

Hypogamy and the Child Penalty

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Austrian Labor Economics Workshop, November 2023



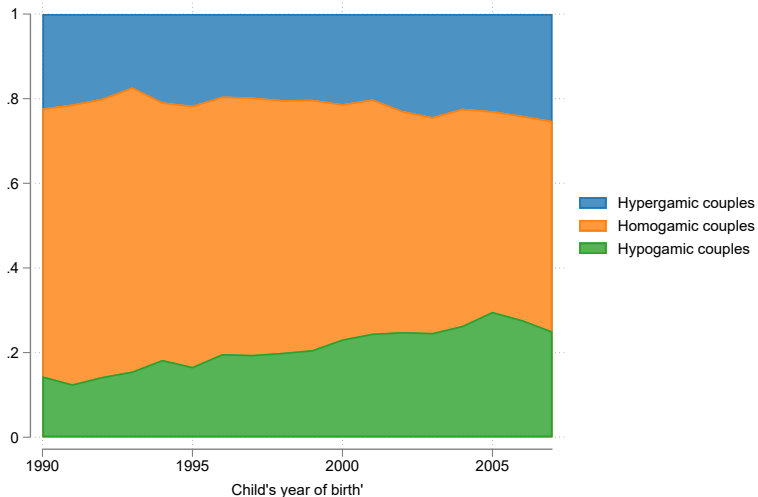
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Basic Question

- Gender inequality explained by costs of childbearing
- Large literature in economics and sociology
- Mainly cross-country differences
- We show that costs might be different in traditional vs. non-traditional couples

Evolution of hypogamy in Austria from 1990 to 2007



Education

What we actually do?

- We use register data for Austria - all births 1990-2007.
- Follow Kleven et al (2019) strategy for child penalty
- Extend analysis by using a couple framework by Musick et al (2020)
- Framework calculates changes in relative earnings of mother wrt father
- We try to understand selection by looking at prebirth earnings of mothers and fathers in different types of couples

Our research is related to

- Child penalty literature – Angelov et al (2016), Kleven et al (2019), Boenke et al (2019)
 - ▶ In old literature subgroup analysis is descriptive, suffers from confounders
- Literature on educational pairings –Klesment and Van Bavel (2017), Almas et al (2023), Qian (2017)
 - ▶ With register data we can distinguish between different kinds of hypogamy
- Literature on power in couples –
 - ▶ We relate the differences in educational attainment to the change of (economic) power after childbirth

Data and definition of variables

- Austrian Social Security Data (ASSD) matched with Birth Registers - all births 1990-2007, only Austrian, married or un-married
- Education: compulsory, apprenticeship degree, high-school, college
- Hypogamy: Mother's edu larger than Father's edu
- Hypergamy: Father's edu larger than Mother's edu
- Homogamy: Father's and Mother's edu same
- Educational pairing: Homo 55.7 %, Hyper 21.7 %, Hypo 20.7 %
- Yearly earnings censored at contribution ceiling

The child penalty following Kleven et al, 2019

Y_{ist}^g is yearly income of individual i of gender g in year s at event time t , regressions estimated separately for women and men:

$$Y_{ist}^g = \sum_{j \neq -2} \alpha_j^g * \mathbf{I}[j = t] + \sum_k \beta_k^g * \mathbf{I}[k = age_{is}] + \sum_y \gamma_y^g \mathbf{I}[y = s] + \nu_{ist}^g \quad (1)$$

- include full set of event time dummies (first term on RHS), age dummies (second term) and year dummies (third term).
- omit event dummy at $t = -2$, implying that event time coefficients measure impact of children relative to two years before first birth.
- age dummies control non-parametrically for underlying life-cycle trends, year dummies control non-parametrically for time trends such as wage inflation and business cycles.

Penalty

The child penalty following Musick et al, 2020

S_{cst} measures the woman's share of couple earnings in couple c , in year s at event time t . Regression estimated at couple level:

$$S_{cst} = \sum_{j \neq -2} \alpha_j * \mathbf{I}[j = t] + \sum_k \beta_k * \mathbf{I}[k = \text{mother_age}_{cs}] + \sum_y \gamma_y \mathbf{I}[y = s] + \theta_{cst} \quad (2)$$

full set of event time dummies (first term on RHS), mother's age dummies (second term) and year dummies (third term). We omit event dummy at $t = -2$, implying that event time coefficients measure change in woman's share of earnings relative to two years before first birth. The original Musick et al. (2020) uses couple fixed effects but we do not include them in the regression (2) as we would like to make Kleven and Musick approach comparable and we want to explore in a next step how individual and couple characteristics change the share in female earnings.

Difference between Kleven and Musick approach?

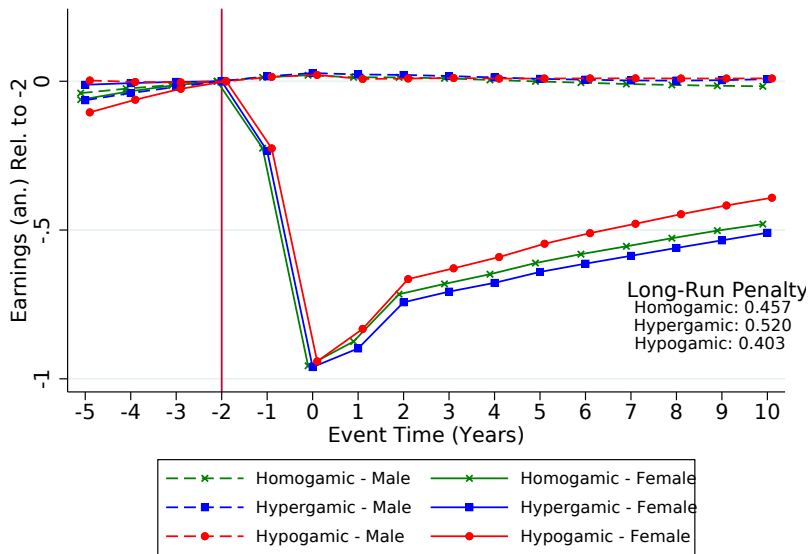
- Kleven constructs loss of mother's earnings wrt counterfactual earnings
- Musick looks at income share within the couple
 - ▶ Earnings of father can also change
 - ▶ Perspective is on couples; earnings within couple directly compared
 - ▶ As child penalty at couple level available, descriptive (regression) analysis possible

Baseline

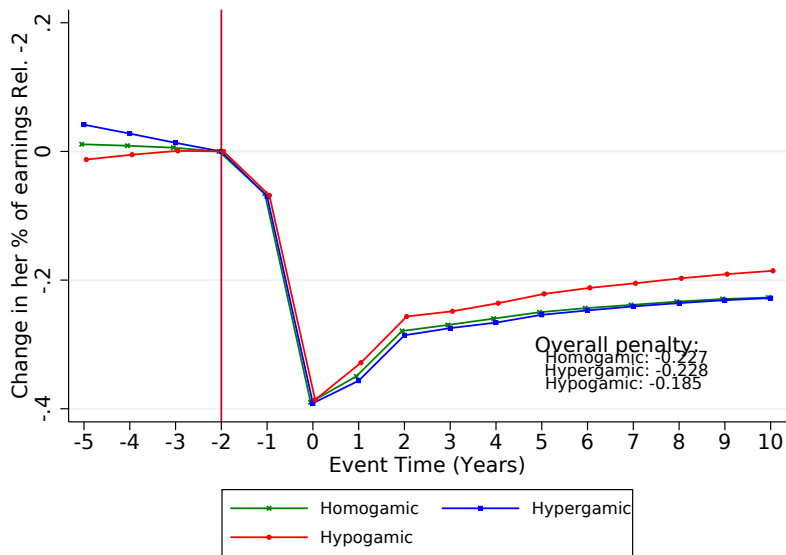
Child penalty by educational pairings

- Are child penalties different by educational pairing?
- We distinguish homogamic, hypergamic and hypogamic couples

Child penalty by educational pairings: Kleven



Child penalty by educational pairings: Musick



Does the child penalty vary by educational pairing

- Simple linear regressions
- Outcome: change in her relative income when the first child is ten years old ($t=10$) to relative income two years before birth ($t=-2$).
E.g. her share at $t=10$: 0.3, $t=-2$: 0.5, so outcome: -0.2
- Include either mother's or father's education and educational pairing
- Year dummies and district dummies.

Child penalty after ten years

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
mother compulsory	0.001 (0.002)	0.020*** (0.003)		0.016*** (0.003)		0.015*** (0.003)	
mother high school	0.028*** (0.001)	-0 (0.002)		-0.001 (0.002)		-0.002 (0.002)	
mother tertiary	0.115*** (0.002)	0.055*** (0.002)		0.050*** (0.002)		0.045*** (0.002)	
father compulsory	-0.060*** (0.003)		-0.090*** (0.003)		-0.095*** (0.003)		-0.094*** (0.003)
father high school	-0.023*** (0.001)		0.015*** (0.002)		0.016*** (0.002)		0.016*** (0.002)
father tertiary	-0.084*** (0.002)		0.003 (0.002)		0.014*** (0.002)		0.008*** (0.002)
man more - hyper		-0.032*** (0.002)	-0.041*** (0.002)				
woman more - hypo		0.032*** (0.002)	0.052*** (0.001)				
hyper 1				-0.022*** (0.002)	-0.034*** (0.002)	-0.022*** (0.002)	-0.033*** (0.002)
hyper 2				-0.076*** (0.003)	-0.092*** (0.003)	-0.079*** (0.003)	-0.091*** (0.003)
hypo 1				0.028*** (0.002)	0.040*** (0.002)	0.030*** (0.002)	0.041*** (0.002)
hypo 2				0.052*** (0.003)	0.107*** (0.003)	0.053*** (0.003)	0.104*** (0.003)
married at birth						-0.001 (0.001)	-0.003** (0.001)
Age first birth						0.001*** (0)	0.002*** (0)
Year of birth FE	x	x	x	x	x	x	x
District FE	X	x	x	x	x	x	x
Observations	349168	349168	349168	349168	349168	349168	349168
R-squared	0.032	0.028	0.027	0.029	0.030	0.029	0.030

Standard errors in parentheses

Mean (SD) of outcome: -.18 (.32).

Outcome: rel_minc t10_tm2

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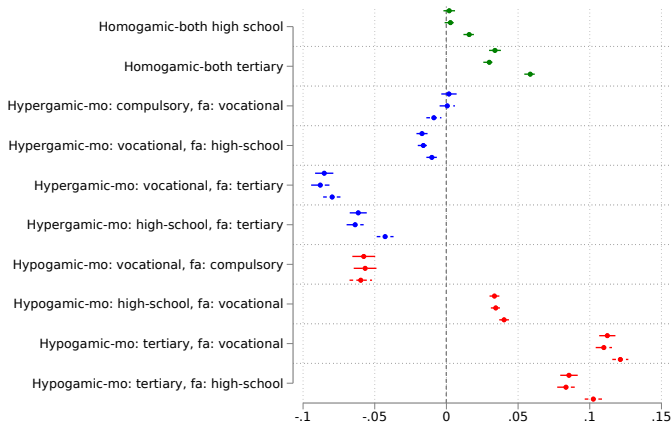
Standard errors in parentheses

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Outcome: rel_minc t10 tm2

Model with 16 couple education categories

Educational pairings in detail



Model 1: year and district FE

Model 2: add married + age at birth

Model 3: M2 + second birth

Selection into couples

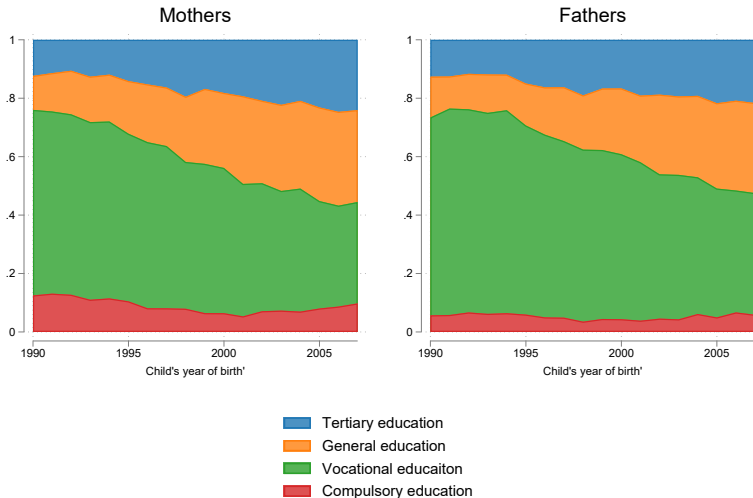
- Our results are correlational and do not account for selection into couples
- Men (women) in hypo couples could be either positively or negatively selected in terms of expected lifetime earnings
- We can compare wages of hypo men versus non-hypo men (or women) before birth to understand the selection mechanisms
- When focusing on earnings from $t=-5$ to $t=-2$, preliminary findings show that men are negatively selected into hypo couples while for women the picture is ambivalent.

Graphs

Conclusions

- Musick et al (2020) allows direct calculation of child penalty on a couple level
- Penalty positively associated with mother's edu, and negatively with father's edu
- Joint consideration of education is necessary
- Difference in edu matters more: hyper couples higher penalty, hypo lower
- Men are negatively selected into hypo couples, while for women the picture is less clear

Evolution of educational attainment of mothers and fathers from 1990 to 2007



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The child penalty following Kleven et al, 2019

We convert estimated level effects into percentages by calculating $P_t^g \equiv \hat{\alpha}_t^g / E[\tilde{Y}_{ist}^g | t]$, where \tilde{Y}_{ist}^g is the predicted outcome when omitting the contribution of the event dummies, i.e.

$$\tilde{Y}_{ist}^g \equiv \sum_k \hat{\beta}_k^g * \mathbf{I}[k = age_{is}] + \sum_y \hat{\gamma}_y^g \mathbf{I}[y = s].$$

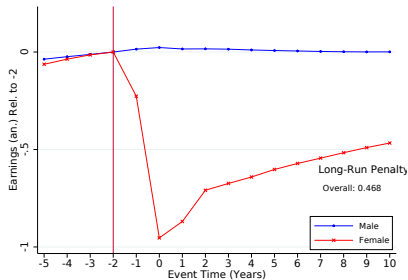
Hence P_t^g captures the effect of children as a percentage of the counterfactual outcome absent children.

Child penalty for women relative to men at event time t can be calculated in the following way:

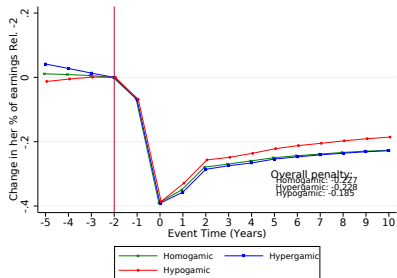
$$P_t \equiv \frac{\hat{\alpha}_t^m - \hat{\alpha}_t^w}{E[\tilde{Y}_{ist}^w | t]} \quad (3)$$

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Child penalty following Kleven and Musick



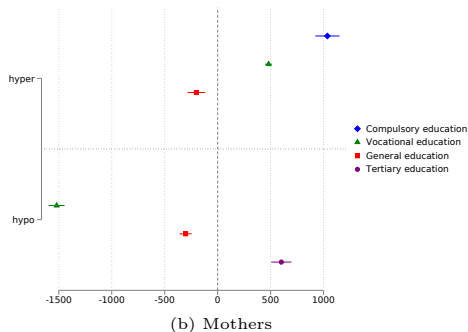
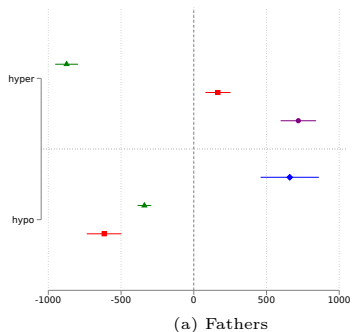
(a) Child penalty Kleven - Baseline



(b) Child penalty Musick - Relative earnings of woman with top-coding correction

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Earnings of men and women before birth in hypo and hyper couples



- We keep father's (left graph)/mother's (right graph) education fixed and estimate earnings by couple type. Four regression for each gender.
- Fathers are negatively selected into hypo, while mothers are negatively selected for compulsory and general education and positively for tertiary education.