is less elastic than men's. This gives employers more market power over women and can explain parts of the gender wage gap. I have shown that an important part of the gender differences in inter-firm mobility can be attributed to the gender earnings gap. This implies a mutually enforcing cycle between wage gaps, earnings gaps, and employers' market power. A part of the gender wage rate gap is then a consequence of women's absolute advantages in home production which cause an hours gap and an earnings gap through specialization. I have further documented important implications for the effects of labor-market and family policies as well as their interdependence.

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Appendix

A Baseline model from Section 2

A rational expectations equilibrium is a sequence of the endogenous variables that fulfills

$$MPL_{g,v,t+s} = w_{g,v,t+s} + n^d_{g,v,t+s} \cdot \frac{\partial w_{g,v,t+s}}{\partial n_{g,v,t+s}} \tag{24}$$

for all $g = F, M,\ v = 1, ..., V$,

$$\sum_{g=F,M} \left(\mu_{g,j,t+s} \frac{\partial u_g \left(c_{j,t+s}, d_{j,t+s}, n_{g,j,t+s}, h_{g,j,t+s}, v_{g,j,t}, j\right)}{\partial c_{j,t+s}} \right) = \lambda_{j,t+s}, \tag{25}$$

$$\sum_{g=F,M} \left(\mu_{g,j,t+s} \frac{\partial u_g \left(c_{j,t+s}, d_{j,t+s}, n_{g,j,t+s}, h_{g,j,t+s}, v_{g,j,t}, j\right)}{\partial d_{j,t+s}} \right) = \chi_{j,t+s}, \tag{26}$$

$$E_{t+s}\beta \cdot \lambda_{j,t+s+1} \cdot (1 + r_{t+s+1}) = \lambda_{j,t+s}, \text{ and} \tag{27}$$

$$w_{F,j,t+s} \cdot n_{F,j,t+s} + w_{M,j,t+s} \cdot n_{M,j,t+s} + (1 + r_{t+s}) \cdot b_{j,t+s} = c_{j,t+s} + b_{j,t+s+1} \tag{28}$$

for all $j \in (0, 1)$,

$$\mu_{g,j,t+s} \frac{\partial u_g \left(c_{j,t+s}, d_{j,t+s}, n_{g,j,t+s}, h_{g,j,t+s}, v_{g,j,t}, j\right)}{\partial n_{j,t+s}} = \lambda_{j,t+s} \cdot w_{g,j,t+s} \text{ and} \tag{29}$$

$$\mu_{g,j,t+s} \frac{\partial u_g \left(c_{j,t+s}, d_{j,t+s}, n_{g,j,t+s}, h_{g,j,t+s}, v_{g,j,t}, j\right)}{\partial h_{j,t+s}} = \chi_{j,t+s} \cdot \frac{\partial f^h \left(h_{F,j,t+s}, h_{M,j,t+s}\right)}{h_{g,j,t+s}}, \text{ and} \tag{30}$$

$$w_{g,j,t+s} = w_{g,v_{g,j,t+s},t+s} \tag{31}$$

for all $g = F, M,\ j \in (0, 1)$,

$$\begin{aligned} &\mathcal{L}\left(\left\{\left\{c_{j,t+s}, d_{j,t+s}, n_{g,j,t+s}, h_{g,j,t+s}, b_{j,t+s}, v_{g,j,t+s}\right\}_{s=0}^{\infty}, j\right\}_{g=F,M}\right)|_{w_{g,j,t+s}=w_{g,v_{g,j,t+s},t+s}} \\ &\geq \mathcal{L}\left(\left\{\left\{c_{j,t+s}, d_{j,t+s}, n_{g,j,t+s}, h_{g,j,t+s}, b_{j,t+s}, v\right\}_{s=0}^{\infty}\right\}_{g=F,M}, j\right)|_{w_{g,j,t+s}=w_{g,v,t+s}} \end{aligned} \tag{32}$$

for all $\forall g = F, M,\ j \in (0, 1)\,,\ v \in \left\{0, \frac{1}{V}, ..., 1\right\} \backslash v_{g,j,t+s}$,

$$g_{t+s} = V \cdot \tau^f_{t+s}, \tag{33}$$

$$\sum_{k=1}^{V} f\left(n_{F,k/V,t+s}, n_{M,k/V,t+s}\right) = \int_0^1 c_{j,t+s}\ \mathrm{d}j + g_{t+s}, \tag{34}$$

and

$$n^d_{g,v,t+s} = \int_{j^*_{g,v-1/V,v}}^{j^*_{g,v,+1}} n_{g,j,t+s}\ \mathrm{d}j\ \forall v \tag{35}$$

for every $s = 1, ..., \infty$ and exogenous paths of $\mu_{g,j,t+s}$, τ^f_{t+s}, and τ^h_{t+s}, $g = F, M$.

B Policy model from Section 4

Here, a rational expectations equilibrium is a sequence of the endogenous variables that fulfills (25), (26), (27), and (28) for all $j \in (0,1)$, (30) and (31) for all $g = F, M,\ j \in (0,1)$, (32) for all $\forall g = F, M,\ j \in (0,1),\ v \in \left\{0, \frac{1}{V}, ..., 1\right\} \backslash v_{g,j,t+s}$, (34), and (35) as well as

$$MPL_{g,v,t+s} = (1 - s_g) \cdot w_{F,v,t+s} + \xi_{F,v,t+s} \cdot \frac{\partial w_{F,v,t+s}}{\partial n_{F,v,t+s}}, \tag{36}$$

$$(1 - s_g) \cdot n_{g,v,t+s} = \zeta_{g,v,t+s} + \xi_{g,v,t+s} \tag{37}$$

$$\zeta_{g,v,t+s} \geq 0,\ w_{g,v,t+s} \geq w_{\min},\ \zeta_{g,v,t+s} \cdot (w_{g,v,t+s} - w_{\min}) = 0 \tag{38}$$

$$\xi_{g,v,t+s} \geq 0,\ w_{g,v,t+s} \geq \widetilde{w}\left(n_{g,v,t+s}, \bullet\right),\ \xi_{g,v,t+s} \cdot \left(w_{g,v,t+s} - \widetilde{w}\left(n_{g,v,t+s}, \bullet\right)\right) = 0 \tag{39}$$

for all $g = F, M,\ v = 0, 1/V, ..., 1,$

$$\mu_{g,j,t+s} \frac{\partial u_g\left(c_{j,t+s}, d_{j,t+s}, n_{g,j,t+s}, h_{g,j,t+s}, v_{g,j,t}, j\right)}{\partial h_{j,t+s}} = \chi_{j,t+s} \cdot \frac{\partial f^h\left(h_{F,j,t+s}, h_{M,j,t+s}\right)}{h_{g,j,t+s}} + s_g^h \cdot w_{g,j,t+s} \tag{40}$$

for all $g = F, M,\ j \in (0,1)$,

$$w_{F,j,t+s} \cdot n_{F,j,t+s} + w_{M,j,t+s} \cdot n_{M,j,t+s} + (1 + r_{t+s}) \cdot b_{j,t+s} - \tau_{t+s}^h = c_{j,t+s} + b_{j,t+s+1} \tag{41}$$

$$g_{t+s} + \sum_{g=F,M} \left(s_g \sum_{k=1}^{V} w_{g,v,t+s} n_{g,v,t+s} + s_g^h \int_0^1 s_g w_{g,g,t+s} h_{g,j,t+s}\ \mathrm{d}j \right) = V \cdot \tau_{t+s}^f + \tau_{t+s}^h \tag{42}$$

for every $s = 1, ..., \infty$ and exogenous paths of $\mu_{g,j,t+s}$, τ_{t+s}^f, and τ_{t+s}^h, as well as $w_{\min}$, s_g, and s_g^h, $g = F, M$.