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Elaborating on the Correlation between Gender Conservative Views and
the Long-Run Child Penalty

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Abstract

Gender inequality still exists in society nowadays. Conservative gender views state that women should stay at home or work less to take care of their children. The child penalty is defined as the impact of children on the earnings of women relative to men. This research uses data from Germany and the United States to elaborate on the correlation between conservative gender views and the child penalty, especially for different levels of education. The long-run child penalties in Germany and the United States are equal to 65.9% and 36.4% respectively, but there are large differences between the levels of education. Lower educated women tend to suffer from a lower child penalty than higher or medium educated women. Furthermore, our results indicate that education can explain parts of the child penalty, but that there are probably other factors related to education that are dominant.

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1 Introduction

Being a parent is often considered a full-time job. Women historically stayed at home to take care of the children, but this is not the standard anymore. The gender views in Western countries have started to become more progressive (Braun and Scott, 2009), and the old division between the responsibilities of a father and mother is changing (Kroska and Elman, 2009). However, data from Western countries suggest that the earnings of a woman are more negatively influenced by becoming a parent than the earnings of a man. The effect of becoming a parent on the earnings of an individual is defined as the child penalty. The relative child penalty describes the effect of having children on the earnings of the mother relative to that of the father. The child penalty contributes to gender inequality, as a small child penalty leads to a large disparity in lifetime earnings. In addition to this, the child penalty contributes to the poverty gap between households headed by a single woman and households headed by a single male (McLanahan and Kelly, 1999). There are multiple possible explanations for this child penalty, and there has been extensive research about these causes. The education of mothers and fathers has shown to be a significant influence on the child penalty (Anderson et al., 2002).

The resulting gender inequality can only be diminished if we can understand the driving forces behind the child penalty. This research provides better insight into the child penalty, by elaborating on the impact of education on the correlation between gender conservative views and the child penalty. The research question is:

‘To what extent can the level of education of parents explain the correlation between gender conservative views and child penalties in a country?’

In this study datasets from the PSID and SOEP are used which describe individuals from the United States and Germany respectively. The United States and Germany have proved to be two distinctive countries in the research from (Kleven et al., 2019a). Germany has a high score on the amount of gender conservative views and a high child penalty. The United States is more progressive and has a lower child penalty. We assign a score for gender conservative views in a country using the data from the ISSP institute, where respondents answer questions about the place of women in the labour market. Furthermore, we divide our datasets of the United States and Germany into three different education levels based on the education system in the countries. We use an event study approach to investigate the existence of the child penalty in both countries, after which we repeat this procedure for each different education level in both countries.

The ISSP data shows that Germany and the United States have become more progressive in their gender views over the years, and Germany became more progressive than the United States since 2012. The results of the PSID and SOEP dataset indicate that there exists a large long-run relative child penalty in the United States and Germany, which is equal to 36.4% and 65.9% respectively. In addition to this, we can clearly see a large difference in the child penalty between each education level. The higher educated women suffer from the largest child penalty in the United States, which is 61.6%. This is more than twice as large as the long-run child penalty

for lower educated women in the United States, which is 29%. The results for Germany also indicate a difference for women of different education levels, but the long-run child penalty is the largest for medium-educated women in Germany. There is also a clear long-run negative effect on the earnings for men, but this is almost negligible when comparing this with earnings of women. The correlation between gender conservative views and the long-run child penalty between Germany and the United States was comparable with the results from (Kleven et al., 2019a). We only used the ISSP from 2012 to further elaborate the correlation, as this was the only dataset that included information on the education level of the respondents. We concluded that the correlation significantly differs over education levels, but that it is clearly not the only cause of the child penalty as it could not explain all correlation.

This paper continues in the following way: Section 2 provides an overview of relevant literature. Section 3 describes all three different datasets that we used in this research. Section 4 elaborates on the methodology. Section 5 describes and discusses the results. Section 6 concludes.

2 Literature

Child Penalty

One of the first researches that described the effect of having children on the earnings of women was (Waldfogel, 1997). She concluded that there was an existing wage gap between mothers and childless women in the United States between 1968-1988, which still existed after correcting this wage gap for part-time employment and unobserved pay-relevant differences between mothers and non-mothers. Her results indicated that there existed a child penalty of four percent for the first child and twelve percent for two or more children. The motherhood penalty is not only seen in the United States, it exists in a variety of countries such as Spain (Quinto Notario et al., 2020), Denmark (Kleven et al., 2019b) and Finland (Napari, 2010). The child penalty between men and women in Europe was recently estimated at 32 percent and ten percent for earnings and wages respectively (Angelov et al., 2016).

Theoretical framework on gender disparities and child penalties suggests that the highest skilled women experience the largest child penalties, as it is often not possible to work part-time in their sectors. The results from (Anderson et al., 2002) underline this suggestion, as the motherhood wage penalty varies across education levels. They conclude that women who did not graduate from their high school do not earn less than women without children and that college-educated women experience a child penalty of roughly 10 percent per child.

Explanations

There are a lot of possible explanations which could theoretically impact the child penalty. The biological costs of carrying and giving birth do not have a significant negative impact according to (Rosenbaum, 2021), in which he evaluates the child penalty for biological and adoptive parents. Part of the motherhood wage gap can be explained by adjustments in the working conditions (Felfe, 2012). This suggests that mothers shift to jobs with lower salaries but more flexibility, enabling them to provide better care for their children. This conclusion is also sup-

ported by (Cukrowska-Torzewska and Matysiak, 2020), although they state that the influence of the choice of jobs is relatively small. They suggest that the gap is mostly related to the loss of mothers' human capital during career-related breaks.

The unexplained part of the child penalty part is often claimed to be a result of discrimination against mothers. The research of (Correll et al., 2007) elaborated the hypothesis that employers discriminate against mothers, and did conclude that mothers suffer from a penalty on a variety of measures, including recommending starting salary. Men did not suffer from any penalty because they are a father, and sometimes even benefited from being a parent. The unexplained part of the residual could however also be a result of the gender norms in a country. (Kleven et al., 2019a) supports this possibility, as they found a correlation between gender conservative views and child penalties in countries. These gender norms should theoretically not impact the child penalty for same sex-couples, as they do not have a traditional division of roles. The conclusions from (Andresen and Nix, 2019) found that the child penalties of same sex-couples differ much from the penalties of heterosexual couples. He found that the child penalties of lesbian couples seem to disappear in the long run, while the child penalties for heterosexual mothers result in a significant household income penalty. They conclude that the 'combination of preferences and gender norms explain the vast majority of the relative child penalty experienced by heterosexual couples'.

Solutions

Governments of high-income countries have tried to diminish the relative child penalties by using various policies, such as paid maternity leave, early childhood education, and child care. The research of (Olivetti and Petrongolo, 2017) evaluates the effect of government policies by comparing different wage gaps for OECD countries. They state that there is little evidence of a positive effect of extended parental leave on female earnings. The government policies which do have a positive impact on reducing gender disparities are early childhood spending and in-work benefits. (Goldin, 2014) states that the last step for gender convergence in child penalties can be achieved by adjusting the current wage structure. She argues that a large part of the current difference is caused by the disproportional rewards for individuals who work long hours, combined with a lack of flexibility. The nonlinear relationship between wage and hours worked increases the wage gap after the birth of a child, as females have a larger desire for flexibility to take care of their children. She claims that 'the gender in pay would be considerably reduced and might vanish altogether if firms did not have an incentive to disproportionately reward individuals who laboured long hours and worked particular hours'.

3 Data

We decided to use datasets that describe Germany and the United States for this research, as they were very distinctive in the results from (Kleven et al., 2019a). Germany has a high long-run child penalty and very conservative gender view, whereas the US has a significantly lower child penalty and more progressive gender views. In addition to this, both datasets provide very extensive information about the education of the respondents. We only consider individuals who are observed between 5 years before and 10 years after the birth of their first child.

There are three variables which we are using to elaborate on the correlation between gender conservative views and education, these are Earnings, Education, and Birth Information of their first child. The education level of an individual is measured by the education in years, and divided into three groups following the boundaries from Table 1.

Education Level	United States	Germany
Low	1-12	0-10
Medium	13-15	11-14
High	$16 \leq$	$14 \leq$

Table 1: Division of education levels for both countries.

We start the lower educated sample for the United States with one year of education, as missing information is also reported as zero in the PSID dataset. The division between the three groups is roughly based on the existing levels of education in the United States, where an individual finishes high school after 12 years of education. College in the United States takes a student about four years, which is why we classify all students who attended (but did not finish) college as ‘medium’ educated. Everyone who finished a college degree is classified as highly educated. The education system in Germany is arranged in a very different way, as at least 10 years is compulsory. Missing data is classified as -2 in this dataset, so there is no need to exclude the individuals with 0 years of education. Obtaining a bachelor’s degree in Germany takes about three years, and a master’s degree another two years. This means that everyone who obtained a master’s degree is classified as highly educated, and everyone who studied longer than the compulsory years but did not obtain a master’s degree is classified as medium educated.

The following three subsections will describe the three specific datasets which we are using in this paper: Section 3.1 describes the SOEP dataset of Germany, Section 3.2 the PSID dataset about the United States, and Section 3.3 the ISSP dataset about the gender conservative views in both countries.

3.1 Germany

The dataset of Germany is from the Socio-Economic Panel (SOEP). This institute provides extensive data about their respondents, including information about the employment and birth of their first children. It was conducted between 1984 and 2016 in West Germany and between 1990 and 2016 in East Germany. We are able to use the data from 1984 for West Germany, and the data about residents of East Germany from 1990. The SOEP data describes 1.015.043 individuals, but we are restricting this sample on multiple conditions. We only consider individuals who have children and were between the ages of 20-45 at the birth of their first child. Furthermore, we limit our sample to individuals who are observed at least eight times between 5 years before and 10 years after the childbirth. Furthermore, they must be observed at least once before and after the birth of their first child. Our final sample consists of 25.962 observations of men, and 23.552 observations of women. Table 2 provides some summary statistics about the resulting dataset.

	Men	Women
Observations	25962	23552
Average Year First Child	2000	2000
Average Income	34727	16492
Average Education (Yrs)	11.85	11.94

Table 2: Summary statistics of the SOEP data after cleaning.

3.2 United States

The United States data is obtained from the Panel Study of Income Dynamics (PSID) and describes a representative sample of the population from 1968 to 2019. The sample consists of 82573 individuals, which are household heads or their spouses. The respondents are interviewed on a yearly basis from 1968 to 1997, and once every two years from 1997 to 2019. There are eight different kinds of variables of interest: Sex, Birth year of the first child, Age, ID, Education, Relation, and Earnings (from the head as well as the spouse). The earnings are defined as the total labour earnings before taxes and transfers, including farm earnings, business earnings, wages, bonuses, overtime pay, commissions, as well as earnings from professional practice and roamers and boarders. There is a variable for each year of the last three variables, which means that there are 205 important variables in the dataset. We drop irrelevant variables such as interview date and sequence number. We also remove every individual who does not have children, as they are not relevant for this research. This results in a sample of 44431 observations.

We have three restrictions for the PSID dataset, which ensure that the sample is as close as possible to a balanced panel with respect to event time. Our sample includes only parents who are observed at least eight times over the fifteen-year window, and at least once before and after the birth of their first child. Furthermore, we restrict our sample to individuals who are between the age of 20-45 when they become a parent. Table 3 gives some summary statistics about the dataset.

	Men	Women
Observations	21753	22678
Average Year First Child	1985	1984
Average Income	29922	11953
Average Education (Yrs)	13.44	14.10

Table 3: Summary statistics of the PSID data after cleaning.

3.3 International Social Survey Programme (ISSP)

The Data from the ISSP allows us to assign a score to both countries based on the amount of gender conservative responses to two specific questions about the position of mothers in the labour market. This valuation is based on the responses to the next survey question:

‘Do you think that women should work outside the home full-time, part-time or not at all under the following circumstances?’

The circumstances of interest to our research are: ‘When there is a child under school age’ & ‘After the youngest child starts school’. The calculation of the score for gender conservative views is the same as the calculation from (Kleven et al., 2019a). We define N_{ct} (for country c and wave t) as the fraction of individuals between 19 and 64 who believe that women should not work at all under at least one of the circumstances. We average the N_{ct} across all available waves for each country.

There are four datasets available for Germany and the United States, which are from 1988, 1994, 2002, and 2012. The first wave of 1988 does not contain any data about East Germany, which means that we will only use the results of West Germany. The datasets of 1994 and 2002 describe East and West Germany separately, which is why we will combine their scores based on the population distribution of 82% for West Germany and 18% for East Germany. The dataset of 2012 is the only wave that contains information about the education level of the respondents. In addition to this, the research of (Kleven et al., 2019a) does not describe any form of compensation for the lacking data about East Germany. This is why we will use two different valuations for the entire sample of a country. Firstly, we use the average overall four waves to be able to compare our results to that of (Kleven et al., 2019a). Secondly, we will only use the results of the last wave in 2012 to be able to elaborate on the established correlation.

4 Methodology

In order to determine the impact of becoming a parent on the earnings for a man and woman, we need to inspect the earning curves of mothers and fathers around the birth of their child. We inspect these curves using an event study approach (Kleven et al., 2019b). We index event time t relative to the year of the first childbirth, and we look at the period of $-5 \leq t \leq 10$. We denote Y_{ist}^g as earnings for individual i of gender g in year s and at event time t . The regression from Equation 1 is first run for men and women separately.

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

This regression includes a full set of time dummies, which is the first term on the right hand of Equation 1. We exclude the event dummy at $t = -1$, which means that we use the earnings at this moment in time as a benchmark. The second term is a full set of age dummies, which enables us to control for underlying life-cycle trends. The last term is a full set of calendar year dummies, which enables to control for time trends such as inflation. The age dummies are also necessary as women tend to be younger when having their first child.

We need to evaluate the impact of children based on the predicted gross labour earnings if someone did not have children, which is why we predict this by omitting the event dummies. This prediction is shown in Equation 2, where we use the estimated coefficients from Equation 1.

$$\tilde{Y}_{ist}^g = \sum_k \hat{\beta}_k^g \cdot I[k = age_{is}] + \sum_y \hat{\gamma}_y^g \cdot I[y = s]. \quad (2)$$

We then use the predicted outcome to determine the impact for each gender in percentages with Equation 3.

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

We can use P_t^g to compare the effect between the two genders, which we define as the child penalty. This is the relative change of the earnings between the man and woman, as a result of becoming a parent. The calculation of the child penalty is shown in Equation 4.

$$P_t \equiv \frac{\hat{\alpha}_t^m - \hat{\alpha}_t^w}{E[\tilde{Y}_{ist}^w | t]} \quad (4)$$

We start our research by estimating the long-run child penalty using the entire sample of each country. We describe the correlation between the gender conservative views and the long-run child penalty for the entire sample by estimating the slope of the correlation. After which we split the samples of Germany and the United States into three levels of education based on the boundaries in Table 1. We estimate the long-run child penalty for each level of education and establish the correlation between the gender conservative views and the child penalty for each level. Finally, we end by evaluating the correlation results.

5 Results

This section is divided into two subsections. Section 5.1 shows and discusses the results for both countries. Section 5.2 evaluates the correlation between gender conservative views and the child penalty.

5.1 Results for Each Country

ISSP Results

The results for the ISSP data are shown in Table 4. Germany had less conservative respondents than the United States in the wave of 2012, but the more conservative waves of 1988 & 1992 resulted in an average that was higher than the United States. We can see a clear downward trend for both countries over the different waves, as the fraction of individuals agreeing with both questions has gone down with 60 percent for Germany and 23 percent for the United States.

	Germany	United States
1988	0.71	0.49
1992	0.56	0.48
2002	0.42	0.40
2012	0.17	0.26
Average	0.49	0.41

Table 4: Results of ISSP data for each wave.

The data about the education level of the individuals is only available for the last wave of 2012. This means that we are only able to evaluate the ISSP score for the different education levels if we use the last wave. The gender conservative view scores for each education level are shown in Table 5. There is a clear negative relation between the level of education and gender conservative views for both countries.

Education level	Germany	United States
Low	0.21	0.32
Medium	0.18	0.24
High	0.13	0.21

Table 5: Fraction of respondents which have conservative views for every education level.

United States: Using the Entire Sample

The results of the regression of Earnings on the dummies of event time are shown for women and men in Table 6. The P-values indicate that all coefficients after the birth of the first child significantly differ from zero for women, even with a significance level of 0.001. This observation leads to the conclusion that there is a significant negative effect of having a child on the earnings of a woman in the United States. The coefficients for men differ much and lead to different conclusions. Almost all coefficients do not significantly differ from zero, even at a significance level of five percent. Only the coefficients for the event times of $t = 8$, $t = 9$, and

$t = 10$ significantly differ from zero, implying that there is a negative long-run effect of having children on the earnings of fathers.

Event Time (t)	Coefficient	P-value	Event time (t)	Coefficient	P-value
-5	1265.54	0.174	-5	-244.32	0.867
-4	1362.34	0.093	-4	-675.25	0.601
-3	942.40	0.218	-3	-342.01	0.779
-2	1063.80	0.120	-2	-523.45	0.635
-1	0	-	-1	0	-
0	-2937.04***	0.000	0	-671.43	0.521
1	-3929.05***	0.000	1	161.21	0.881
2	-4163.77***	0.000	2	-511.50	0.633
3	-6151.58***	0.000	3	183.52	0.868
4	-5687.97***	0.000	4	-932.86	0.397
5	7552.76***	0.000	5	-556.54	0.626
6	-7759.61***	0.000	6	-1234.26	0.278
7	-3929.05***	0.000	7	-1685.86	0.154
8	-4163.77***	0.000	8	-2526.98*	0.033
9	-6151.58***	0.000	9	-3821.52*	0.002
10	-5687.97***	0.000	10	-2539.94*	0.042

*** Significant at the $p < 0.001$ level.

* Significant at the $p < 0.05$ level.

Table 6: Estimation Results for Women (Left) and Men (Right) in the United States.

Table 6 provides interesting insight into the existence of the child penalty in the United States. However, we can not directly draw conclusions on the relative child penalty, as there is a difference in earnings of men and women. The coefficients of the event dummies are therefore weighted with the expected income of an individual of the same sex without children. The relative child penalty is calculated with the predicted income of a woman without children at the same event time. Figure 1 describes the child penalty for men and women in the United States and gives the estimated long-term relative child penalty.

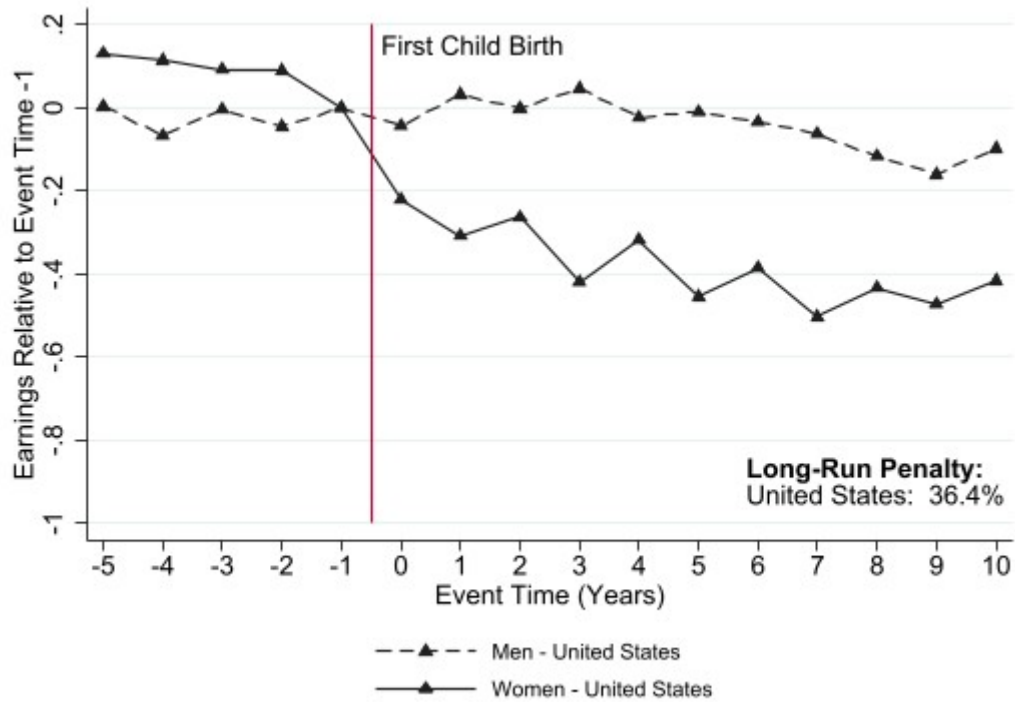
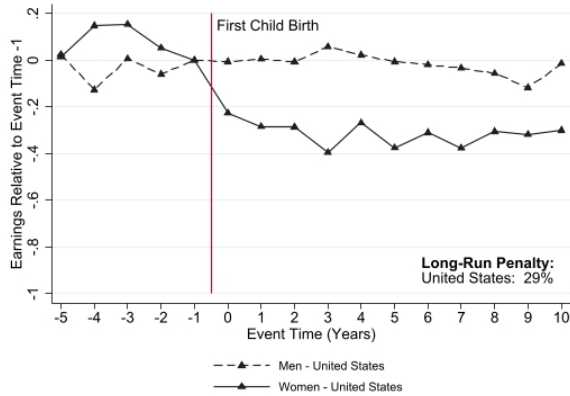


Figure 1: Results of the child penalty for Men and Women in the United States.

There is a clear difference in the development of the earnings of a father and a mother. The earnings of a new mother are way more negatively impacted than the earnings of new fathers. The difference in earnings for the mother fluctuates between two and ten years after giving birth. There is a negative long-term impact of having children for men, but this is almost negligible in comparison to the loss in earnings for women. This difference is underlined with the Long-Run Penalty estimation of 36.4%.

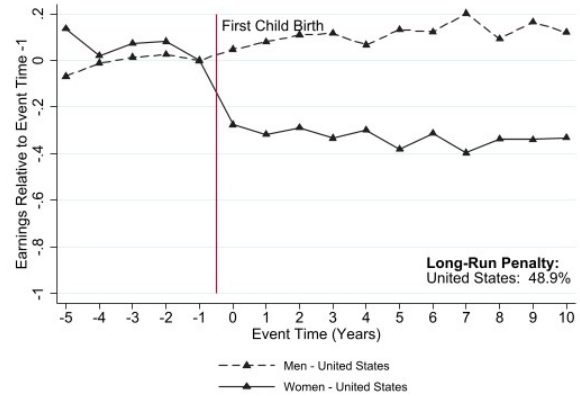
United States: Looking at the Differences between Levels of Education

The Tables with estimates of the coefficients of the regression and their p-values can be found in the Appendix. Figure 2 shows the child penalty of men and women in the United States for the different levels of education and the number of observations.



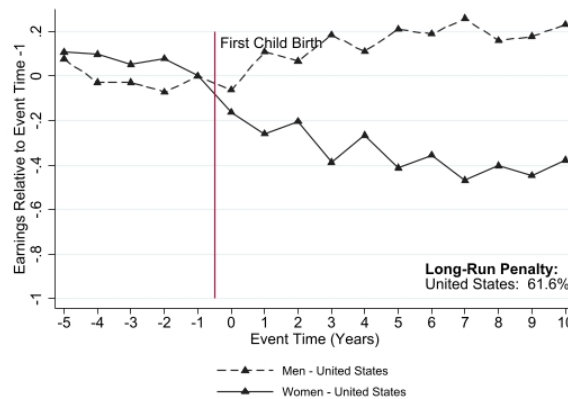
Low level of Education.

M=7998 & W=5756



Medium level of Education.

M=3484 & W=3709



High level of Education.

M=6949 & W=5758

Figure 2: Estimates of the child penalty for different levels of education for the United States.

We can see that the child penalty differs across education levels. The long-term child penalty seems to have a positive relation with the years of education of an individual. The lower educated women suffer from a relatively small child penalty one year after giving birth, as the differences between the genders are much bigger for medium and higher educated individuals. This is surprising, as these samples have the most gender-conservative views. A possible explanation could be that it is easier in their jobs to work part-time, which is often not possible in high-end jobs. Another possible cause of the high child penalty could be that women with higher earnings are the head of the household, implying that they can not work less as their earnings are necessary to maintain the family.

Germany: Using the Entire Sample

The regression results with the coefficients and p-values are shown in Table 7. The results seem very similar to the results of the United States, in the way that every coefficient for women after the birth of the first child significantly differs from zero with a p-value smaller than 0.001. Furthermore, we can see that the coefficients for women in Germany are all roughly similar around 15000. The coefficients for men of the event times $-5 \leq t \leq 3$ do not significantly differ from zero, but we can conclude that there is a long-term effect of having children for men. This conclusion can be drawn based on the coefficients of event times $t \geq 5$, as they are all negative and significant. The long-term negative effect of children on the earnings of men in Germany is roughly equal to 5000.

Event Time (t)	Coefficient	P-value	Event Time (t)	Coefficient	P-value
-5	11.024	0.980	-5	-206.01	0.803
-4	575.12	0.176	-4	-575.68	0.465
-3	784.24	0.053	-3	-167.12	0.825
-2	771.87	0.049	-2	51.94	0.943
-1	0	-	-1	0	-
0	-10454.73***	0.000	0	-689.78	0.321
1	-15541.81***	0.000	1	-852.76	0.221
2	-13187.73***	0.000	2	-1156.43	0.99
3	-14138.37***	0.000	3	-1128.24	0.113
4	-14500.26***	0.000	4	-2382.30	0.001
5	-14607.29***	0.000	5	-3072.22***	0.000
6	-14546.96***	0.000	6	-3159.15***	0.000
7	-15123.83***	0.000	7	-3964.27***	0.000
8	-15617.39***	0.000	8	-5030.64***	0.000
9	-15363.68***	0.000	9	-4590.30***	0.000
10	-15242.12***	0.000	10	-5705.16***	0.000

*** Significant at the $p < 0.001$ level.

*** Significant at the $p < 0.001$ level.

Table 7: Estimation Results for Women (Left) and Men (Right) in Germany.

Figure 3 describes the relative child penalty between men and women, where the coefficients are weighed by the relative mean of earnings for men and women in the event time.

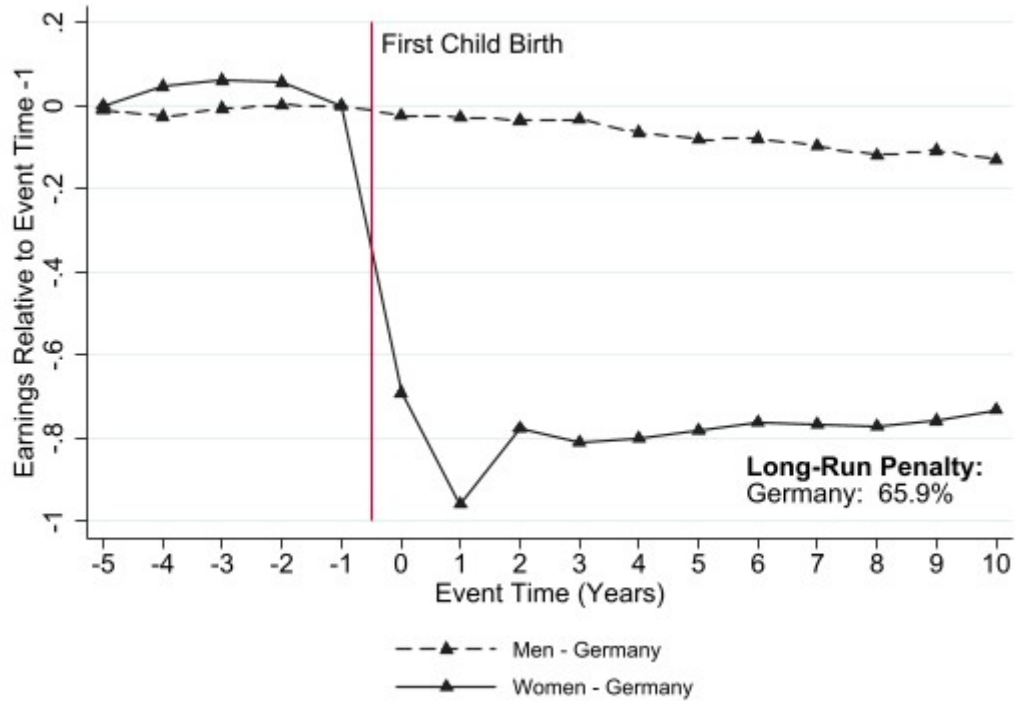
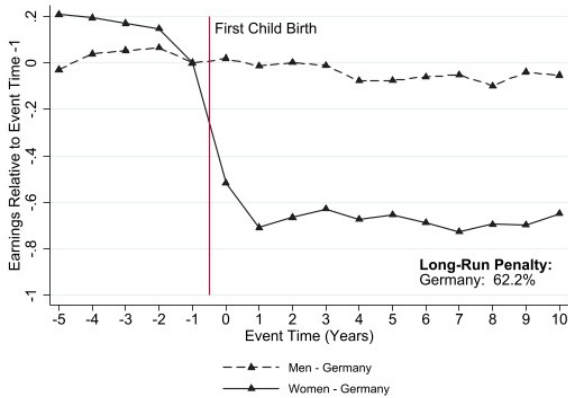


Figure 3: Results of the child penalty for Men and Women in Germany.

The earnings of women already drop with a small instance when they get pregnant, which we can conclude based on the difference between event time $t = -2$ and $t = -1$. There is a very steep drop at $t = 1$ of around 0.92 percent relative to their earnings at event time $t = -1$. The earnings recover to a loss of roughly 75 percent at event time $t = 10$. The child penalty for men is much smaller, we can see that there is a small drop in their earnings relative to their earnings at event time $t = -1$. It is important to underline that the coefficient did not significantly differ from zero until event time $t = 3$, but we can conclude that there is a small negative long-term child penalty for men. The relative child penalty between men and women is somewhat smaller because of this, and the resulting average over the event times $5 \leq t \leq 10$ is equal to 65.9%.

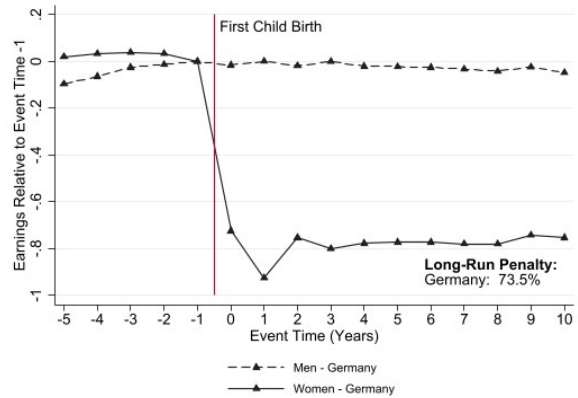
Germany: Looking at the Differences between Levels of Education

The child penalty is different for each level of education in Germany, which is shown in Figure 4. The long-run child penalty for lower educated women is high when comparing this to the results of the United States, but relatively small when comparing this with the child penalty of women of other education levels in Germany. The drop at $t = 0$ and $t = 1$ is roughly 70% for these women, which is almost twenty percent smaller than the drop for the entire sample of Germany. This drop is also significantly higher for medium and higher educated women, for which the drop is both around roughly 0.94 percent. The earnings for men also react differently for each level of education. Lower and higher educated men also have to deal with a small but considerable child penalty, while this is almost negligible for medium educated men. We can notice a clear recovering trend for the earnings of women who are highly educated, especially at event time $t = 10$. This is the main reason for the lower long-run child penalty of higher educated women.



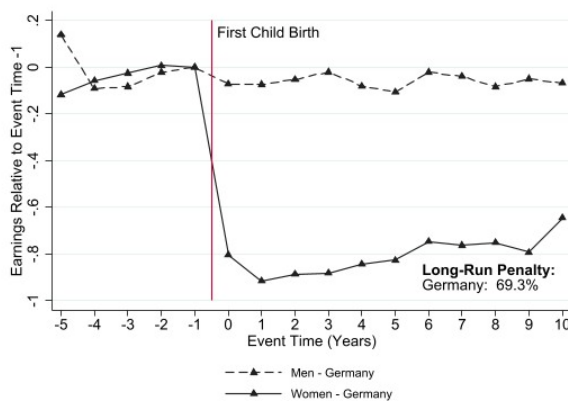
Low level of Education.

M=3080 & W=4779



Medium level of Education.

M=15846 & W=13473



High level of Education.

M=6944 & W=6314

Figure 4: Estimates of the child penalty for different levels of education for Germany.

5.2 Correlation between Gender Conservative Views and the Child Penalty

The correlation between gender conservative views and child penalty is calculated in (Kleven et al., 2019a) using all four waves for Germany, this is also the case for the left figure in Figure 5. The slope is equal to 4.214 which does not differ much from the slope between the United States and Germany in (Kleven et al., 2019a). However, as our data about the gender conservative views in the different education levels were only available for the last wave of ISSP data, we only use wave 4. The right figure from Figure 5 describes the correlation and the slope when we use only wave 4 from the ISSP data. We can see a complete shift in the slope, which becomes negative.

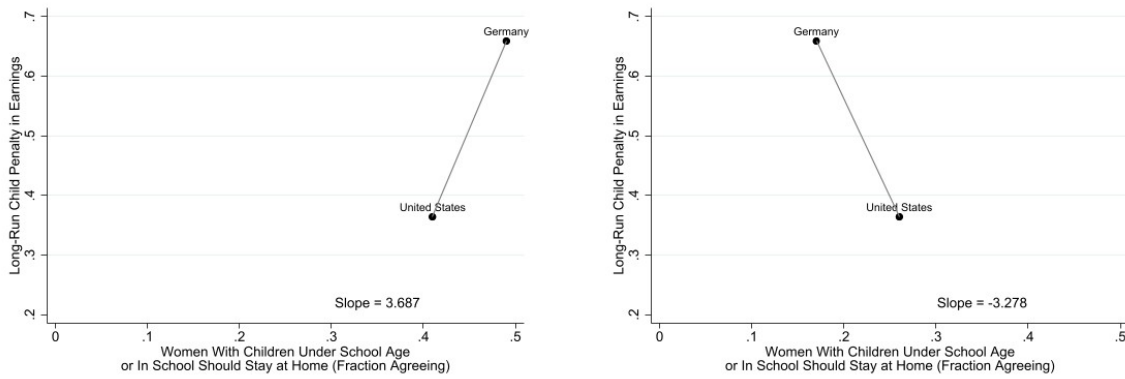
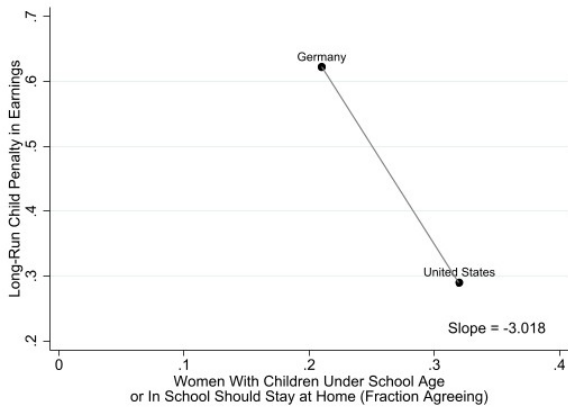
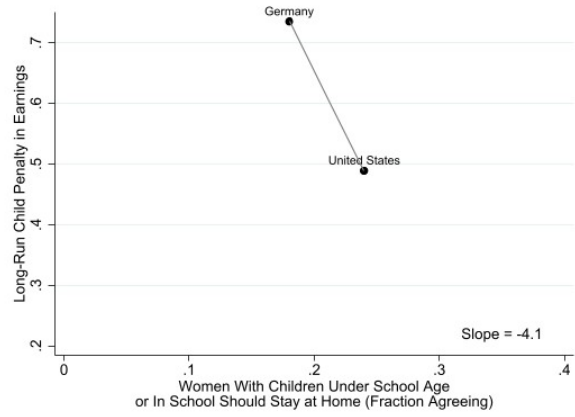


Figure 5: Correlation between Gender Conservative Views and the Long-Run Child Penalty.

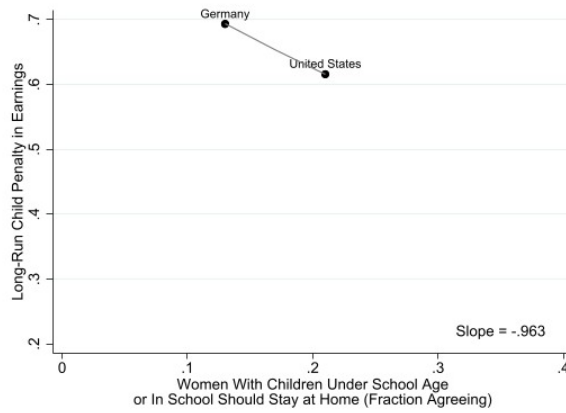
A negative slope between gender conservative views and the child penalty is very remarkable, as this would suggest that gender conservative countries have a more equal distribution of earnings for men and women. The reason for this discrepancy is probably due to the fast-changing gender views in Germany, with a difference of almost 0.14 in the 10 years. Despite the unexpected negative relation between gender conservative views and the child penalty, it is still useful to investigate if education level can provide further insight into this relation. Therefore, we calculate the slope for each level of education to further elaborate on the established correlation between gender conservative views and the child penalty. The correlations and their slopes for each education level are shown in Figure 6.



Low level of Education.



Medium level of Education.



High level of Education.

Figure 6: Correlation between gender conservative views and the child penalty for different levels of education.

The slopes of the correlation differ much for each education level. The slope is only -0.983 for higher educated women, while it is -4.1 and -0.983 for respectively lower and medium educated women. The difference in slopes indicates that there are different relations between gender conservative views and the child penalty for each level of education. However, all slopes are not close to the slope of the entire sample. This suggests that there are other factors that have a large influence on the relation between gender conservative views and the child penalty. We can conclude that higher educated women have more progressive gender views but suffer from a large child penalty, even larger than the child penalty of lower or medium educated women with more conservative views. The lower educated women have the most conservative views on gender roles but have the smallest child penalty. This contradiction could indicate that gender views are not one of the main causes of the child penalty, but that education and the corresponding working sectors of education levels could have a more vital role in the child penalty.

6 Conclusion

Becoming a parent changes the life of the father and mother, as their child needs extensive care for the first years. Conservative gender views state that the mother needs to stay at home to take care of the child, while the father takes care of the family earnings. The gender views in Western countries have started to become more progressive in the last decades, and the old-fashioned gender roles are changing. Mothers that quit their job to take care for their children are not the standard anymore, and the parents divide the costs and care of their child more equally nowadays. However, we can still see a large difference in the earnings curve of men and women around the birth of their first child. The child penalty estimates the impact of children on the earnings of women relative to men. This child penalty describes the gender inequality of becoming a parent, and even a small child penalty can lead to a large difference in lifetime earnings. Minimising the child penalty, therefore, contributes to gender equality, but we can only minimise the child penalty if we understand the driving behind this phenomenon. This research provides further insight into the relation between gender conservative views and the child penalty (Kleven et al., 2019a), by elaborating the influence of education on this relation. Our research analyses data about mothers and fathers from Germany (SOEP) and the United States (PSID), using event time studies around the birth of their first child. We can estimate the effect of the first child on the earnings of the mother or father, after controlling for life-cycle trends and time trends. The loss in earnings for an event time is weighed by the predicted earnings without a child, after which we obtain the relative child penalty. We analyse the amount of gender conservative views in the countries using ISSP data.

Our results reveal that Germany historically had more conservative gender views than the United States, but has become a more progressive country since 2012. Furthermore, we can conclude that there is a negative relation between gender conservative views and education for both countries. Although Germany is the country that has the most progressive gender views since 2012, women still have to deal with a large long-run child penalty of about 66 percent. The long-run child penalty in the United States was a lot smaller than this, as it was only 36 percent. We conclude that the amount of education does play a role in the child penalty, as we see large differences over the established education levels. The lower educated women did suffer from a smaller child penalty in Germany and the United States, which was only 62% and 29%. This can be seen as relatively small in comparison to the other education levels because we can see a large increase for medium and higher-educated women. The eventual correlation between gender conservative views and the child penalty for Germany and the United States was equal to 3.687, which is comparable with the results of (Kleven et al., 2019a). However, we could only elaborate on the correlation for the different education levels with the last wave of ISSP data. This resulted in a negative slope of -3.278, which seems like a contradiction because we would expect a positive relation between gender conservative views and the child penalty. There is a clear difference between the slopes of the three different education levels, which indicates that there is a different relation between the child penalty and gender conservative views for all education levels. This could indicate that the education level of a parent influences the child penalty. Nonetheless, the slopes of all three education levels are lower than the slope of the entire

sample. This suggests that there are other important factors that influence the child penalty, possibly something indirectly connected to education such as the working sector, intelligence, and education of parents.

Looking back at this research, we conclude that the choice of countries was not optimal. Germany was a conservative country over all the waves of ISSP data but became a country with really progressive views on gender roles because we could only use the last wave of 2012. Furthermore, one could argue that we should have relaxed our constraints on the datasets which were split on education level. The reason for this is that the dataset of lower educated individuals in Germany only has 3080 observations for men. A more extensive dataset would result in more robust estimates. We suggest further research to elaborate on possible causes of the child penalty, especially causes that are related to education level. We think that there is something related to education level which is one of the main driving forces behind the relation between gender Conservative views and the child penalty. In addition to this, we suggest a quantitative expansion of this research which includes more than two countries, in order to have a more robust estimate of the correlation between gender conservative views and the child penalty for different education levels.

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Appendix

United States

Event time (t)	Coefficient	P-value	Event time (t)	Coefficient	P-value
-5	115.772	0.257	-5	211.54	0.855
-4	1432.911	0.098	-4	-1223.70	0.238
-3	1328.25	0.100	-3	57.49	0.952
-2	505.4413	0.487	-2	-577.30	0.499
-1	0	-	-1	0	-
0	-2418.219***	0.001	0	-70.52	0.930
1	-3001.772***	0.000	1	57.20	0.945
2	-3397.297***	0.000	2	-87.36	0.917
3	-4620.96***	0.000	3	668.11	0.440
4	-3531.687***	0.000	4	285.22	0.742
5	-4780.454***	0.000	5	-85.03	0.924
6	-4508.939***	0.000	6	-281.50	0.755
7	-5317.666***	0.000	7	-470.75	0.615
8	-4849.485***	0.000	8	-889.87	0.352
9	-4937.956***	0.000	9	-1838.42	0.066
10	-5226.725***	0.000	10	-229.29	0.823

*** Significant at the $p < 0.001$ level.

* Significant at the $p < 0.05$ level.

Table 8: Estimation Results for Lower educated Women (Left) and Men (Right) in the US.

Event time (t)	Coefficient	P-value	Event time (t)	Coefficient	P-value
-5	1505.68	0.275	-5	-1417.80	0.559
-4	260.37	0.821	-4	-242.72	0.906
-3	843.67	0.432	-3	272.32	0.891
-2	1032.11	0.282	-2	602.09	0.736
-1	0	-1	-1	0	-
0	-3817.95***	0.000	0	1188.53	0.486
1	-4367.91***	0.000	1	1990.59	0.260
2	-4493.16***	0.000	2	3108.81	0.077
3	-5057.48***	0.000	3	3206.92	0.079
4	-5066.40***	0.000	4	2093.98	0.249
5	-6455.26***	0.000	5	4013.77*	0.033
6	-5837.93***	0.000	6	4277.45*	0.023
7	-7406.90***	0.000	7	6671.08*	0.001
8	-7008.23***	0.000	8	3544.69	0.070
9	-6914.15***	0.000	9	5974.49*	0.004
10	-7466.62***	0.000	10	4974.89*	0.017

*** Significant at the $p < 0.001$ level.

* Significant at the $p < 0.05$ level.

Table 9: Estimation Results for Medium educated Women (Left) and Men (Right) in the US.

Event time (t)	Coefficient	P-value
-5	1655.37	0.522
-4	1838.94	0.402
-3	808.30	0.702
-2	1521.98	0.417
-1	0	-
0	-3502.22	0.059
1	-5074.59	0.011
2	-5219.89	0.008
3	-8466.81***	0.000
4	-7443.71***	0.000
5	-10053.06***	0.000
6	-10888.26***	0.000
7	-12622.49***	0.000
8	-13801.72***	0.000
9	-13970.65***	0.000
10	-15096.29***	0.000

*** Significant at the $p < 0.001$ level.

Event time (t)	Coefficient	P-value
-5	1200.667	0.760
-4	-543.0823	0.874
-3	-451.9197	0.892
-2	-1391.419	0.644
-1	0	-1
0	-1332.84	0.647
1	2135.88	0.480
2	1713.88	0.565
3	4028.83	0.196
4	3102.37	0.310
5	5140.21	0.106
6	5828.60	0.065
7	6952.31*	0.037
8	5459.31	0.098
9	5575.72	0.110
10	9272.18*	0.007

* Significant at the $p < 0.05$ level.

Table 10: Estimation Results for Higher educated Women (Left) and Men (Right) in the US.

Germany

Event Time (t)	Coefficient	P-value
-5	1426.29	0.013
-4	1399.04	0.011
-3	1273.05	0.017
-2	1167.1	0.026
-1	0	-
0	-4684.96***	0.000
1	-6792.91***	0.000
2	-6629.22***	0.000
3	-6594.28***	0.000
4	-7283.40***	0.000
5	-7303.54***	0.000
6	-7703.88***	0.000
7	-8058.69***	0.000
8	-7997.20***	0.000
9	-7921.91***	0.000
10	-7501.58***	0.000

*** Significant at the $p < 0.001$ level.

Event Time (t)	Coefficient	P-value
-5	-356.54	0.770
-4	502.26	0.669
-3	768.44	0.499
-2	1050.38	0.349
-1	0	-
0	337.36	0.755
1	-243.75	0.823
2	50.29	0.964
3	-217.25	0.850
4	-1642.52	0.163
5	-1651.62	0.171
6	-1362.00	0.275
7	-1196.85	0.346
8	-2312.84	0.086
9	-909.12	0.512
10	-1238.91	0.387

* Significant at the $p < 0.05$ level.

Table 11: Estimation Results for Lower educated Women (Left) and Men (Right) in Germany.

Event Time (t)	Coefficient	P-value
-5	252.11	0.651
-4	410.09	0.432
-3	488.96	0.317
-2	436.73	0.349
-1	0	-
0	-9823.27***	0.000
1	-12959.55***	0.000
2	-10924.49***	0.000
3	-11765.95***	0.000
4	-11750.89***	0.000
5	-11901.63***	0.000
6	-12025.20***	0.000
7	-12539.05***	0.000
8	-12720.05***	0.000
9	-11949.75***	0.000
10	-12489.18***	0.000

*** Significant at the $p < 0.001$ level.

Event Time (t)	Coefficient	P-value
-5	-1967.62	0.022
-4	-1374.96	0.096
-3	-580.24	0.463
-2	-297.70	0.694
-1	0	-
0	-423.61	0.555
1	43.14	0.952
2	-530.74	0.463
3	-6.31	0.993
4	-676.27	0.364
5	-727.14	0.338
6	-843.27	0.276
7	-1118.47	0.159
8	-1485.64	0.069
9	-851.92	0.314
10	-1707.97*	0.048

* Significant at the $p < 0.05$ level.

Table 12: Estimation Results for Medium educated Women (Left) and Men (Right) in Germany.

Event Time (t)	Coefficient	P-value
-5	-1857.95	0.198
-4	-935.94	0.480
-3	-436.26	0.727
-2	116.57	0.923
-1	0	-
0	-15010.03***	0.000
1	-21598.33***	0.000
2	-17948.71***	0.000
3	-18275.80***	0.000
4	-17788.35***	0.000
5	-18140.88***	0.000
6	-16637.46***	0.000
7	-17754.33***	0.000
8	-17859.85***	0.000
9	-19626.37***	0.000
10	-16270.22***	0.000

*** Significant at the $p < 0.001$ level.

Event Time (t)	Coefficient	P-value
-5	2190.11	0.340
-4	-1493.80	0.486
-3	-1408.21	0.489
-2	-381.99	0.846
-1	0	-
0	-1333.00	0.473
1	-1741.51	0.347
2	-1060.73	0.569
3	-419.78	0.824
4	-1707.20	0.374
5	-2329.91	0.238
6	-482.05	0.812
7	-905.08	0.666
8	-2015.11	0.354
9	-1220.70	0.589
10	-1698.70	0.466

* Significant at the $p < 0.05$ level.

Table 13: Estimation Results for highly educated Women (Left) and Men (Right) in Germany.