

Labor Market Effects of Reducing the Gender Gap in Parental Leave Entitlements

E. Del Rey,¹ M. Racionero² and J. I. Silva³

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¹University of Girona

²Australian National University

³University of Girona

Introduction

- Substantial gender wage and unemployment gaps persist in most OECD countries.
- A large portion of the gender earnings and wage gaps have been attributed to the presence of children (e.g, Chung, Downs & Sandler (2017) for Denmark, Landais & Egholt (2018) for the US)
- Family policies emerge as potentially relevant tools to address these gaps: this paper focuses on parental leave regulations.
- The empirical literature on the effect of parental leave on labor market outcomes is inconclusive (Olivetti & Petrongolo, 2017).
- Despite public policy debate and empirical interest, there are few theoretical contributions on parental leave.

Related literature

- Erosa, Fuster & Restuccia (2010): first general equilibrium model of fertility and labor market decisions in a search and matching framework. Relatively complex with 3 - bargaining, redistribution and job creation - channels, resort to calibrations to evaluate the welfare effects of leave policies on fertility, leave take-up and employment.
- Del Rey, Racionero & Silva (2017): theoretical implications of parental leave provisions on unemployment and wages. Simpler model that focuses on the job creation channel and provides analytical results for one type of worker.

This paper

Explore the effect of parental leave entitlements for mothers and fathers on wage and unemployment gaps.

- 1 Introduce parental leave policies in a labor search and matching model and study the effect of gender-specific parental leave duration on unemployment and wages.
 - We consider two types of workers, males and females, who compete for same jobs and share same search frictions.
 - Use the model to identify the theoretical effects of increasing the duration of gender-specific parental leave.
- 2 Calibrate the economies of selected countries and simulate changes in the leave duration policies.

Preview of the results

1 Theoretically:

- An increase in leave duration has ambiguous effects on job creation (and, therefore, on unemployment) and wages.
- Explore analytically and graphically the mechanisms underlying the ambiguous effects.

2 Quantitatively:

- In all countries considered, an increase in the duration of either leave increases unemployment and reduces both wages.
- We explore the effect of reducing the gender gap in leave duration: female parental leave duration policy has a more significant impact on labor market outcomes.

A glimpse at the facts

Table: Labor market outcomes and parental leave entitlements

Labor market variables	France	Italy	Norway	Portugal
Gender wage gap (%)	10.4	8.8	9.0	15.6
Female unemployment rate (%)	8.8	10.9	3.2	8.7
Male unemployment rate (%)	8.0	7.0	3.7	7.0
Parental Leave Entitlements				
Paid maternity leave (months)	4	5.4	3.3	3.3
Paid paternity leave (months)	0.5	0.1	0	1
Paid parental and home care leave available to mothers (months)	6.5	6.5	19.5	6.1
Paid parental and home care leave reserved for fathers (months)	6.5	0.0	2.5	4.3
Total paid leave available for mothers (months)	10.5	11.9	22.8	9.4
Total paid leave reserved for fathers (months)	7.0	0.1	2.5	5.3
Male share of recipients of parental leave (%)	3.5	11.8	40.8	43.0
Average paid leave rate available to mothers (%)	44.7	52.7	50.0	66.1
Average of net replacement rates (12 months of unemployment) (%)	73.0	77.0	74.0	80.0
Average of net replacement rates (60 months of unemployment) (%)	59.0	30.0	69.0	49.0

Data source: OECD and Family OECD Database 2015

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The Mortensen-Pissarides Model

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- A measure 1 of risk-neutral, infinitely-lived workers and risk-neutral, infinitely-lived firms.
- Workers and firms discount future payoffs at a common rate r and capital markets are perfect.
- Time is continuous.
- Two types of workers: males (m) and females (f) competing for the same jobs.
- Workers can be either unemployed or employed. If employed, they can either be working or on parental leave.

The Mortensen-Pissarides Model

- Matching unemployed workers and job vacancies is costly; the matching function is $m(u, v)$ increasing in both of its arguments, concave, and homogenous of degree 1.
- Let $\theta = \frac{v}{u}$ represent market tightness, $u = u_m + u_f$
- $\Omega_i = u_i/u$, with $i = m, f$, and $\Omega_f + \Omega_m = 1$
- Unemployed workers find jobs at rate $p(\theta) = \frac{m(u, v)}{u}$, $p'(\theta) > 0$
- Vacancies are filled at rate $q(\theta) = \frac{m(u, v)}{v}$, $q'(\theta) < 0$
- $q(\theta)\Omega_i$ is the prob. that they are filled with type i workers

Firms

The value of a vacancy to the firm satisfies

$$rV = -c + q(\theta)\Omega_f(J_f - V) + q(\theta)\Omega_m(J_m - V).$$

where $\Omega_i = u_i/u$, with $i = m, f$. The value of a filled position

$$rJ_i = A_i - w_i - s_i(J_i - V) - \sigma_i(J_i - X_i).$$

The value that the firm attributes to the parental leave satisfies

$$rX_i = -\psi_i + \gamma_i(J_i - X_i).$$

Let δ_i represent the average duration of the parental leave, i.e. the inverse of γ_i .

An unemployed individual gets

$$rU_i = b_i + p(\theta)(W_i - U_i),$$

Employed workers get

$$rW_i = w_i - s_i(W_i - U_i) - \sigma_i(W_i - L_i),$$

Finally, a worker on parental leave gets

$$rL_i = z_i + \gamma_i(W_i - L_i)$$

To close the model...

- Two standard assumptions:

- free entry condition for vacancies

$$V = 0$$

- bilateral Nash bargaining over wages

$$w_i = \operatorname{argmax}\{(W_i - U_i)^{\beta_i} J_i^{1-\beta_i}\}$$

- Unemployment dynamics: given θ , u_i evolves according to

$$\dot{u}_i = s_i e_i - p(\theta) u_i,$$

Equilibrium

- Job creation by firms:

$$\Omega_m[\theta]J_m[w_m] + \Omega_f[\theta]J_f[w_f] = \frac{c}{q[\theta]}.$$

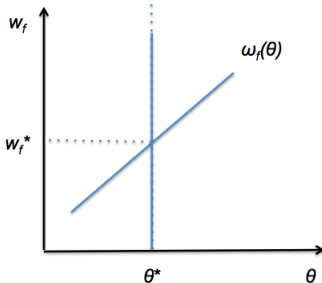
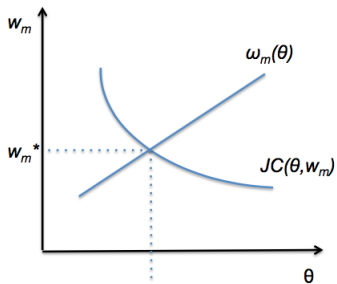
- Equilibrium wage, for $i = m, f$:

$$\begin{aligned} & w_i - (1 - \beta_i)b_i - \beta_i A_i - \beta_i p[\theta]J_i[w_i] \\ &= \frac{\sigma_i}{r + \gamma_i[\delta_i]} [\beta_i(p[\theta]J_i[w_i] - \psi_i) - (1 - \beta_i)(z_i - b_i)]. \end{aligned}$$

where $J_i[w_i]$ is the value of a filled position for the firm:

$$J_i[w_i] = \frac{(r + \gamma_i[\delta_i])(A_i - w_i) - \sigma_i \psi_i}{r(r + \sigma_i + s_i) + \gamma_i[\delta_i](s_i + r)}.$$

Equilibrium wages and market tightness



Theoretical effects of increasing the parental leave duration (males)

- Effect on the job creation curve

$$\left. \frac{dw_m}{d\delta_m} \right|_{JCC} = - \left(\frac{dJ_m}{d\delta_m} / \frac{dJ_m}{dw_m} \right) < 0.$$

- Effect on the male wage curve

$$\left. \frac{dw_m}{d\delta_m} \right|_{w_m} = \left(1 + \frac{\sigma_m}{r + \gamma_m} \right) \beta_m p[\theta] \frac{dJ_m}{d\delta_m} - \frac{\sigma_m}{(r + \gamma_m)^2} \frac{d\gamma_m}{d\delta_m} \times$$
$$[\beta_m (p[\theta] J_m - \psi_m) - (1 - \beta_m) (z_m - b_m)] \leq 0$$

- Direct negative effect on job value of the firm ∇w_m .
- Net benefit for the firm: if + then Δw_m .
- Net benefit for the worker: if + then ∇w_m .

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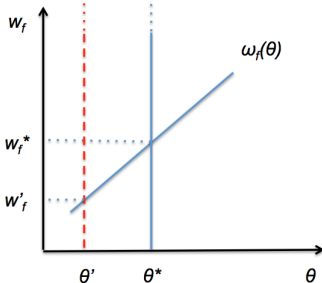
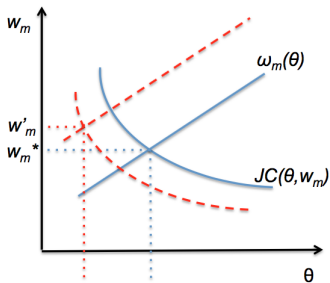
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Case 1: $\Delta w_m, \nabla w_f, \Delta u$



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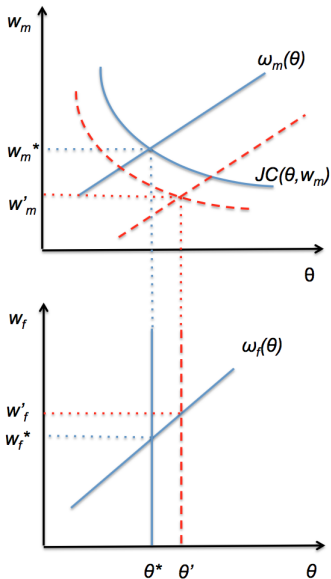
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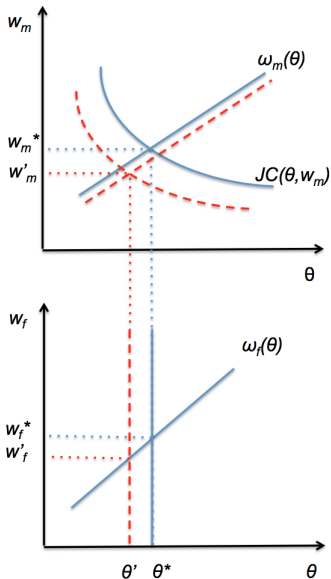
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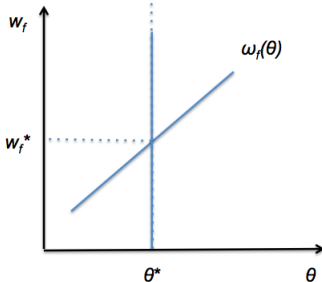
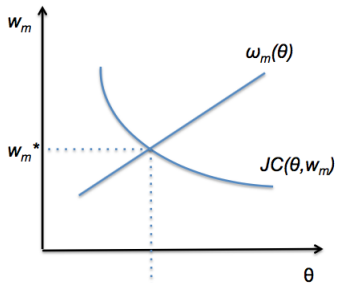
Case 2: $\nabla w_m, \Delta w_f, \nabla u$



Case 3: $\nabla w_m, \nabla w_f, \Delta u$



Case 4: $\sigma_m = 0$



Calibration (monthly frequency)

Block 1: Set parameters and variables					
Parameter/variable	France	Italy	Norway	Portugal	Source/Target
Interest rate, r	0.0022	0.0032	0.0025	0.0046	OECD database
Matching function elasticity, α	0.60	0.60	0.60	0.60	Barbara and Petrongolo (2001)
Workers bargaining power, β	0.60	0.60	0.60	0.60	Hosios (1990)
Female productivity, A_f	1.0	1.0	1.0	1.0	Normalization
Labor market tightness, θ	1.0	1.0	1.0	1.0	Normalization
Total labor force, N	1.0	1.0	1.0	1.0	Normalization
Job finding rate, $p(\theta)$	0.077	0.043	0.385	0.063	Elsby et al (2013)
Male labor force, N_m	0.539	0.611	0.535	0.544	OECD Database
Female unemployment rate, \hat{u}_f	0.088	0.109	0.032	0.087	OECD Database
Male unemployment rate, \hat{u}_m	0.080	0.070	0.037	0.070	OECD Database
Net replacement rate, $\frac{b_i}{w_i}$	0.45	0.55	0.44	0.46	OECD Benefits and Wage Statistics
On leave female payment rate, $\frac{z_f}{w_f}$	0.449	0.527	0.494	0.677	OECD family database
On leave male payment rate, $\frac{z_m}{w_m}$	0.201	1.00	0.979	0.563	OECD family database
On leave female duration (months), $\delta_f = \frac{1}{\gamma_f}$	10.5	11.9	22.8	7.5	OECD family database
On leave male duration (months), $\delta_m = \frac{1}{\gamma_m}$	7.0	0.1	2.5	5.8	OECD family database
On leave female take-up rate, σ_f	0.125	0.085	0.077	0.062	OECD Database and OECD family database
On leave male take-up rate, σ_m	0.005	0.011	0.053	0.047	OECD Database and OECD family database
Wage adjusted labour productivity ratio, $\frac{\Delta}{w}$	1.142	1.100	1.273	1.096	Eurostat (Structural business statistics)
Gender wage gap, $\frac{w_m}{w_f}$	1.104	1.088	1.090	1.156	OECD Database

- Targets.
- Key parameters.
- Policy variables.
- Normalization.
- Own assumptions.

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Female productivity, A_f	1.0	1.0	1.0	1.0	Normalization
Labor market tightness, θ	1.0	1.0	1.0	1.0	Normalization
Total labor force, N	1.0	1.0	1.0	1.0	Normalization
Job finding rate, $p(\theta)$	0.077	0.043	0.385	0.063	Elsby et al (2013)
Male labor force, N_m	0.539	0.611	0.535	0.544	OECD Database
Female unemployment rate, \hat{u}_f	0.088	0.109	0.032	0.087	OECD Database
Male unemployment rate, \hat{u}_m	0.080	0.070	0.037	0.070	OECD Database
Net replacement rate, $\frac{b_i}{w_i}$	0.45	0.55	0.44	0.46	OECD Benefits and Wage Statistics
On leave female payment rate, $\frac{z_f}{w_f}$	0.449	0.527	0.494	0.677	OECD family database
On leave male payment rate, $\frac{z_m}{w_m}$	0.201	1.00	0.979	0.563	OECD family database
On leave female duration (months), $\delta_f = \frac{1}{\gamma_f}$	10.5	11.9	22.8	7.5	OECD family database
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On leave female take-up rate, σ_f	0.125	0.085	0.077	0.062	OECD Database and OECD family database
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Wage adjusted labour productivity ratio, $\frac{\Delta}{w}$	1.142	1.100	1.273	1.096	Eurostat (Structural business statistics)
Gender wage gap, $\frac{w_m}{w_f}$	1.104	1.088	1.090	1.156	OECD Database

- **Targets.**
- Key parameters.
- Policy variables.
- Normalization.
- Own assumptions.

Calibration (monthly frequency)

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Calibration (monthly frequency)

Block 2: Calibrated parameters and variables					
Parameter/variable	France	Italy	Norway	Portugal	Solves
Matching function scale, κ	0.077	0.043	0.385	0.063	$p(\theta) = \kappa\theta^{(1-\alpha)}$
Female labor force, N_f	0.461	0.389	0.465	0.456	$N_f = N - N_m$
Female unemployment, u_f	0.041	0.042	0.015	0.040	$u_f = \hat{u}_f N_f$
Male unemployment, u_m	0.043	0.043	0.020	0.038	$u_m = \hat{u}_m N_m$
Female job separation rate, s_f	0.0074	0.0053	0.0127	0.0060	\hat{u}_f
Male job separation rate, s_m	0.0067	0.0032	0.0148	0.0047	\hat{u}_m
Share of unemployed female, Ω_f	0.485	0.498	0.429	0.510	$\Omega_f = 1 - \Omega_m$
Share of unemployed male, Ω_m	0.515	0.502	0.571	0.490	$\Omega_m = \frac{u_m}{(u_m + u_f)}$
Job filling rate, $q(\theta)$	0.077	0.043	0.385	0.063	$p(\theta) = \theta q(\theta)$
Male productivity, A_m	0.913	0.943	0.742	1.119	JC, wages, $\frac{w_m}{w_f}$ and $\frac{\Delta}{w}$
Female wage, w_f	0.794	0.834	0.652	0.896	JC, wages, $\frac{w_m}{w_f}$ and $\frac{\Delta}{w}$
Male wage, w_m	0.876	0.907	0.710	1.036	JC, wages, $\frac{w_m}{w_f}$ and $\frac{\Delta}{w}$
Vacancy cost, c	0.199	0.172	0.190	0.252	JC, wages, $\frac{w_m}{w_f}$ and $\frac{\Delta}{w}$
Productivity loss during worker's leave, $\psi * A_i$	0.146 * A_i	0.141 * A_i	0.207 * A_i	0.128 * A_i	JC, wages, $\frac{w_m}{w_f}$ and $\frac{\Delta}{w}$

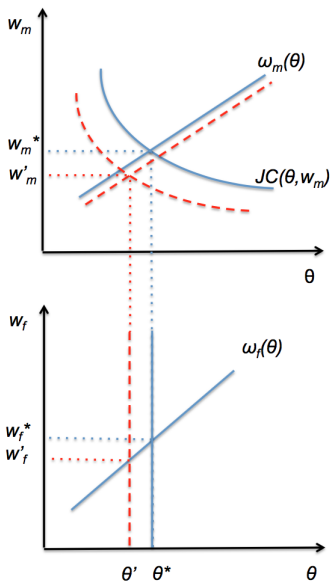
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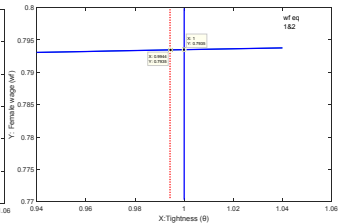
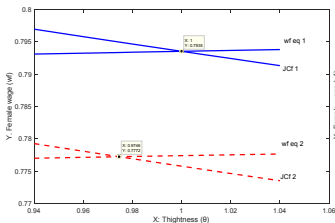
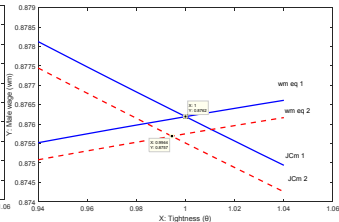
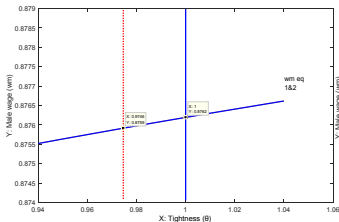
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Simulated results for all countries: ∇w_m , ∇w_f , Δu (Case 3)



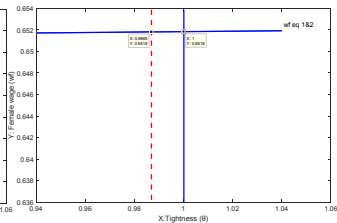
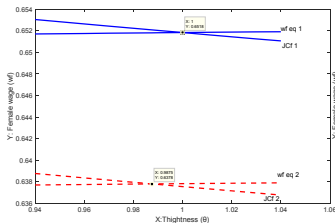
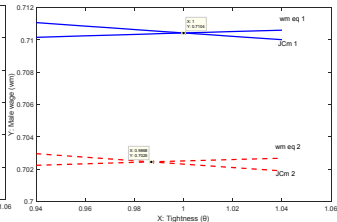
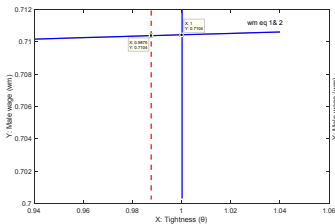
Increasing paid leave duration by one month: France



Δ duration maternity leave

Δ duration paternity leave

Increasing paid leave duration by one month: Norway



Δ duration maternity leave

Δ duration paternity leave

Gender gap effects of reducing the paid leave duration gap

Table: Gender wage and unemployment gap effects of reducing gender leave gap

Block 1: $\downarrow \delta_f$						
	δ_f (months)		$\hat{u}_f - \hat{u}_m$ (% points)		$(\frac{w_m}{w_f} - 1) \times 100\%$	
Country	benchmark	$\downarrow \delta_f$	benchmark	$\downarrow \delta_f$	benchmark	$\downarrow \delta_f$
France	10.5	9.5	0.80	0.80	10.4%	8.2%
Italy	11.9	10.9	3.90	3.88	8.8%	7.5%
Norway	22.7	21.7	-0.50	-0.50	9.0%	6.7%
Portugal	7.5	6.5	1.70	1.59	15.6%	14.7%
Block 2: $\uparrow \delta_m$						
	δ_m (months)		$\hat{u}_f - \hat{u}_m$ (% points)		$(\frac{w_m}{w_f} - 1) \times 100\%$	
Country	benchmark	$\uparrow \delta_m$	benchmark	$\uparrow \delta_m$	benchmark	$\uparrow \delta_m$
France	7.0	8.0	0.80	0.80	10.4%	10.4%
Italy	0.1	1.1	3.90	3.90	8.8%	8.6%
Norway	2.5	3.5	-0.50	-0.50	9.0%	7.8%
Portugal	5.6	6.6	1.70	1.71	15.6%	15.0%
Block 3: $\uparrow \delta_m = \delta_f$						
	δ_m (months)		$\hat{u}_f - \hat{u}_m$ (% points)		$(\frac{w_m}{w_f} - 1) \times 100\%$	
Country	benchmark	$\uparrow \delta_m$	benchmark	$\uparrow \delta_m$	benchmark	$\uparrow \delta_m$
France	7.0	10.5	0.80	0.81	10.4%	10.2%
Italy	0.1	11.9	3.90	3.91	8.8%	6.6%
Norway	2.5	22.7	-0.50	-0.53	9.0%	-14.7%
Portugal	5.6	7.5	1.70	1.71	15.6%	14.4%

Conclusions

- We have explored the effect of parental leave duration for mothers and fathers on gender wage and unemployment gaps.
- We extended the labor search and matching model in Del Rey, Racionero and Silva (2017) to include two types of workers, males and females, who compete for the same jobs.
- Theoretically: an increase in type-specific parental leave duration has ambiguous effects on unemployment and wages that are driven by the effect on the implicit bargaining power of the targetted worker.

Conclusions

- We calibrated the economies of selected countries (France, Italy, Portugal and Norway) and simulated policy changes:
 - In all countries considered an increase in the duration of either leave increases unemployment and reduces both wages.
 - Female parental leave duration policy has a more significant impact on labor market outcomes (due to higher female leave take-up rate).
- Extensions: make take-up decision endogenous, relax equal job finding rate assumption.