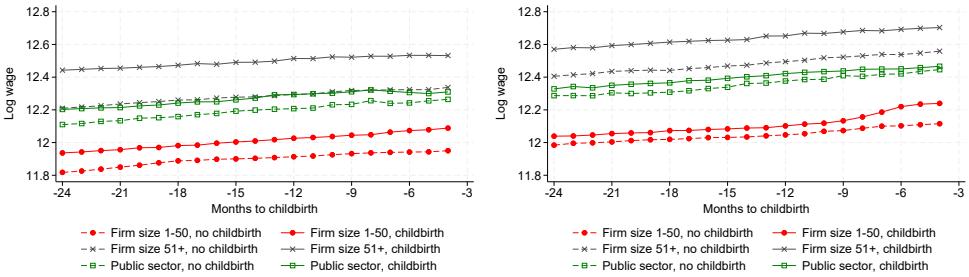
Supplemental Appendix

Tax Evasion and the Contribution-Benefit Link: The Case of Parental Benefits in Hungary and Latvia

Anikó Bíró, Péter Elek, Vitalijs Jascisens, Dániel Prinz, László Sándor and Anna Zasova

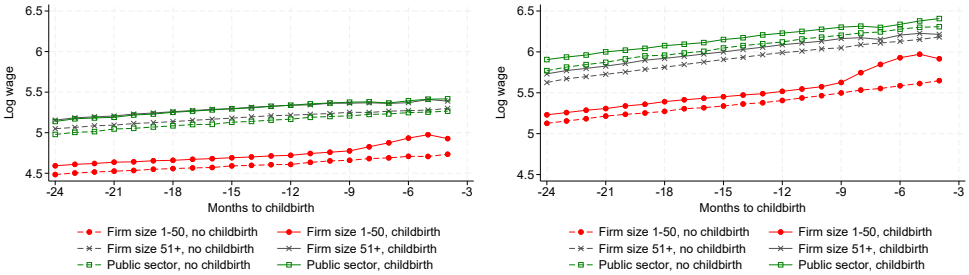
Hungary



Panel A. January 2013 to December 2014

Panel B. October 2015 to December 2017

Latvia



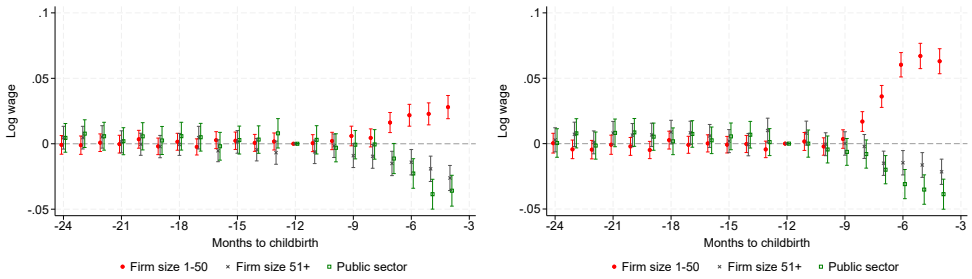
Panel C. January 1999 to December 2004

Panel D. May 2005 to December 2008

Appendix Figure A1. Reported Earnings Before Childbirth

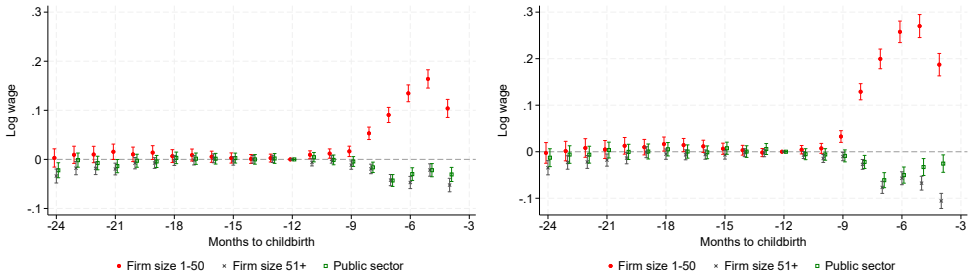
Notes: Figure shows time patterns of reported earnings before giving birth. In all panels, red circles indicate smaller firms with 1 to 50 employees and gray crosses indicate larger firms with more than 50 employees, green squares indicate public sector. Dashed lines indicate the control group of women who did not give birth and solid lines indicate mothers. Number of individuals in panel A: no childbirth group – 5 558 for firm size 1-50, 8 260 for firm size 51+, 4 425 for public sector; childbirth group – 2 634 for firm size 1-50, 3 300 for firm size 51+, 2 203 for public sector. Number of individuals in panel B: no childbirth group – 5 041 for firm size 1-50, 7 392 for firm size 51+, 4 422 for public sector; childbirth group – 3 150 for firm size 1-50, 3 546 for firm size 51+, 2 626 for public sector. Number of individuals in panel C: no childbirth group – 3 317 for firm size 1-50, 5 130 for firm size 51+, 3 579 for public sector; childbirth group – 5 152 for firm size 1-50, 7 634 for firm size 51+, 5 257 for public sector. Number of individuals in panel D: no childbirth group – 2 987 for firm size 1-50, 4 325 for firm size 51+, 2 343 for public sector; childbirth group – 4 494 for firm size 1-50, 7 176 for firm size 51+, 3 976 for public sector.

Hungary



Panel A. January 2013 to December 2014 Panel B. October 2015 to December 2017

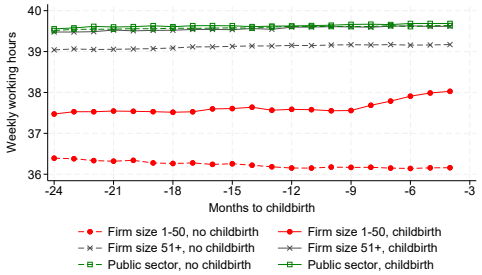
Latvia



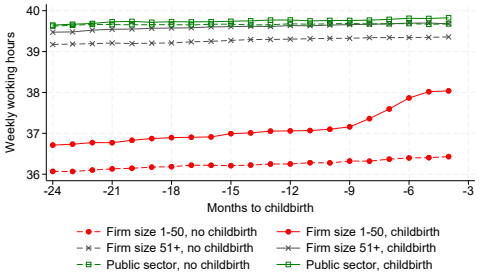
Panel C. January 1999 to December 2004 Panel D. May 2005 to December 2008

Appendix Figure A2. Reported Earnings Before Childbirth—Estimation Allowing for Treatment Effect Heterogeneity

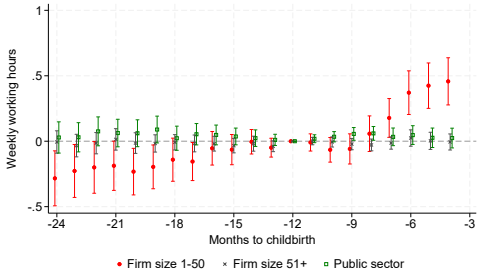
Notes: Figure shows time patterns of reported earnings before giving birth, using the estimator of Sun and Abraham (2021), implemented with Stata package Sun (2021). Panel A shows estimates for births between January 2013 and December 2014 in Hungary. Panel B shows estimates for births between October 2015 and December 2017 in Hungary. Panel C shows estimates for births between January 1999 and December 2004 in Latvia. Panel D shows estimates for births between May 2005 and December 2008 in Latvia. Each panel shows estimated β parameters and 95% confidence intervals from equation (1). Number of individuals in panel A: 8,192 for firm size 1-50, 11,560 for firm size 51+, and 6,628 for the public sector. Number of individuals in panel B: 8,191 for firm size 1-50, 10,938 for firm size 51+, and 7,048 for the public sector. Number of individuals in panel C: 8,469 for firm size 1-50, 12,764 for firm size 51+, and 8,836 for the public sector. Number of individuals in panel D: 7,481 for firm size 1-50, 11,501 for firm size 51+, and 6,319 for the public sector.



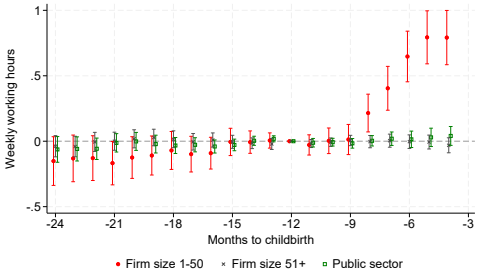
Panel A. Descriptive, January 2013 to December 2014



Panel B. Descriptive, October 2015 to December 2017



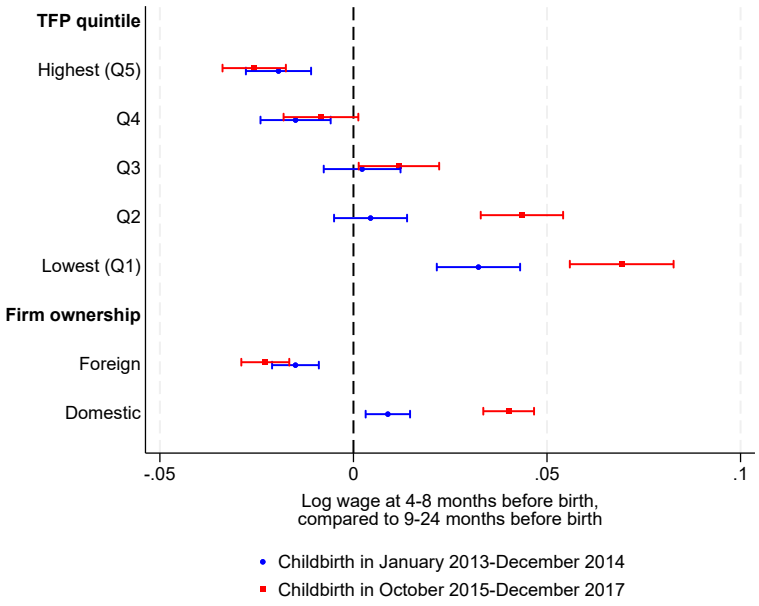
Panel C. Regression Estimates, January 2013 to December 2014



Panel D. Regression Estimates, October 2015 to December 2017

Appendix Figure A3. Reported Working Hours Before Childbirth, Hungary

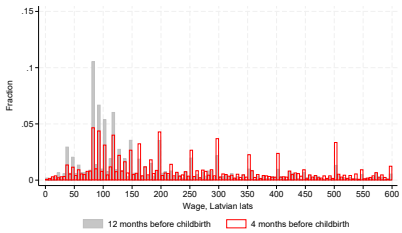
Notes: Figure shows time patterns of weekly working hours before giving birth. In all panels, red circles indicate smaller firms with 1 to 50 employees and gray crosses indicate larger firms with more than 50 employees, green squares indicate public sector. Dashed lines indicate the control group of women who did not give birth and solid lines indicate mothers. Panels C and D show estimated β parameters and 95% confidence intervals from equation (1). Number of individuals in panels A and C: no childbirth group – 5 558 for firm size 1-50, 8 260 for firm size 51+, 4 425 for public sector; childbirth group – 2 634 for firm size 1-50, 3 300 for firm size 51+, 2 203 for public sector. Number of individuals in panel B and D: no childbirth group – 5 041 for firm size 1-50, 7 392 for firm size 51+, 4 422 for public sector; childbirth group – 3 150 for firm size 1-50, 3 546 for firm size 51+, 2 626 for public sector.



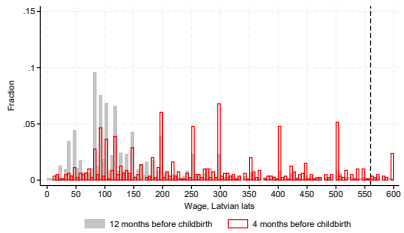
Appendix Figure A4. Reported Earnings Before Childbirth—Heterogeneity, Additional Results for Hungary

Notes: Figure shows heterogeneity in the change in reported earnings before giving birth by firm characteristics for Hungary. Blue circles denote the period before reporting incentives were strengthened (childbirths between January 2013 and December 2014) and red squares denote the period after reporting incentives were strengthened (childbirths between October 2015 and December 2017). Each result shows estimated β parameters and 95% confidence intervals from a modified version of equation (1), in which we replace the event time dummies with a binary indicator that equals on 8 to 4 months before birth, and zero 24 to 9 months before birth. We calculate the value added-based TFP. When doing so, we apply the estimation procedure of Wooldridge (2009) and use the `prodest` Stata package by Rovigatti and Mollisi (2020). Foreign ownership indicates at least 50% foreign ownership of the firm's capital. The heterogeneity indicators refer to twelve months before giving birth

Firm Size 1-50

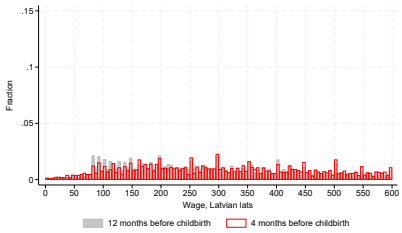


Panel A. Full Sample

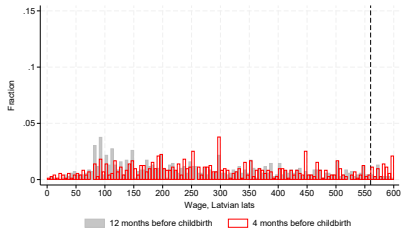


Panel B. Women Receiving Large Wage Increase

Firm Size 51+

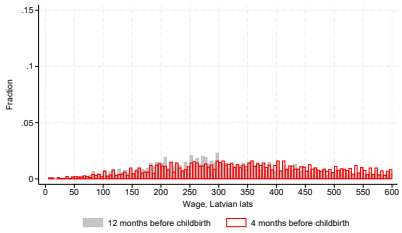


Panel C. Full Sample

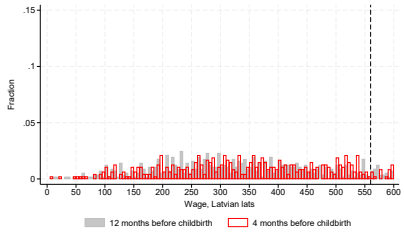


Panel D. Women Receiving Large Wage Increase

Public Sector



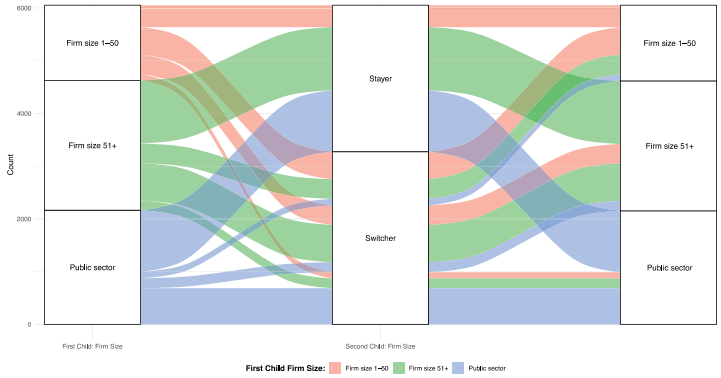
Panel E. Full Sample



Panel F. Women Receiving Large Wage Increase

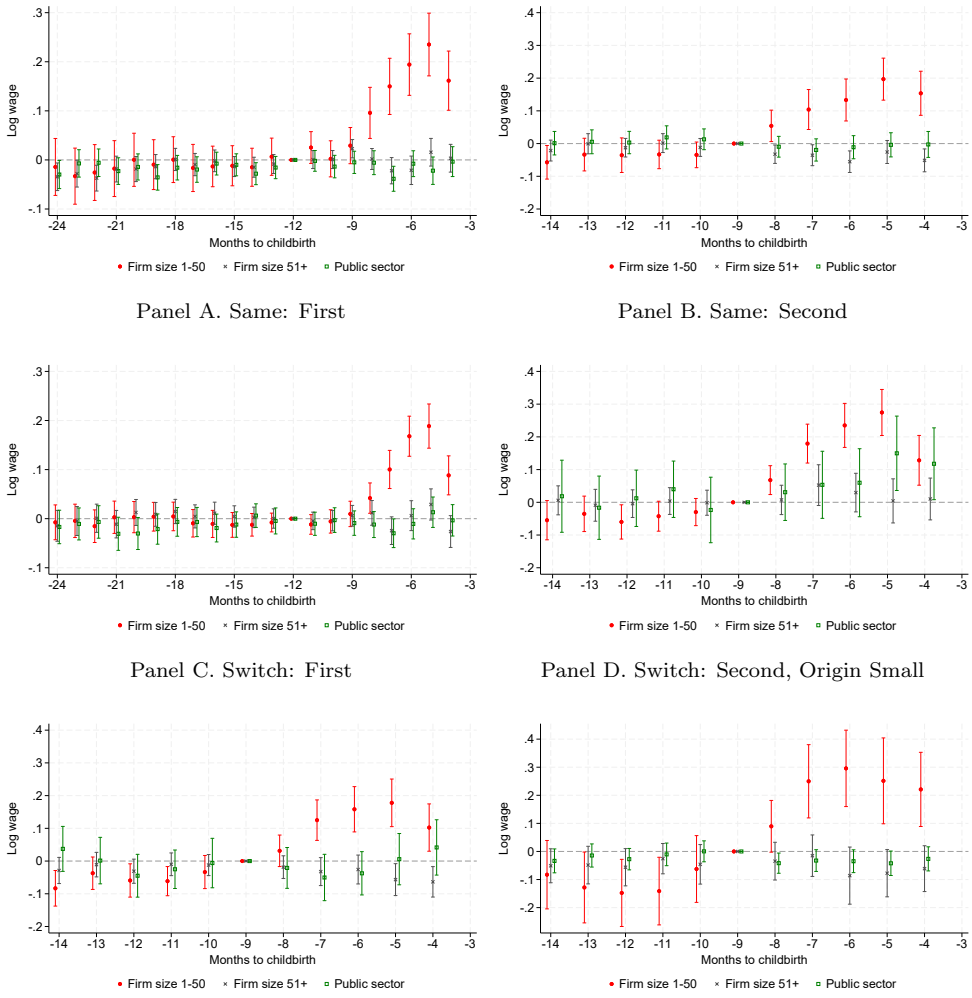
Appendix Figure A5. Distribution of Reported Earnings Before Childbirth, Latvia (in Latvian lats)

Notes: Figure shows the distribution of reported earnings 12 and 4 months before childbirth for births occurring after May 2005 in Latvia. Panels A and B display the distribution for small private firms (1–50 employees); panels C and D for large private firms (more than 50 employees); and panels E and F for the public sector. Panels A, C, and E present the distribution for the baseline sample; panels B, D, and F focus on women who experienced a large wage increase and are restricted to births occurring in 2005–2007, the period during which the parental benefit cap was in effect. This indicator equals one if the earnings change falls within the top 1% of the year-specific distribution of monthly earnings changes. The year-specific distributions were calculated using the full sample of women, excluding transitory earnings changes. Transitory earnings changes were defined as cases in which a large increase was preceded by another large increase or a decrease in the previous month, or followed by a decrease in the subsequent month. Wages are reported in Latvian lats (the currency in use during the sample period) to highlight spikes at round-number values. The fixed exchange rate was 0.7028 lats per 1 euro. The vertical dashed line in panels B, D, and F indicates the wage level required to reach the parental benefit cap between 2005 and 2007. The cap was 558 euros, which required monthly earnings of approximately 800 euros (562 lats). The maximum value on the x-axis, 600 lats, corresponds to 7.5 minimum wages in 2005, 6.7 minimum wages in 2006 and 5 minimum wages in 2007. Sample sizes: panel A 4,088; panel B 1,015; panel C 6,105; panel D 850; panel E 3,394; panel F 682.



Appendix Figure A6. Labor Market Transitions Between First and Second Pregnancies, Latvia

Notes: Figure shows labor market transitions between the first and second pregnancies for Latvian women who gave birth twice between January 1999 and December 2010, with at least 34 months between the two births. The sample is restricted to women who were employed 14 to 4 months before childbirth. The flows indicate transitions across employer types—small firms (1–50 employees), large firms (51+ employees), and the public sector—between the first and second births. Stayers are women who remained with the same employer, while switchers are women who changed employer.



Panel A. Same: First

Panel B. Same: Second

Panel C. Switch: First

Panel D. Switch: Second, Origin Small

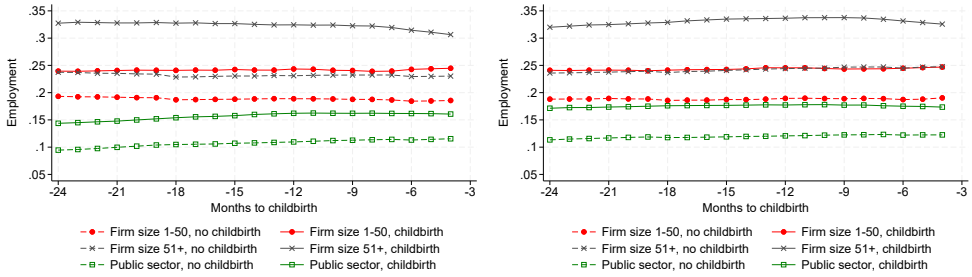
Panel E. Switch: Second, Origin Large

Panel F. Switch: Second, Origin Public

Appendix Figure A7. Reported Earnings Before Childbirth: First and Second Pregnancies, Latvia

Notes: Figure shows event–study estimates of log monthly reported earnings before childbirth for Latvian women who gave birth twice between January 1999 and December 2010, with at least 34 months between the two births. The sample is restricted to women who were continuously employed 14 to 4 months before childbirth. Panel A shows women who remained with the same employer during their first pregnancy; panel B shows the same group during their second pregnancy. Panel C displays the first pregnancy of women who switched employer between births, while panels D–F show their second pregnancy by employer type at the first birth - small firms, large firms, and the public sector, respectively. Each panel shows estimated $\hat{\beta}$ parameters and 95% confidence intervals from equation (1). Standard errors are clustered at the individual level. Number of individuals in panel A: 6,720 (firm size 1–50), 10,651 (firm size 51+), 7,087 (public sector); number of individuals in panel B: 1,552 (firm size 1–50), 2,757 (firm size 51+), 2,019 (public sector); number of individuals in panel C: 7,314 (firm size 1–50), 10,720 (firm size 51+), 6,922 (public sector); number of individuals in panel D: 1,657 (firm size 1–50), 1,931 (firm size 51+), 973 (public sector); number of individuals in panel E: 1,509 (firm size 1–50), 2,269 (firm size 51+), 1,038 (public sector); number of individuals in panel F: 1,261 (firm size 1–50), 1,750 (firm size 51+), 1,540 (public sector).

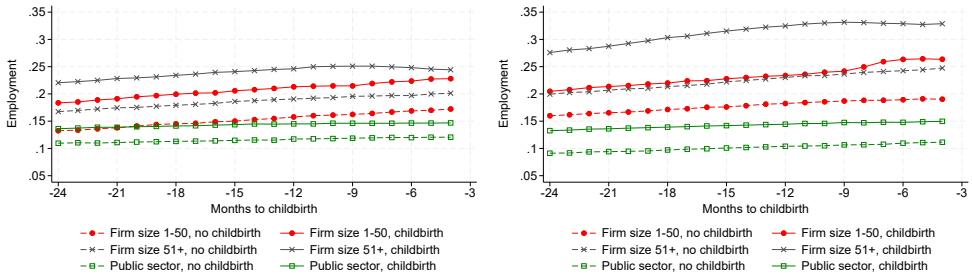
Hungary



Panel A. January 2013 to December 2014

Panel B. October 2015 to December 2017

Latvia



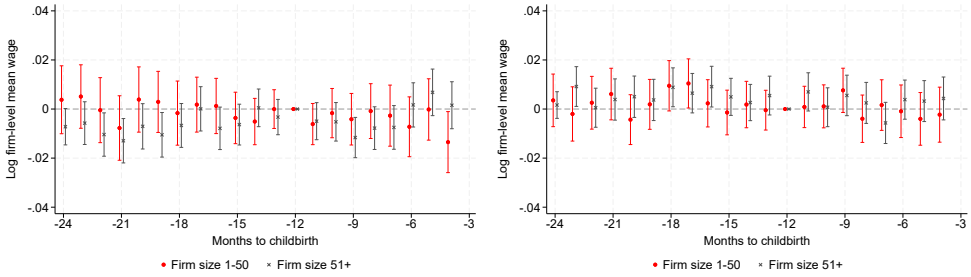
Panel C. January 1999 to December 2004

Panel D. May 2005 to December 2008

Appendix Figure A8. Employment Before Childbirth

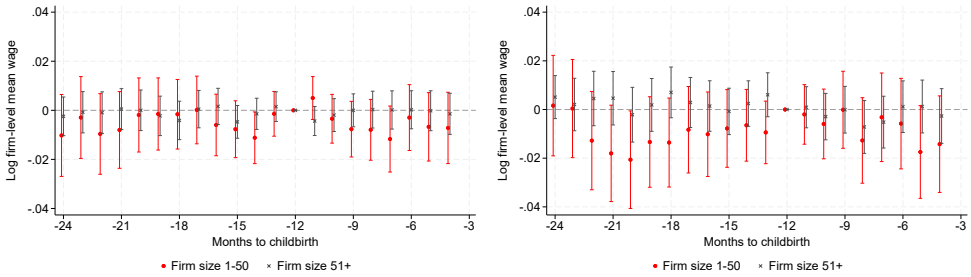
Notes: Figure shows time patterns of employment before giving birth. In all panels, red circles indicate smaller firms with 1 to 50 employees and gray crosses indicate larger firms with more than 50 employees, green squares indicate public sector. Dashed lines indicate the control group of women who did not give birth and solid lines indicate mothers. Number of individuals in panel A: no childbirth group – 65 252; childbirth group – 32 180. Number of individuals in panel B: no childbirth group – 56 307; childbirth group – 35 321. Number of individuals in panel C: no childbirth group – 45 275; childbirth group – 48 970. Number of individuals in panel D: no childbirth group – 32 216; childbirth group – 33 785.

Hungary



Panel A. January 2013 to December 2014 Panel B. October 2015 to December 2017

Latvia

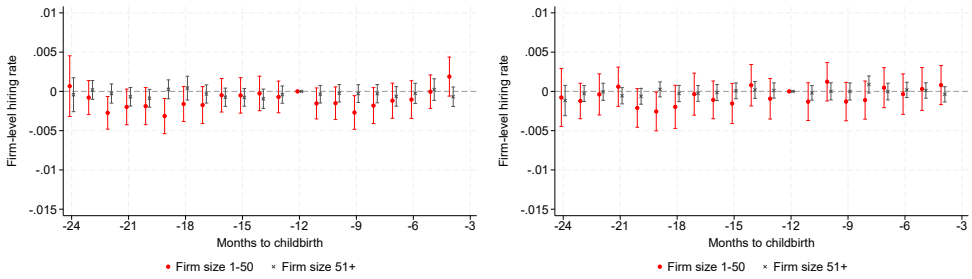


Panel C. January 1999 to December 2004 Panel D. May 2005 to December 2008

Appendix Figure A9. Firm-Level Mean Wage Before Childbirth

Notes: Figure shows time patterns of leave-out mean of firm-level wage before giving birth. Panel A shows estimates for births between January 2013 and December 2014 in Hungary. Panel B shows estimates for births between October 2015 and December 2017 in Hungary. Panel C shows estimates for births between January 1999 and December 2004 in Latvia. Panel D shows estimates for births between May 2005 and December 2008 in Latvia. Each panel shows estimated β parameters and 95% confidence intervals from equation (1). Sample is restricted to women who did not switch firms between event time -24 to -4. Number of individuals in panel A: 6 328 for firm size 1-50 and 10 623 for firm size 51+; panel B: 6 474 for firm size 1-50 and 10 070 for firm size 51+; panel C: 5 284 for firm size 1-50 and 9 318 for firm size 51+; panel D: 4 072 for firm size 1-50 and 7 223 for firm size 51+.

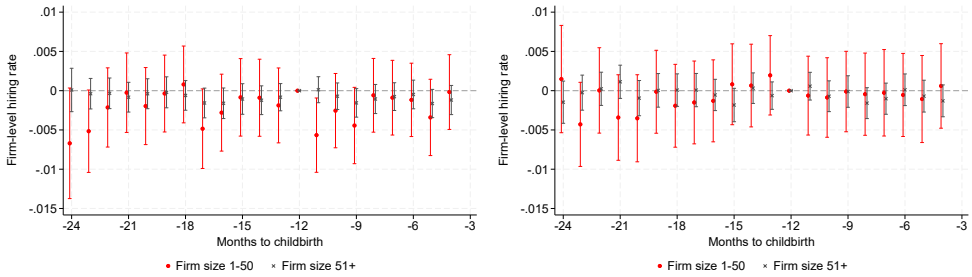
Hungary



Panel A. January 2013 to December 2014

Panel B. October 2015 to December 2017

Latvia



Panel C. January 1999 to December 2004

Panel D. May 2005 to December 2008

Appendix Figure A10. Firm-Level Hiring Rate Before Childbirth

Notes: Figure shows monthly firm-level hiring rates. Panel A shows estimates for births between January 2013 and December 2014 in Hungary. Panel B shows estimates for births between October 2015 and December 2017 in Hungary. Panel C shows estimates for births between January 1999 and December 2004 in Latvia. Panel D shows estimates for births between May 2005 and December 2008 in Latvia. Each panel shows estimated β parameters and 95% confidence intervals from equation (1). Sample is restricted to women who did not switch firms between event time -24 to -4. Number of individuals in panel A: 7 216 for firm size 1-50 and 10 623 for firm size 51+; panel B: 7 267 for firm size 1-50 and 10 070 for firm size 51+; panel C: 5 319 for firm size 1-50 and 9 318 for firm size 51+; panel D: 4 090 for firm size 1-50 and 7 223 for firm size 51+.

Appendix Table A1—Benefit Response by Month of Birth in Hungary in the Pre-Reform Period

Birth month	Overlapping months Maternity leave	Overlapping months Parental and home care leave
January	6	6
February	6	6
March	6	6
April	5.5	5.5
May	4.5	4.5
June	3.5	3.5
July	2.5	2.5
August	1.5	1.5
September	0.5	0.5
October	0	11.08
November	0	9.6
December	0	8.47
Average	3	5.43
Increase in monthly benefit items		
Gross	0.175	0.317
Gross (weighted) average	0.281	
Net	0.147	0.234
Net (weighted) average	0.213	

Notes: Table shows by birth month the number of months in the benefit qualification period (the previous calendar year) that overlapped with the first six months of term pregnancies in Hungary before the policy change (top panel) and the implied average increase in benefits (bottom panel). The reference period for calculating both maternity leave and parental and home care leave benefits was the calendar year preceding the start of benefit receipt. Special regulations applied when the mother had not worked at least 180 days during that year. Paid maternity leave starts up to four weeks before birth. For example, a woman giving birth on April 1 had a reference period of January–December of the previous year, which completely overlapped with the first six months of her pregnancy. A woman giving birth on October 1 had no overlap between pregnancy and the reference year. Assuming births are uniformly distributed across the year and accounting for partial months, the average overlap between the reference period and the first six pregnancy months was about three months. Paid parental and home care leave starts 24 weeks after starting maternity leave. For women giving birth in the first half of a year, the reference period was again the previous year, resulting in a gradually decreasing overlap with early pregnancy months. For births in the second half of a year, the reference period is the same year and we assume that the woman worked during pregnancy months 1–6, then took sick leave or exited employment during months 7–9. Hence, a woman who gave birth on October 1 was assumed to be in employment in the first half of the year, meaning that in principle earnings could be fully adjusted before parental and home care leave calculation. Slightly less relative adjustment was possible for births later in the fourth quarter. For instance, for an average birth in December, we assume an adjustment of 6 months over 8.5 months of employment, i.e., $6/8.5 \times 12 = 8.47$ annualized months. Special regulations applied for births in the third quarter because, then, the woman did not work at least 180 days in the reference year according to our assumptions. These calculations are illustrative and intended to demonstrate the logic of reference-period overlap before the policy change. The bottom panel shows the corresponding average increase in monthly benefit items, e.g., $3/12 \times 0.7 = 0.175$ for paid maternity leave. We take into account that paid maternity leave is received for 6 months (25% of the overall duration) and paid parental and home care leave for 18 months (75% of the duration), hence the average monthly gross increase is $0.175 \times 0.25 + 0.317 \times 0.75 = 0.281$. Paid maternity leave is subject to the 16% PIT and is exempt from SSC, while parental and home care leave is subject to a 26% effective tax rate (16% PIT and a reduced 10% SSC rate).

Appendix Table A2—Government Costs Associated With the Wage Response

Panel A. Hungary

	January 2013 to December 2014	October 2015 to December 2017
Monthly average wage unit	1.00	1.00
Net government loss per childbirth	0.02	0.45
Total gross benefit amount per childbirth	14.0	14.0
Ratio of net government loss and total benefit	0.2%	3.2%

Panel B. Latvia

	January 1999 to December 2004	May 2005 to December 2008
Monthly average wage unit	1.00	1.00
Net government loss per childbirth	0.07	0.75
Total gross benefit amount per childbirth	4.1	11.1
Ratio of net government loss and total benefit	1.6%	6.7%

Notes: Table shows a rough estimation of the government costs of the wage response measured in the unit of the monthly average wage. Net government loss per childbirth is given by multiplying the "government" row of row E of Table 1 with the wage response of row B of Table 3. The total gross benefit amount per childbirth is calculated using the benefit payment regulations, in Hungary also taking into account the benefit cap (for details see Figure 1). The ratio is calculated by the division of the two terms.

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