

# Paid parental leave and families' living arrangements

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# Introduction

- Child's living arrangement = family structure experiences (e.g. 2 vs 1 parent, married vs cohabiting couple)
- Recent trends: shift from the traditional to alternative living arrangements
- Literature shows substantial impact on child outcomes (health, behavior, education, labor market, marriage, etc.)  
"These differences are generally quite large and dwarf the effects of income and maternal employment. " (Blau & Van der Klaauw, 2013)
- How do **public policies** affect children's living arrangements?

# Outline

- 1 Literature
- 2 Institutions & Hypotheses
- 3 Empirical Strategy
- 4 Data
- 5 Results
- 6 Conclusions
- 7 APPENDIX

## Related empirical research

### Effects of public policy on living arrangements:

- effects of U.S. welfare programs (EITC, TANF) on behavior of single mothers, with inconclusive findings 1996 (waivers) reduced cohabitation and increased marriage probability
- little on effects for children (e.g., prob. to live with single mother)
- nothing on other public transfers (e.g., parental leave benefits)
- little outside the U.S.

### Effects of the German paid parental leave reform

- Geisler and Kreyenfeld (2012) study fathers' propensity to take parental leave - significant increase driven by highly educated men
- Kluge and Tamm (2013) study fathers' share in total childcare in the first year - no significant reform effect
- Kluge and Schmitz (2014) study labour market outcomes, and effect on marriage rates - significant drop explained by tax disadvantages
- Bergemann and Riphahn (2014) study labour market responses of mothers
- Cygan-Rehm (2016) studies fertility effects - some delay, but full catch-up.

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# Contribution

This paper

- studies an universal reform, which affected *all* children
- examine various hypotheses and mechanisms
- provides non-U.S. evidence
- uses a causal strategy: RD + DID
- investigates differences by child sex (underexplored!)

# Legal framework

## Institutions to protect mother and child

1. **paid maternity leave:** prohibits employment for 14 weeks around birth, pays full prior net earnings
2. **parental leave period:** employment protection for up to 3 years after a birth
3. **parental leave benefits:** changed on January 1, 2007 from a means-tested subsidy to an earnings replacement

# Parental leave benefit

→ Before January 1, 2007: *Erziehungsgeld*

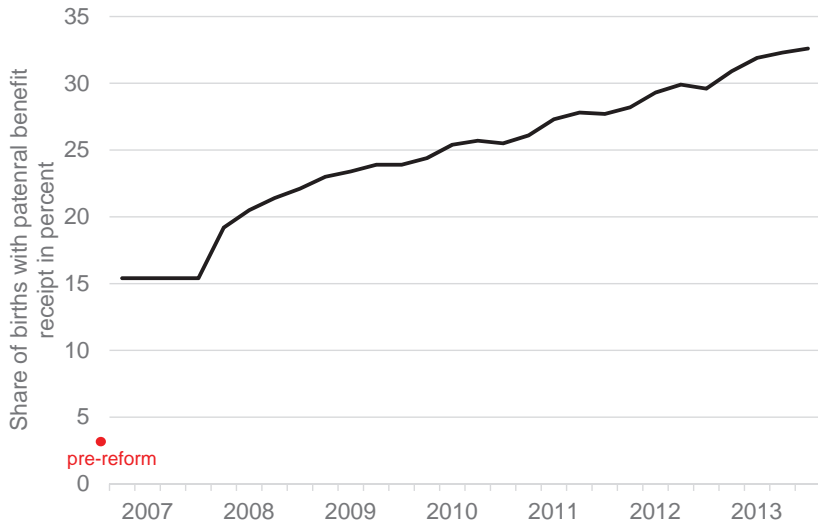
- a means-tested system → "help the needy"
- means-testing applied to total family income during leave-taking
- two options:
  - (1) at most 300 EUR/month for up to 24 months (ca. 65% of parents)
  - (2) at most 450 EUR/month for up to 12 months (ca. 10% of parents)
- not subject to income tax

→ After January 1, 2007: *Elterngeld*

- replaces 67% of pre-birth earnings → "incentivize the rich"
- ranges from 300 to 1,800 EUR/month, 300 EUR if no pre-birth earnings
- paid for 12 months to one parent, + 2 to other partner (or mix)
- "daddy months" to incentivize paternal leave taking
- not subject to income tax but raises tax burden, ("Progressionsvorbehalt")  
progressivity effect



# Post-reform paternal take-up

[details](#)

# Hypotheses: reform effects on living arrangement choices

## Reform generated

- **winners** with new eligibility: generous benefits for 12 + 2 months  
(max gain:  $12 * 1,800 = 25,200$  EUR)
- **losers** with shortened transfer: 300 EUR monthly for second year  
(max loss:  $12 * 300 = 3,600$  EUR)

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**H2a:** For the "winners": *economic independence effect*: more income → more independence → ↑ more single mothers.

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taxrate

pathways

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# Identification strategy

## Combine

- regression discontinuity (Jan-March 2007 vs Oct-Dec 2006) &
- difference-in-differences (2006/7 vs non-reform cohorts)

$$y_i = \alpha \text{treat}_i + \beta \text{after}_i + \gamma (\text{treat}_i \cdot \text{after}_i) + \text{cohort}'_i \theta + x_i' \gamma + \epsilon_i$$

- $y_i$ : child's living arrangement:
  - (0/1) lives with married parents (72 %)
  - (0/1) lives with cohabiting parents (16 %)
  - (0/1) lives with a single mother (12 %)
- $\text{treat}_i$ : treatment indicator (=1 if born in reform winter 2006/7, =0 otherwise)
- $\text{after}$ : indicator for 1st quarter (=1 if born Jan-March, =0 if Oct-Dec)
- $\text{cohort}$ : cohort fixed effects (ref. 2004/5, 2005/6, 2007/8, 2008/9)
- $x_i$ : controls (child's age in months and its square, gender, multiple birth, state of residence, maternal age and its square, education, employment, migration status)



# Identification assumption

## A child's birth date is independent of the reform

### Major validity threats:

- anticipation at the time of conception
  - reform largely unanticipated (e.g., Kluve and Tamm 2012),  
time line: start of public discussion in May 2006, passed in September 2006
  - difficult to perfectly plan conception
  - plausible: births in March 2007 still uninfluenced
- manipulation of delivery date
  - shifts of births with due date in the last December week  
(Neugart and Ohlsson 2012, Tamm, 2012)
  - sensitivity test: exclude of children born December/January

# Data

- German **Micro Census**: 1% sample of households, survey years 2005-2012
  - + large samples, information on month of birth and household structure
  - little retrospective information
- Sample: first-born children, cohorts 2004/5-2008/9, born in Germany, reside in West Germany (ca. 1,000 obs. per cohort - 2 quarters) sample
- Living arrangement at age 0 and 1 (during benefit receipt) , and at ages 2-3.
- Proxy for "winners" / "losers": mother worked prior to birth descriptives

## Reform effects on child living arrangement at ages 0-1

	(1) married couple	(2) cohabiting couple	(3) single mother
A: all children (N=9,889) treat*after	-0.018 (0.021)	0.038 ** (0.018)	-0.021 (0.016)
B: children of non-working mothers (N=2,231, 23 %) treat*after	-0.038 (0.043)	0.032 (0.034)	0.006 (0.038)
C: children of working mothers (N=7,306, 74 %) treat*after	-0.012 (0.025)	0.043 **	← -0.031 *
Child characteristics	yes	yes	yes
Maternal characteristics at birth	yes	yes	yes

→ Increased probability of living with cohabiting parents (by 4 pp vs 16% at baseline)

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**H1: Economic dependence effect:** decrease in propensity to live with single mother among "losers"?

→ No effect on single motherhood; shift away from marriage towards cohabitation.

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**H2a: Economic independence:** increase in single motherhood, particularly among the "winners"?

**H2b: Father involvement effect:** decline in single motherhood, particularly among the "winners"?

→ Evidence consistent with H2b, not H2a.

- Note: pattern also consistent with alternative interpretations.

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### H3: Gender differences in involvement effects?

→ Reestimate with gender interactions

## Reform effects on child living arrangement at ages 0-1 by gender

	(1) married couple	(2) cohabiting couple	(3) single mother
A: all children (N=9,889)			
treat*after	0.002 (0.030)	0.046 * (0.025)	-0.048 ** (0.023)
treat*after*boy	-0.039 (0.042)	-0.016 (0.036)	0.054 * (0.032)
B: children of non-working mothers (N=2,231)			
treat*after	-0.039 (0.060)	0.033 (0.045)	0.006 (0.054)
treat*after*boy	0.002 (0.086)	-0.002 (0.069)	0.001 (0.076)
C: children of working mothers (N=7,306)			
treat*after	0.017 (0.036)	0.048 ← (0.030)	-0.065 ** (0.025)
treat*after*boy	-0.058 (0.050)	-0.010 (0.043)	0.068 ** (0.034)

After the reform, girls are more likely to live with the fathers.

**Interpretation:** Preferential treatment for girls or re-balancing?

## Gender difference in child living arrangements at ages 0-1

	(1) married couple	(2) cohabiting couple	(3) single mother
A: Before reform (2005-2006 N = 12,366)			
boy	0.020 ** (0.008)	-0.004 (0.006)	-0.016 *** (0.006)
B: After reform (2007-2009 N=20,966)			
boy	0.008 (0.006)	-0.007 (0.005)	-0.002 (0.005)
Child characteristics	yes	yes	yes

→ Pre-reform disadvantage for girls disappears after reform.

### H3: Gender differences in involvement effects?

→ Confirmed; response for daughters only, reform balances prior disadvantages



## Heterogeneity in the effect on marriage by pre-reform income level

	married couple
Panel A: all children (N=8,001)	
treat*after	-0.050 (0.033)
treat*after*(above median household income)	0.017 (0.042)
Panel B: children of non-working mothers (N=1,663)	
treat*after	-0.059 (0.053)
treat*after*(above median household income)	0.029 (0.086)
Panel C: children of working mothers (N=6,092)	
treat*after	-0.040 (0.043)
treat*after*(above median household income)	0.001 (0.052)
Child's characteristics	yes
Maternal characteristics at childbirth	yes

**H4: Tax disadvantage of marriage:** decrease in marriage rates, larger for household incomes below the median?

No evidence of significant differences between the income groups, but increase

# Robustness

- Change specification: drop control variables
- Change control cohorts: drop 2004/5, 2008/9 births
- Manipulations of deliveries: drop January-December births
- Placebo reforms in years 2005/6 and 2007/8

details

# Conclusions

## German reform of parental leave benefit system

- abolished a means-tested system & introduced an earnings replacement
- created "losers" & "winners"

## Main findings

- affects children's living arrangements at age 0 and 1
- increased probability of living with cohabiting parents by 4 pp (vs 16% at baseline), reduced single motherhood among the "winners"

**H1:** shift from marriage towards cohabitation for "losers" (economic dependence hypothesis)

**H2:** patterns match increased paternal involvement in early child rearing, not economic independence hypothesis.

**H3:** increased paternal involvement for daughters only; balances prior disadvantage of daughters

**H4:** negative tax effect, but imprecisely estimated

- Decline in single motherhood persist beyond the benefit take-up (at age 2-3)

→ Living arrangement effects as unintended side effect

→ Beneficial, if single motherhood is harmful

Thank you for your attention!

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## Exploring potential pathways

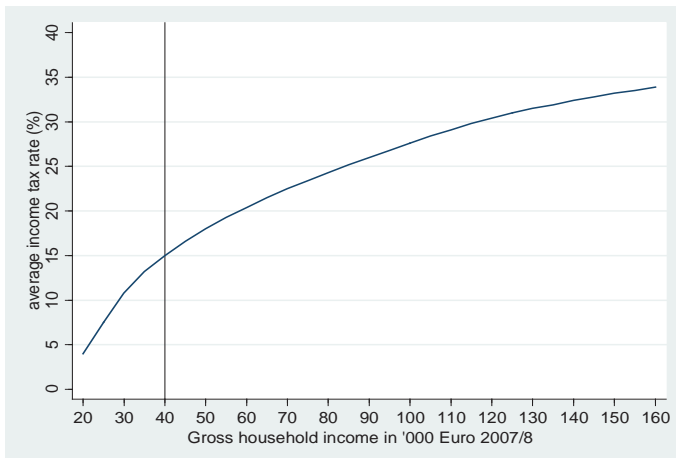
- As income ↑
  - Economic independence of women ↑; single motherhood ↑
  - “Divorce threat point” ↑ well-being outside marriage ↑; single motherhood ↑
  - Relative financial attractiveness of woman ↑; single motherhood ↓
  - Household budget constraints ↓, welfare ↑ and stress (financial) ↓; single motherhood ↓
  - Bargaining power of woman (as determined by  $\frac{Y_w}{Y_w+Y_m}$ ) ↑; effect on single motherhood ambiguous
- As bargaining power ↑
  - woman can negotiate more favourable outcomes; effect ambiguous
    - woman may demand higher paternal involvement
    - could affect time spent with children/household activities
  - well being in outside option (divorce) increases; single motherhood ↑
  - women may invest more in children, particularly girls
    - marriage-specific investments ↑, consumption value of children ↑
- As employment ↓ for winners in 1st year
  - more leisure time of mother, less work stress for mothers; single motherhood ↓
  - more child care by mother, more likely to breastfeed; single motherhood ↓
  - more father involvement due to daddy months, family bonding ↑; single motherhood ↓
  - consumption complementarities in leisure and child care activities if PL taken together
    - amount of marriage-specific investments ↑; relative value of marriage ↑
- Fertility effects
  - depend on incentives implied by reformed parental leave benefits
  - here: Cygan-Rehm (2016) shows no short-run effects on higher-order fertility

hypotheses

# Progressive tax function

hypotheses

## Average income tax rate, by household income



**Note:** The bar at 40,000 Euro indicates the median gross household income in our sample of married couples. The median gross annual household income is approximated based on information on monthly net household incomes from the Micro Census.

## Progressivity effect of the new benefit

### Average tax rates and progressivity effect

Household income p.a. (in 1,000 Euro)	Average tax rate (in percent)	Income tax payable p.a. (in Euro)	Change in average tax rate when income plus 5,000 Euro p.a. (in percentage points)
20	4	800	3.5
25	7.5	1,875	3.3
30	10.8	3,240	2.4
35	13.2	4,620	1.8
40	15.0	6,000	1.6
45	16.6	7,470	1.4
50	18.0	9,000	1.3
55	19.3	10,615	1.1
60	20.4	12,240	1.1
65	21.5	13,975	1.0
70	22.5	15,750	0.9
75	23.4	17,550	0.9
80	24.3	19,440	0.9
85	25.2	21,420	0.8
90	26.0	23,400	0.8
95	26.8	25,460	0.8

→ Progressivity effect is particularly large at household incomes below the median

# Descriptive Statistics

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## Child's characteristics

birth cohort 2008/09	0.190	0.392
birth cohort 2007/08	0.211	0.408
birth cohort 2006/07 (treated)	0.193	0.395
birth cohort 2005/06	0.198	0.399
birth cohort 2004/05	0.208	0.406
born in 1st quarter of year	0.486	0.500
male	0.497	0.500
multiple birth	0.036	0.187
age in months	13.720	6.850
state of residence: Schleswig-Holstein	0.047	0.211
state of residence: Hamburg	0.031	0.174
state of residence: Niedersachsen	0.117	0.322
state of residence: Bremen	0.008	0.087
state of residence: Nordrhein-Westfalen	0.257	0.437
state of residence: Hessen	0.099	0.299
state of residence: Rheinland-Pfalz	0.060	0.238
state of residence: Baden-Württemberg	0.170	0.375
state of residence: Bayern	0.200	0.400
state of residence: Saarland	0.012	0.109



# Descriptive Statistics [back](#)

<b>Maternal characteristics</b>		
age at childbirth	28.753	5.523
school degree: no	0.030	0.170
school degree: Hauptschulabschluss	0.221	0.415
school degree: Realschulabschluss	0.354	0.478
school degree: Fachhochschulreife	0.082	0.275
school degree: Abitur	0.300	0.458
school degree: other	0.004	0.064
school degree: missing	0.008	0.090
occupational degree: no	0.205	0.404
occupational degree: Lehre	0.511	0.500
occupational degree: Berufsfachschule, Schule Gesundheitswesen, Fachschule, Meister, Beamtenausb.	0.090	0.287
occupational degree: tertiary degree	0.179	0.383
occupational degree: other	0.010	0.100
occupational degree: missing	0.004	0.066
pre-birth employment: non-working	0.226	0.418
pre-birth employment: working	0.739	0.439
pre-birth employment: missing	0.036	0.185
born in Germany	0.782	0.413

# Sensitivity tests

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	(1) married	(2) cohabit	(3) single m.
<b>A: baseline - all (N=9,889)</b>	<b>-0.018</b>	<b>0.038 **</b>	<b>-0.021</b>
A1: no controls (N=9,889)	-0.013	0.036 **	-0.023
A2: exclude cohort 04/05 (N=7,833)	0.001	0.026	-0.027
A3: exclude cohort 04/05, 08/09 (N=5,958)	-0.002	0.034	-0.032 *
A4: w/o Jan & Dec (N=6,358)	-0.003	0.030	-0.027
A5: placebo reform 2007/08 (N=7,982)	-0.031	0.021	0.010
A6: placebo reform 2005/06 (N=7,982)	-0.013	-0.012	0.025

## Sensitivity tests - by group

	(1) married couple	(2) cohabiting couple	(3) single mother
Panel A: all children			
A1: baseline (N=9,889)	-0.018 (0.021)	0.038 (0.018) **	-0.021 (0.016)
A2: no controls (N=9,889)	-0.013 (0.023)	0.036 (0.018) **	-0.023 (0.017)
A3: excl. birth cohort 04/05 (N=7,833)	0.001 (0.022)	0.026 (0.019)	-0.027 (0.016)
A4: excl. birth cohorts 04/05, 08/09 (N=5,958)	-0.002 (0.023)	0.034 (0.019) *	-0.032 (0.017) *
A5: excl. January & December (N=6,358)	-0.003 (0.027)	0.030 (0.022)	-0.027 (0.020)
A6: placebo reform 2007/8 (N=7,982)	-0.031 (0.022)	0.021 (0.019)	0.010 (0.015)
A7: placebo reform 2005/6 (N=7,982)	-0.013 (0.021)	-0.012 (0.017)	0.025 (0.016)
Panel B: children of non-working mothers			
B1: baseline (N=2,231)	-0.038 (0.043)	0.032 (0.034)	0.006 (0.038)
B2: no controls (N=2,231)	-0.031 (0.049)	0.024 (0.036)	0.007 (0.040)
B3: excl. cohort 04/05 (N=1,737)	-0.015 (0.045)	0.016 (0.036)	-0.001 (0.04)
B4: excl. cohort 04/05, 08/09 (N=1,349)	-0.031 (0.048)	0.041 (0.038)	-0.010 (0.043)
B5: excl. January & December (N=1,434)	0.063 (0.053)	-0.043 (0.041)	-0.020 (0.049)
B6: placebo reform 2007/8 (N=1,758)	-0.063 (0.049)	0.053 (0.041)	0.009 (0.042)
B7: placebo reform 2005/6 (N=1,758)	0.043 (0.045)	-0.073 (0.035) **	0.030 (0.040)
Panel C: children of working mothers (N=7,306)			
C1: baseline (N=7,306)	-0.012 (0.025)	0.043 (0.021) **	-0.031 (0.017) *
C2: no controls (N=7,306)	-0.005 (0.026)	0.041 (0.022) *	-0.036 (0.018)
C3: excl. cohort 04/05 (N=5,821)	0.009 (0.026)	0.030 (0.022)	-0.039 (0.018) **
C4: excl. cohort 04/05, 08/09 (N=4,404)	0.006 (0.027)	0.035 (0.023)	-0.041 (0.019) **
C5: excl. January & December (N=4,696)	-0.023 (0.031)	0.054 (0.026) **	-0.031 (0.022)
C6: placebo reform 2007/8 (N=5,928)	-0.029 (0.025)	0.018 (0.022)	0.011 (0.016)
C7: placebo reform 2005/6 (N=5,928)	-0.025 (0.024)	-0.003 (0.020)	0.022 (0.017)

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# Sample construction

## Number of observations by survey year and birth cohort

Birth cohort	Micro Census survey year							
	2005	2006	2007	2008	2009	2010	2011	2012
2004/5	965	1,091	1,077	1,088	0	0	0	0
2005/6	0	956	1,006	1,006	1,010	0	0	0
2006/7=treat	0	0	906	1,001	980	1,011	0	0
2007/8	0	0	0	1,004	1,085	1,034	1,009	0
2008/9	0	0	0	0	907	968	1,010	975

Note: colors refer to year of a child's life (age) at the time of the survey

1st	2nd	3rd	4th
(age 0)	(age 1)	(age 2)	(age 3)

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## Post-reform utilization patterns

- share of fathers using paid parental leave:  
2006: 3.5%  
2007: 16%  
2013: 32.3%
- average duration of fathers' transfer receipt:  
2007: 4.2 months  
2013: 3.1 months
- share of fathers receiving benefits for less than 2 months:  
2007: 65.3%  
2013: 79.7%
- share of mothers receiving benefits for 10-12 months:  
2007: 86.6%  
2013: 92.8%
- timing of fathers' utilization in 2007 (if shorter than mother):  
23% start in month 1 (33% start in quarter 1)  
30% start in month 12

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## Effect at age 2-3 [back](#)

### Estimation results: effects on children's living arrangements (at ages 2-3)

	(1) married couple	(2) cohabiting couple	(3) single mother
Panel A: all children (N=10,200)			
treat*after	0.025 (0.021)	0.019 (0.015)	-0.044 *** (0.017)
Panel B: children of non-working mothers (N=3,413)			
treat*after	-0.006 (0.037)	0.027 (0.028)	-0.021 (0.032)
Panel C: children of working mothers (N=5,904)			
treat*after	0.027 (0.026)	0.017 (0.020)	-0.044 ** (0.020)
Child's characteristics	yes	yes	yes
Maternal characteristics at childbirth	yes	yes	yes

**Notes:** Each cell represents a separate linear regression. All regressions include a constant. Child characteristics comprise indicators for a child's birth cohort, quarter of birth, gender, multiple birth, and state of residence, as well as age in months (linear and squared). Maternal characteristics at childbirth include mother's age in years (linear and squared), indicators for education, employment, and migration status. Robust standard errors in parentheses. \*, \*\*, and \*\*\* indicate statistical significance at the 10, 5, and 1 percent level.

**Source:** Micro Census survey years 2007-2012, own calculations. Samples restricted to first-born children who were born in Germany and reside in West Germany.