Origin, Norms, and the Motherhood Penalty

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Abstract

We explore the effect of gender equality norms and shared institutional and economic contexts on the size of the motherhood penalty, studying child migrants and children of immigrants in Sweden. While there are results pointing to a robust negative association between the gender equality rank of the region of origin and the labor market impact of parenthood, the overall picture is more one of similarity across highly diverse groups. Within-household reductions in female earning shares are not systematically related to gender equality background. Patterns for estimated fatherhood penalties signal the potentially group-specific impact of parent related restrictions and methodological concerns related to differential selection into parenthood at different ages.

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1 Introduction

A rapidly growing literature highlights the role of parenthood in explaining gender gaps in the labor market. A significant body of evidence suggests that having children has substantial and long-lasting effects on the labor market outcomes of women, but typically not on those of men. This so called "motherhood penalty" has been documented in a large number of countries with varying institutional, social, and economic conditions (Kleven et al., 2019*b*; Dotti Sani, 2015; Kleven, Landais and Leite-Mariante, 2023).[1] Recent evidence from the US suggests that the penalty is substantial also where one could expect it to be less pervasive, e.g. due to strong (relative) female labor market positions (Almond, Cheng and Machado, 2023).

But the underlying mechanisms are much less well understood. We explore the effect of gender equality norms on the size of the motherhood penalty, studying family formation among former child migrants and children of immigrants in Sweden 1990–2018. The analysis uses the fact that people of different backgrounds who reside in the same country face similar institutions and economic conditions, but are potentially exposed to different cultural factors depending on their own country of origin or that of their ancestry. Thus, we combine the estimation of child penalties using an event study design with a so-called epidemiological approach (Hofstede, 2001; Inglehart and Baker, 2000).

Our general approach in combination with rich population-wide administrative data from a country characterized by substantial and diverse immigration over several decades, provides the opportunity to investigate the role of norms at different levels. In addition to the cultural factors captured by the epidemiological approach, there may be context-specific norms affecting all families. In our setting, similarities in motherhood penalties across groups that differ in background characteristics can be seen as indications on such influences. At the micro level, family-specific norms could operate across generations. By investigating the role of grandmother labor market outcomes, and its interaction with background-related gender norms, we uncover how norms at different levels influence individual behavior.

The event study approach to measure the labor market impact of parenthood outlined by Kleven, Landais and Søgaard (2019) has been proven relevant in many settings and powerful in terms of its strikingly clear results. The idea of comparing individual trajectories around the time of first childbirth to a counterfactual established by those who have not yet given birth, is in many ways appealing. Yet, some methodological concerns apply, not least when using across-group variations to elicit the role of norms. The concept of a penalty is dependent on there being something to lose. If gender norms affect employment and earnings already before having children, a comparison of child penalties may underestimate their true influence. The epidemiological approach also entails a trade-off between on-the-one-hand studying people strongly affected by the origin culture, and on-the-other including individuals that are comparable in individual characteristics and exposure to host context factors.[2] Focusing on child

[1] Examples of countries include Sweden (Angelov, Johansson and Lindahl, 2016), Denmark (Kleven, Landais and Søgaard, 2019; Lundborg, Plug and Rasmussen, 2017*a*), Norway (Bütikofer, Jensen and Salvanes, 2018), Finland (Sieppi and Pehkonen, 2019), Spain (de Quinto, Hospido and Sanz, 2020), and the United States (Chung et al., 2017).

[2] For example, correlations between source country child penalties and those observed among people migrat-

migrants and children of immigrants gives comparability in terms of institutional and overall societal exposure during adolescence and early adulthood. By documenting pre-child differences and supplementing the baseline estimates by a coarsened exact matching approach to study child penalties among individuals with similar status and characteristics, we illuminate the potential influences of norms in a more complete way.

We estimate total child penalties over a ten-year period after first childbirth and relate this penalty to measures of gender inequality based on country of ancestry. Similar to e.g. Blau et al. (2020), we use the Global Gender Gap Index (GGI) from the World Economic Forum to measure culture and gender norms. The GGI takes into account social, political, and economic equality across the genders. We show that this measure is highly correlated with female relative labor force participation rates, which has been the main measure of gender inequality or norms used in the literature. Our analysis builds on a ranking of weighted GGI averages for 29 origin country groups identified in the administrative data.

Our baseline findings point to origin related norms as determinants of the motherhood penalty (MP), but also show that mothers of diverse backgrounds exhibit striking similarities in a shared context. Further analyses reveal patterns questioning the importance of group-specific cultural norms and contain cautionary tales also regarding the identifying assumptions of event studies on the effects of parenthood across subgroups of varying socioeconomic status.

First, we show that origin country GGI is related to pre-child female labor market outcomes also among the child migrants and children of immigrants constituting our main sample. The rank correlation between the gender equality index and labor income 2 years prior to first child birth is 0.83. There is also a strong correlation with outcomes among adult first generation migrants of similar origin.[3] Mothers originating in countries characterized by unequal gender norms are younger at first childbirth and the age difference between spouses is on average greater in this group of mothers. But there is no association between GGI and the number of children or female educational attainment. The fact that the female share of household earnings is actually higher among low GGI mothers suggests that other forces than norm-based gender divisions between spouses are at play.

Event study estimates (following Kleven, Landais and Søgaard (2019)) by ancestry/origin suggest a significant correlation between the estimated earnings penalty and the GGI index, ranging from more than 45 percent for some of the least gender-equal groups to less than 40 percent at the top of the ranking. This association remains when controlling for other source region factors in terms of GDP and average fertility rates. Employment penalties over the 10-year period have an even stronger association with the gender equality measure of the region of origin. In general, the estimates confirm the presence of a substantial motherhood penalty in

ing as adults may reflect country/gender-specific determinants of pre-child investments and decisions, rather than norms influencing behavior in the host country. Furthermore, the often long process of labor market assimilation among immigrants (Duleep, 2015) also raises issues about comparable baseline trajectories of treated and controls.

[3]For example, comparing characteristics in the 28 region of origin groups (excluding Sweden), the rank correlation across generations for years of education and the probability of living in a single household are above 0.9, and the correlation in earnings is 0.76.

the Swedish context of comparatively strong family-friendly institutions and otherwise limited gender gaps. All origin groups exhibit a sharp income drop after child birth and incomplete long-term recovery.

As discussed above, the potential penalty from parenthood depends on the point of departure: If you earn very little, you don't have much to lose. Pre-child differences across groups can thus affect patterns of estimated penalties. Using coarsened exact matching we therefore compare deviations between the penalty of each region of origin group and a sample of Sweden-origin mothers similar in terms of own and partner income and age. Results show that increasing comparability means an even stronger similarity in maternal earnings trajectories. However, a significant association between the deviation from the matched comparison group and the quantile of gender equality remains. In other words, the motherhood penalty tends to be systematically larger among people originating in culturally unequal contexts also when accounting for the fact that pre-child factors differ.

However, the analysis also gives several reasons for being cautious in not drawing too strong conclusions regarding the role of origin culture norms in determining outcomes. First, it easy to forget that the overall picture is that mothers' earnings develop similarly in all groups. This can potentially be seen as an indication that shared social and institutional contexts are primary drivers of behavior in diverse populations. Second, there is a lot of dispersion in the estimates for groups at similar GGI rankings. For example, the relative employment penalty among women with a background in Iran is 21 percent (and of the same magnitude as the Nordic countries at the top of the ranking), compared to 33–38 percent for women from Turkey, Iraq, and other countries in the Middle East with similarly low gender equality rankings. Also, while there is a clear connection between grandmother's earnings rank and the motherhood penalty among daughters, this association does not seem to differ very much by GGI classification. Although there may obviously be complex selection mechanisms at work, the result puts limits to the influence of cultural factors related to geographic origin.

The strongest findings casting doubt on a direct link between origin related cultural norms and the impact of motherhood come from studying within-household female earnings shares. While there is a strong reduction in mothers' share of household income in most groups, the estimates suggest essentially no association between the 10-year penalty and the GGI rank. To the extent that this outcome reflects household bargaining and preferences related to child responsibilities, the finding speaks against culturally rooted norm differences as major drivers. In fact, performing an analysis of fatherhood penalties suggests a similar (although somewhat weaker) association between GGI and estimated penalties as for mothers. Obviously, a gender norm explanation would predict the opposite.[4]

Our paper contributes to the literature on the mechanisms behind the child penalty. Previous work gives little support to biology in terms of pregnancy related factors (comparing penalties in families with adopted and biological children (Kleven, Landais and Søgaard, 2021),

[4]While the trajectories for fathers are very different from those of mothers (a gradual decrease rather than a drop to a lower income level), and the fact that pre-trends signal that the identifying assumption of exogenous timing of birth is questionable in some groups, we cannot rule out the possibility that there are other factors correlated with origin that influence also female outcomes.

or to gender-based comparative advantage (examining differences across heterosexual and same-sex couples (Nix, Andresen et al., 2019; Moberg, 2017)). Variations in family policies have also been shown to have limited explanatory power for the long-run effects of children on women's earnings (see e.g. Kleven et al., 2020; Schönberg and Ludsteck, 2014; Lalive and Zweimüller, 2009; Lalive et al., 2014).[5]

Norms and culture are factors receiving increasing attention in the general literature on gender labor market disparities.[6] The epidemiological approach has been used to study a variety of outcomes including female labor force participation and fertility (see Guiso, Sapienza and Zingales, 2006; Fernández, 2011; Giuliano, 2020, for reviews of the literature). By culture, one typically refers to a collection of beliefs and preferences; in this context those specifically related to gender norms. Norms are usually proxied with past female labor force participation rates from individuals' country of ancestry (Fernandez and Fogli, 2009) or (as in our case) with summary measures of overall gender inequality.

In the context of motherhood penalties, Kleven et al. (2019*b*) show a positive relationship between child penalties and elicited gender norms across countries, which is consistent with an important role for gender norms. Boelmann et al. (2020) find that East German mothers return to work sooner than West German mothers (living within the same commuting zone) even two decades after reunification, suggesting a strong persistence of the culture in which women were raised. Kleven (2022*a*) shows that child penalties correlate with gender norms in the US. Building on the epidemiological approach, the study also finds strong associations between source region/country child penalties and the penalties among movers/migrants.

The literature on the role of culture in determining women's labor supply exploiting source country characteristics is by construction often related to the labor market integration of immigrant women (Blau, Kahn and Papps, 2011; Blau, 2015; Blau and Kahn, 2015; Finseraas and Kotsadam, 2017; Neuman, 2018; Antecol, 2000; Fortin, 2005). A typical finding is that the labor market performance in the host country is positively associated with the female labor force participation in the source country. There are also investigations of other outcomes using epidemiological measures; e.g. do Blau et al. (2020) find that US immigrants allocate tasks within the household differently depending on the characteristics of their source countries. Other studies focus on intergenerational transmission of roles and attitudes (Bredtmann, Höckel and Otten, 2020; Farré and Vella, 2013; Fernández, Fogli and Olivetti, 2004; Bütikofer, 2013). These studies tend to find that immigrant source country gender roles influence immigrant and second generation behavior in the receiving country.

Previous work thus suggests that there exists a factor, i.e., culture or gender norms, that is distinguishable from human capital or social capital, which affects economic behavior. At the same time, these studies also document that culture is malleable; there is substantial evidence of cultural assimilation among second generation populations. Similarly, studies on

[5]There is also evidence on that women (in the US and UK) systematically underestimate the employment effects of motherhood, and that women and men tend to express more traditional values after becoming parents Kuziemko et al. (2018).

[6]Despite significantly converging roles of men and women in the labor market and society, there are still sizable gender gaps in employment, wages, and representation in top jobs in virtually all countries (see Bertrand, 2020; Olivetti and Petrongolo, 2016; Petrongolo, 2019; Goldin, 2023, for reviews).

intergenerational transmissions of attitudes document significant effects of parents' attitudes and behaviors on those of their children. Overall, this literature establishes an important role of culture for economic outcomes, and of both vertical and horizontal transmission of norms and culture.

2 Data

We use administrative data on the Swedish population from several registers linked by unique identifiers. The data include annual information on all individuals aged 16–74 from 1990 to 2018 and have been compiled and pseudonymized by Statistics Sweden into collections held by the Institute for Evaluation of Labor Market and Education Policy (IFAU). There is detailed information on earnings, parental benefits, educational attainment, social benefits, and family relationships. All nominal variables are adjusted for inflation using the 2018 consumer price index. Earnings are taken from tax registers and are winsorized at the 99.5% level. The main outcome is earnings (income from employment). We also study employment, full-time equivalent monthly wages, and a labor income measure adding parental benefits (income from job-protected parental leave plus temporary leave to care for sick children) to earnings.

The annual data are merged with multigenerational information on child-parent relationships. Households are defined as a man and a woman with a joint child. Men and women are included from five years before the birth of their first child to up to ten years after. This means we include child births occurring over the time period 1990–2018. It does not have to be the first child for both the man and the woman, but only the first child for the focal person. The number of children is the number of own children, not the number of children in the household.

Individuals are excluded from the panel in years when they are studying (defined through the receipt of student benefits and loans). Otherwise, we place no restrictions on positive earnings or relationship status, which means that all individuals are included as long as they are in the population registers. If an individual dies or moves out of Sweden, they are included up to that point. Therefore, an individual does not have to be in the data for all 16 years (around childbirth) to be included in the analysis. Thus, the analysis is based on an unbalanced panel of individuals.

We have information on the place of birth of the individuals and the place of birth of their parents (if the individual is born in Sweden) for all individuals. If there are few people from a specific source region, the place of birth is grouped into a larger group of countries.[7] To identify gender norms, we primarily use the Global Gender Gap Index (GGI) from the World Economic Forum (World Economic Forum, 2023). Countries and country groups are ranked according to the level of gender inequality in that country according to the GGI. We will discuss results using alternative country based gender equality measures; these robustness checks confirm the baseline findings.

As gender norms are given at the country level, and sometimes we have the region of birth

[7] See Table C.5 for a list of source countries and regions.

rather than country of birth, the gender gap index is weighted according to the number of immigrants from that country relative to the other countries in that group of countries. For example, in the case of Norway/Iceland, the GGI value for Norway is given more weight than the GGI value for Iceland, because there are more immigrants from Norway in Sweden than from Iceland. The weights are proportional to the number of immigrants in Sweden during our period of analysis (1990–2018).

Our main analysis focuses on child migrants (at most ten years old at immigration) and second-generation immigrants. A Sweden-born individual is defined as second-generation if both of the individual's parents were born outside of Sweden. To classify origin, we use the place of birth for child migrants and the place of birth of the individual's mother for second-generation immigrants. We pool the samples of child migrants and second generation immigrants according to these definitions, and refer to the pooled sample as the group with immigrant background, and the sample of Sweden-born individuals with Sweden-born parents as natives.

3 Research design

We follow previous literature (Angelov, Johansson and Lindahl, 2016; Kleven, Landais and Søgaard, 2019) by estimating child penalties using an event study design including individuals that have children at some point. Identification comes from individuals of the same age in the same calendar year but with a first child born at a different age since all individuals in the regressions have children at some point. Identification therefore comes from variation in the treatment timing, i.e. at which age they have their first child. Following Kleven et al. (2019*a*), we add calendar year dummies and age dummies to control flexibly for business cycle trends and life cycle trends:

$$Y_{it} = \boldsymbol{\beta}' \boldsymbol{D}_{it}^{\text{Event}} + \boldsymbol{\gamma}' \boldsymbol{D}_{it}^{\text{Age}} + \boldsymbol{\lambda}' \boldsymbol{D}_{it}^{\text{Year}} + \varepsilon_{it}, \tag{1a}$$

where Y_{it} is the labor market outcome of interest (primarily labor income) for individual i in event time t. Boldface is used to denote vectors, where $\boldsymbol{D}$ refers to vectors of a full set of dummies for event time, age, and calendar year. Individuals are included from five years before first birth to ten years after. Event time $t = -1$ is omitted to provide the baseline. We also follow Kleven, Landais and Søgaard (2019) and convert the coefficients to percentage effects using the following specification:

$$P_{it} \equiv \frac{\tilde{\beta}_t}{\boldsymbol{E}[\tilde{Y}_{it} \mid t]}, \tag{1b}$$

where $\tilde{Y}_{it}$ is the predicted counterfactual outcome of having children. Standard errors are clustered at the individual level and robust to heteroskedasticity. We run the regression separately for all comparison groups, which means that calendar year and age profiles are allowed to vary across the groups that we study.

Given that we are interested in estimating variations in the size of child penalties depending on regional background, the methodology has the clear advantage of being able to use all

child births in Sweden and not relying on e.g., couples using IVF (Lundborg, Plug and Rasmussen, 2017*b*), having twins (Rosenzweig and Wolpin, 1980), or sibling sex mix (Angrist and Evans, 1998). Within this framework, we however need to assume that the timing of births is random conditional on age and calendar year. Although it is impossible to test the validity of this assumption, we can look at pre-trends to rule out that the decision to have children is clearly correlated with unobservable characteristics that matter for labor market outcomes in the period prior to parenthood. Positive pre-trends are common in the literature on child penalties (Kleven et al., 2019*a*; Andresen and Nix, 2022).

For Sweden, the positive pre-trends are driven by the inclusion of students. From Figure C.3, it is evident that the exclusion of students (identified by the reception of student benefits) also means that there are no longer any pre-trends present, although the size of the estimated child penalties are unaffected. Comparing the pre- and post-period, it seems that individuals in Sweden (both women and men) tend to wait with having children until they are done with their studies. Moreover, very few individuals become students after they have children. This pattern could potentially be driven by the fact that the relatively generous scheme for parental benefits is tied to earnings, generating strong economic incentives to enter the labor market before entering parenthood.

Conditional on not being a student, the parallel trends assumption holds. It is clear that earnings are stable until the birth of the first child and thereafter drop sharply. It is therefore unlikely that the short-run earnings drop after entering parenthood is due to something else than the event of having children. The flat pre-trends signifies that the decision to enter parenthood is not driven by labor market outcomes, e.g., by waiting for promotion or having children as a response to becoming unemployed. In the long-run, we are not able to rely on the smoothness assumption to the same extent, and interpreting the long-run penalties requires stronger assumptions.

To compare across regional origins, we run specification 1a for each regional group separately. That means that we allow non-parametric variation in terms of period (calendar year), cohort (year of birth for first child), and life-cycle (age of parenthood) across groups. Hence, we allow for that these groups would have followed different earnings trajectories in the hypothetical scenario that they did not have children. Given that we have essentially no pre-trends for any group, the common trend assumption within each group holds. To compare regional groups we again make the transformation in equation 1b, which means that we compare the impact of children relative to the expected earnings for each regional group. To relate child penalties to the level of gender equality in the source region we take the average of the estimated annual child penalties over the 10-year horizon following the birth of the first child, and plot it against the GGI rank.

Given that we use variation in regional origin as a measure of gender norms, we need to make sure that we are capturing differences in gender norms from source country and not something else that correlates with these gender norms. In order to do so, we first consider variation in source region factors. We follow Blau et al. (2020) and also control for regional ranking in terms of GDP per capita and fertility. First, we look at the correlation between the child penalty in earnings and the gender inequality in the source region. To rule out

that it is rather a measure of income or fertility we also control for regional rank in terms of GDP per capita and fertility rate when measuring the correlation. Moreover, we run a specific regression including, first, the rank of regional GGI and subsequently we add the rank of regional GDP per capita and fertility rate, respectively, and interact them with age and calendar year. The estimation is done with the following specification:

$$Y_{it} = \alpha + \sum_{k=1}^{3} \beta_k D_i^{\text{Post}} \times X_k + \sum_{k=1}^{3} \gamma_k D_i^{\text{Age}} \times X_k + \sum_{k=1}^{3} \lambda_k D_i^{\text{Year}} \times X_k + \tau \boldsymbol{D}_i^{\text{Event}} + \varepsilon_{it} \tag{2}$$

where $X_1 = \text{GGI}_i$, $X_2 = \text{GDP}_i$, and $X_3 = \text{Fertility}_i$. As regional origin is also correlated with other dimensions, such as educational attainment and pre-parenthood earnings, we conduct an additional analysis in which we compare each regional group with a group of natives. This allows us to compare each group with a similar group of natives, ensuring that we are not capturing dimensions such as labor market attachment prior to parenthood. We use a coarsened exact matching following the procedure described in Blackwell et al. (2009) and Iacus, King and Porro (2012). We match on age, calendar year, educational attainment, and pre-parenthood earnings. As the characteristics of both the father and mother are potentially important, we match on the earnings and education level of both parents. We use one-to-one matching, i.e. only individuals with a perfect match are included, and the rest are excluded. To enable exact matching, earnings are binned into quintiles, while age and calendar year are binned into groups of five years. Given the large number of individuals in the native population, the number of individuals that needs to be excluded in the immigrant background group is relatively small (see Table C.6).

4 Description

This section first presents statistics at the country group level underlying the ranking in terms of gender equality norms. Then we discuss individual and household characteristics of the sample used in the main analysis.

4.1 Gender equality ranking and other country characteristics

Table 1 presents the (parental) birth country groups used in creating the gender equality ranking. The World Bank's gender gap index (GGI) discussed in the data section places Iraq at the bottom of gender equality among the 28 groups, and puts Iceland and Norway at the top. While there is some variation, countries in the Middle East are often found in the lower end of the ranking, whereas Northern European (in particular Nordic) countries are typically found in the upper part.

The GGI is strongly correlated with other indicators of inequality, and also with economic development. For example, the (Spearman's rank) correlation between GGI and relative female labor force participation is .62. High GGI values are associated with higher GDP per capita, and with lower fertility rates. In the analysis we will use both the ranking and the values for GGI (and other indicators).

Table 1: Country group characteristics

	Gender Gap Index	GDP per Capita	Relative FLFP	Fertility Rate
Iraq	0.530	10565	0.104	5.882
Iran	0.584	12389	0.121	4.691
Middle East and N Africa	0.593	17030	0.284	4.540
Turkey	0.635	28199	0.421	3.107
South Asia and Mongolia	0.660	5996	0.328	5.071
West, Central, South Africa	0.672	4957	0.754	6.020
East Asia	0.672	28943	0.753	1.950
Czechia, Slovakia, Hungary	0.688	35237	0.744	1.886
Northeast Africa	0.705	1471	0.529	7.146
Bosnia and Herzegovina	0.712	14897	0.592	1.772
Southeast Asia	0.716	14589	0.769	3.020
E Europe, Caucasia, C Asia	0.717	24690	0.798	2.023
Former Yugoslavia	0.723	21836	0.686	2.173
Chile	0.723	24968	0.426	2.579
Mediterranean Europe	0.727	35897	0.539	1.387
Mexico and Central America	0.730	13334	0.490	3.509
US and Canada	0.731	60758	0.749	2.047
South America	0.731	14993	0.590	3.381
Poland	0.736	33121	0.766	2.060
Oceania	0.744	46715	0.694	2.039
Continental Europe	0.756	55186	0.650	1.613
The Baltic states	0.756	35718	0.751	2.040
UK and Ireland	0.769	49601	0.687	1.852
Denmark	0.782	57678	0.827	1.670
Germany	0.787	53639	0.623	1.450
Sweden	0.820	52531	0.876	2.130
Finland	0.832	48689	0.820	1.780
Island and Norway	0.845	63787	0.789	1.963
Total	0.717	30979	0.613	2.885

Notes: The table shows the source region characteristics for the regions in our main analysis sample. Regions are ranked in ascending order according to their Gender Gap Index in 2020 (World Economic Form). Relative FLFP is the female to male labor force participation rate in 1990 (World Bank). GDP per Capita in 1990 (World Bank), and fertility rate in 1990 (World Bank). See Table C.5 for a list of countries included in each source region.

4.2 Characteristics of the main sample

Table 2 displays characteristics for mothers in the main analysis sample. We divide the group of immigrant background (arriving before age 10 or born in Sweden) into high and low GGI countries, where the latter constitute about two thirds of the sample containing 45,000 mothers of immigrant background. The number of native mothers included amount to some 720,000.

Immigrant mothers are on average almost one year younger than natives at first childbirth, and those originating in countries with less equal gender norms are also substantially younger than those from more equal origins. They also exhibit a somewhat larger age difference to their partners, although the numbers are between 2.6 and 3.0 in all subgroups. The data show no strong signs of differences in completed fertility, although the figure is highest in the low GGI category (2.1 compared to 2.0 among the high GGI mothers).

Turning to income two years prior to first childbirth, we find that the region of origin differences typically seen among adult migrants are present also in our sample of child migrants and children of immigrants. Earnings are lower among individuals of immigrant background than among natives, and particularly among those originating in countries classified as less gender equal. Statistics based on the less crude grouping (Table C.1), suggests a rank correlation between the GGI and individual earnings of 0.83. At first glance, this pattern is consistent with women originating in less equal countries prioritizing labor market outcomes to a lesser degree. However, further statistics in Table 2 signal that it may be premature to assign all of the differences to gender equality norms. First, the correlations are similar for individual and household income. Second, and more importantly, mothers from low GGI countries actually have a higher share of household earnings than the natives and high GGI immigrant mothers. The statistics are thus likely to be affected by other mechanisms related to economic inequality and immigrant integration in general.

Most of the previous work using the epidemiological approach to study gender norms and the outcomes of immigrant women in the labor market have focused on first generation (adult) migrants. While we believe there are good reasons to focus an analysis of child penalties on the child migrants and the second generation (e.g. alleviating concerns about delayed fertility due to unobserved circumstances for adult migrants), comparing outcomes across generations within the region of origin groups is relevant. In Table C.7, we document that the characteristics at the country of origin level among females of immigrant background are highly correlated across the first and second generations. Also, they are strongly associated with patterns in the region of origin. For example, the pre-child income of mothers in our main sample has a correlation of 0.80 with the income of women in the first generation, and a similar correlation with source country GDP and GGI. Years of education is strongly related across generations (correlation coefficient 0.92), and negatively associated with fertility rates in the source region. The latter variable exhibits a positive association with the number of children born in the first and second generation of migrants to Sweden, however declining over generations.

Table 2: Descriptive characteristics—mothers

	Immigrant background			Natives
	All	Low GGI	High GGI	
Age	27.06	26.29	27.42	27.94
	(4.88)	(4.56)	(4.99)	(4.73)
Age difference	2.73	3.03	2.59	2.58
	(4.25)	(4.03)	(4.35)	(4.11)
Number of children	2.03	2.10	2.00	2.05
	(0.71)	(0.71)	(0.71)	(0.67)
Years of education	11.77	11.87	11.72	12.29
	(2.04)	(2.05)	(2.04)	(2.09)
Quantile of income	45.21	40.63	47.40	50.57
	(24.16)	(24.89)	(23.50)	(22.52)
Quantile of household income	48.81	42.36	51.89	55.62
	(22.79)	(23.62)	(21.72)	(20.45)
Mother's share of household income	0.47	0.50	0.46	0.45
	(0.28)	(0.31)	(0.26)	(0.24)
Observations	45344	14639	30705	720685

Notes: The table shows the descriptive statistics for our main analysis sample of women. Women with immigrant background are divided into two groups depending on being in the upper or lower part of the distribution in terms of source region GGI (see Table 1 for a ranking of source regions according to GGI).

5 Results

This section presents the results from the empirical analysis outlined in section 3. First, we consider child penalties among mothers of different origin and their correlation with gender equality norms as reflected in the GGI. After a graphical representation of the estimates and the associations, we investigate whether the link between gender equality classifications and child penalties can be explained by other source region characteristics. Second, we perform a matched analysis comparing immigrant mothers to natives with similar individual and partner outcomes prior to first childbirth. This analysis addresses the concern that there may be adaptations due to gender norms already before family formation, and the possibility that child penalties are dependent on the point of departure (e.g. how much one stands to lose or that work-life adaptation opportunity varies with earnings levels). Finally, we present results for supplementary outcomes and discuss investigations looking further into potential mechanisms and caveats regarding the baseline results.

5.1 Source region norms and the motherhood penalty

The upper graph of Figure 1 displays the event study graphs for motherhood penalties (MP) by region of origin in the main sample.[8] The first thing to notice is that all the region of origin categories exhibit the same characteristic pattern of a substantial drop in earnings, and an incomplete earnings recovery, over the first ten years following first childbirth. In other words, mothers of varying background in Sweden share similarities not only with each other, but with mothers around the world (Kleven, Landais and Leite-Mariante, 2023).

As seen in panel (b) of Figure 1, illustrating the association between the estimated penalties (over the 10-year period) and the GGI ranking, there appears to be some source region gender equality norms also among mothers fully or to a large degree grown up in the same broader Swedish context. The estimated earnings loss varies from 49 percent in the "Middle East and North Africa" category, to 36 percent e.g. among mothers with a background in the Baltic countries. The estimated slope for the 28 categories is -.24 (-.21 if weighted by the number of individuals in the respective groups) percentage points per step in the ranking. A broader grouping by GGI quintile indicates that the biggest difference is in the long-run recovery in the least gender equal category compared to the others (see Figure C.2). One should, however, note that there is substantial dispersion in the estimates also between groups with a similar GGI background. For example, the estimate for mothers of Iranian background is 38, which is considerably lower than in other groups close in GGI rank, and comparable to groups much higher up in the GGI ranking. This pattern may be seen as a first signal that origin related norms are not a perfect predictor and/or the possibility that emigrants may not always be representative of the norms characterizing the source region.

Corresponding analyses for other labor market outcomes reveal a substantial GGI gradient in the motherhood penalty for labor income including parental benefits (Figure A.1) and

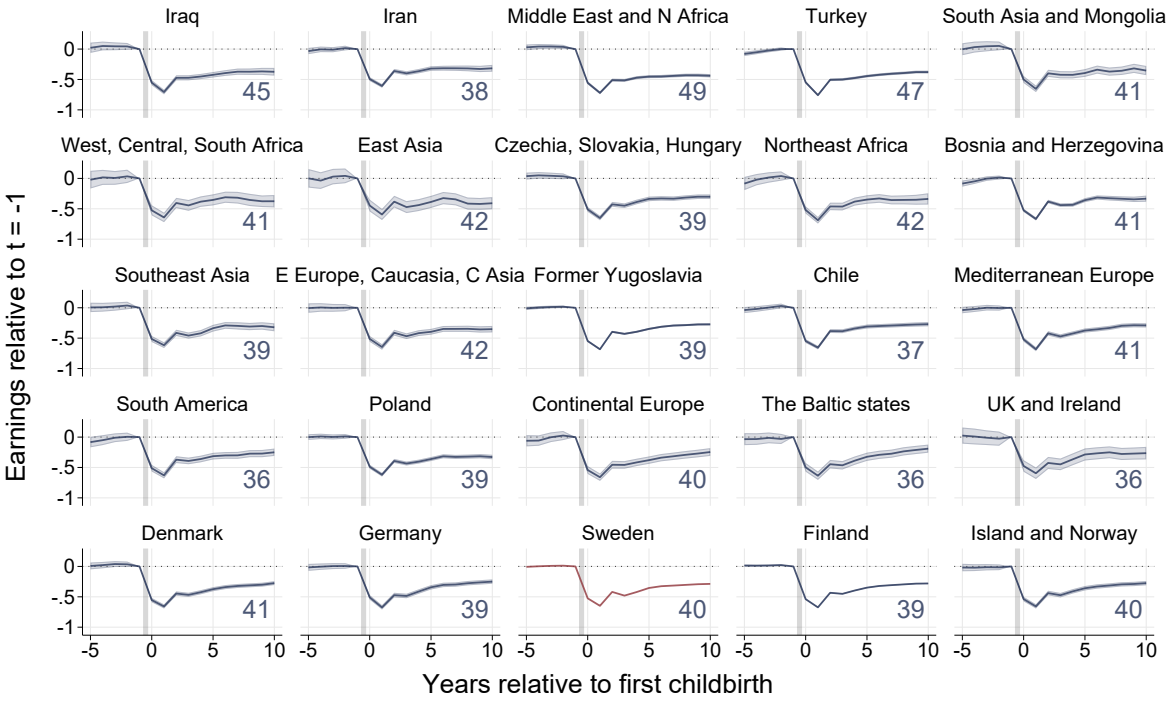
[8] A few groups with a limited number of individuals are excluded from the country specific graph matrix. The categories are however included in the other parts of the analysis.

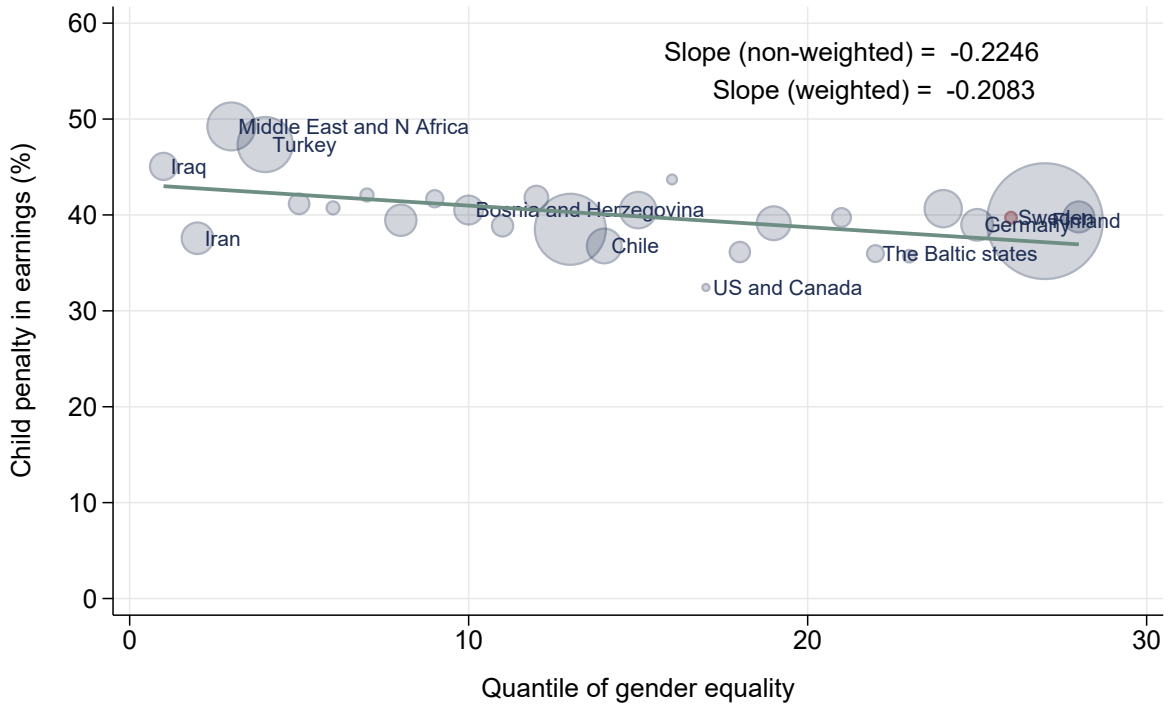
for employment (Figure A.2), where estimated impacts range from more than 35 to less than 15 percent (relative to pre-child levels) in income including parental benefits, and between 35 and 16 percent for employment. For full-time equivalent wages, the estimated impact of motherhood is smaller but also exhibits a negative association with GGI (Figure A.4). On the contrary, the effect on contracted work hours (percent of full-time) appears to increase with GGI background (Figure A.3). The latter finding is consistent with hours reductions being a common response among Swedish women working full time prior to first childbirth.

It is possible that the gender equality index is correlated with and captures other source country characteristics than gender norms. The first column of Table 3 displays estimates of Equation 2 described in section 3, interacting the event (*Post*, which is first childbirth) with the linear GGI rank variable. Note that the estimations also allow both age and year effects to vary with GGI background. The point estimate suggests that moving up one step in the ranking means slightly above SEK 1,000 higher annual earnings post motherhood on average, i.e. a smaller child penalty. Columns 2 and 3 perform the same analysis, but replaces GGI with source country GDP and fertility rates, respectively. Estimates suggest that people with a family background in richer countries experience smaller child penalties, and those originating where fertility is higher have stronger penalties. Columns 4–6 combine the source country variables. The estimated impact of gender norms is not much affected by controlling for the other source region characteristics.[9]

[9]It could be noted that the sign of the fertility estimates changes when one accounts for GDP and the GGI ranking.

Figure 1: Motherhood earnings penalties





Notes: The upper graph shows the estimated child penalties in earnings for the main sample, by region of (parental) origin. See Section 3 for details. The lower graph displays the 10-year earnings penalty by the GGI rank of the source region. Circle size is proportional to the number of observations (except for Sweden). The regression line represents a (non-weighted) linear prediction.

Table 3: Mothers' earnings: GGI and other source country characteristics

	(1) Income	(2) Income	(3) Income	(4) Income	(5) Income	(6) Income
Post × GGI	1070.5***			950.1***	1272.4***	1069.0***
	(38.16)			(69.90)	(68.51)	(77.77)
Post × GDP		1458.1***		164.3		650.5***
		(58.92)		(107.9)		(120.0)
Post × Fertility			-1039.4***		325.5***	640.5***
			(49.09)		(88.15)	(98.23)
GGI	✓			✓	✓	✓
GDP		✓		✓		✓
Fertility			✓		✓	✓
Year	✓	✓	✓	✓	✓	✓
Year × GGI	✓			✓	✓	✓
Year × GDP		✓		✓		✓
Year × Fertility			✓		✓	✓
Age	✓	✓	✓	✓	✓	✓
Age × GGI	✓			✓	✓	✓
Age × GDP		✓		✓		✓
Age × Fertility			✓		✓	✓
Event time dummies	✓	✓	✓	✓	✓	✓
Observations	806254	806254	806254	806254	806254	806254

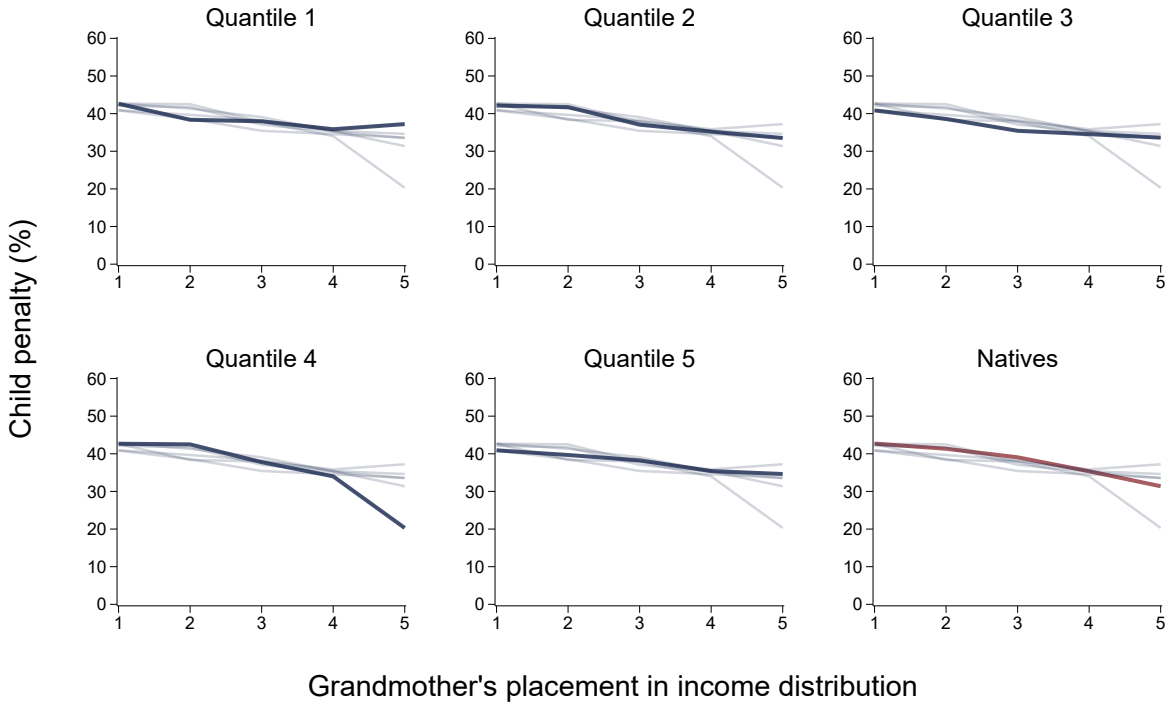
Standard errors in parentheses, * p < 0.1, ** p < 0.05, *** p < 0.01.

Notes: This table shows the regressions following Equation 2. Post is a dummy variable for being being in a time post childbirth. GGI, GDP, and Fertility are rank variable for source region characteristics. Event time dummies are dummy variables for event time, where event is birth of the first child. Age and Year are indicator variables.

5.2 Family norms and the motherhood penalty

Another dimension in which the impact of gender norms on child penalties can be examined is by focusing on the relative income of grandparents (Kleven, Landais and Søgaard, 2019). Figure 2 shows the child penalties when our main analysis sample of women is disaggregated both by the region of origin (quintiles for GGI) and by their mothers' position in the income distribution in Sweden. The idea is to investigate whether women who grew up with less traditional (family-oriented) gender norms in their household, i.e. their mothers were more career-oriented, also have a lower child penalty. As can be seen from the figure, there is a downward sloping trend in the size of the child penalty relative to the grandmother's position in the income distribution, suggesting that this is indeed the case. This relationship holds for all groups regardless of the grandmother's region of origin (including for natives). This suggests that both across and within groups of regional origins, the child penalties incurred by women are related to how career-oriented their mothers were. This is aligned with idea that the size of child penalties for women are partly determined by within-family transmission of gender norms from parents to their children.

Figure 2: Grandmothers placement in income distribution (main sample by GGI)



Notes: The figures show the total child penalty (average over the 10 years following first childbirth) for women relative to their mother's placement in the earnings distribution. The figures are separated based on the GGI in source region. The lower right figure shows the same but for natives.

5.3 The gradient in child penalty by gender inequality indices: norms or baseline differences in earnings?

The results presented so far are generally in line with the hypothesis that gender norms, captured by differences in source region characteristics, are related to the magnitude of the motherhood penalty. However, the observed gradient in the motherhood penalty by source region GGI may also be driven by differences in the baseline level of earnings across individuals with varying backgrounds (Kleven, 2022*b*). For example, in Table 2, we show that earnings in the year before child birth differs substantially across low- and high-GGI mothers on the one hand, and between mothers of immigrant background to native mothers, on the other. Moreover, using methods presented in (Kleven, 2022*b*), in panel (b) of Appendix Appendix C we show that women's counterfactual earnings are negatively related to source region GGI, suggesting that the variation in child penalty across groups with varying source region GGI is driven at least partly by baseline effects.

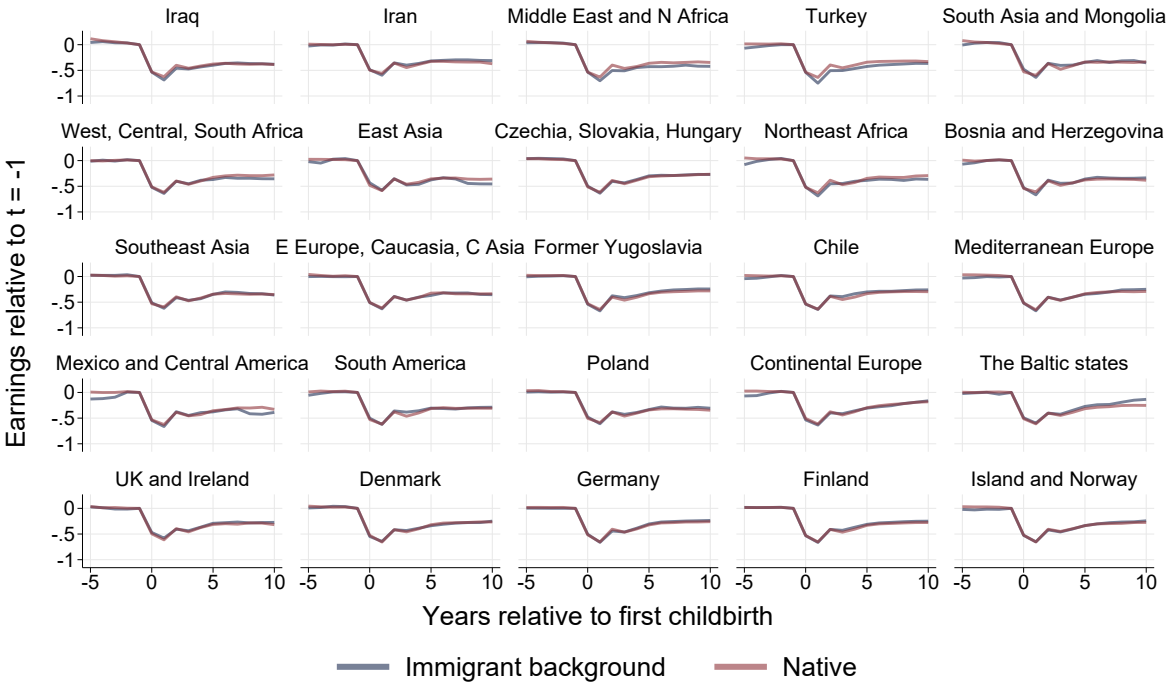
These results contrast to those found for counterfactual employment rates across US states documented in (Kleven, 2022*b*). To explore the role of baseline differences, we begin by performing an analysis comparing mothers of immigrant background to native mothers with similar own and partner economic status prior to having their first child using, using Coarsened Exact Matching (CEM). Next, we turn to look at changes of the within-household earnings differences and the origin related patterns of fatherhood penalties.

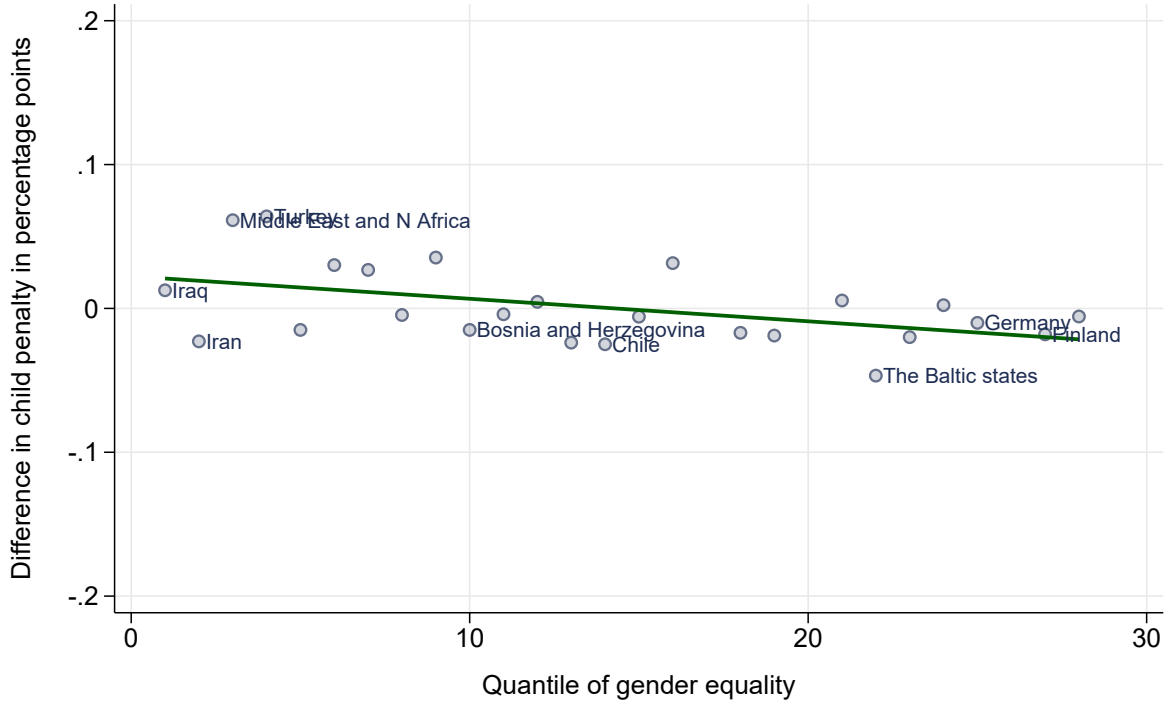
5.3.1 Matched comparisons

As discussed in the introduction, the event study approach to studying the labor market impact of parenthood builds on certain assumptions that could be questioned, in particular when making comparisons across groups and linking findings to cultural norms. It is possible that norms affect behavior already before family formation and that we therefore miss some of its impact. However, a basic idea in previous work emphasizing the role of parenthood for explaining gender gaps is that the event makes (traditional) norms salient. Systematic pre-child differences in socioeconomic status may also relate to expected effects in more mundane ways, e.g. by simply reflecting how much earnings one can lose, or affecting the bargaining position (or joint optimization) within households.

Figure 3 displays results from specifications using the CEM approach outlined in Section 3. For each region of origin category, we compare the earnings profiles to a sample containing mothers of Swedish background matched on own and partner's characteristics. A first impression is that when narrowing down the comparison to mothers with similar characteristics, most of the immigrant categories closely mirrors their Sweden-origin counterparts. Close inspection, however, reveals that there is some tendency for low-GGI mothers to recover slightly less well, and for high-GGI mothers to outperform the comparison groups. This results in the gradient is visible in the right-hand graph, where a DiD-type comparison going from the bottom to the top of the ranking implies a change of about -0.04 in the motherhood penalty. In other words, some of the association seen in the baseline results is no longer present in this comparison, although there is still a gradient.

Figure 3: Comparison with natives with similar income level—Women





Notes: The upper figure shows the results from out matched specification where we have matched each regional group to a sample of natives with similar characteristics. The lower figure shows the estimated difference in percentage points between the estimated child penalties in earnings for our main analysis sample (with an immigrant background) and the matched sample of natives. A positive difference means that the child penalty is higher for the group with an immigrant background, and a negative difference means the opposite.

5.3.2 Within-household comparisons and father trajectories

If intra-household re-arrangements in labor market and household responsibilities among parents are affected by gender norms linked to origin, we would expect to see stronger shifts in mother's share of household earnings in groups with a background in gender unequal contexts. Figure 4 presents an analysis along the same lines as above, but with the relative change in the earnings share attributable to the mother within the household as the dependent variable.[10] We see that mothers with diverse backgrounds all exhibit strong and similar reductions in earnings shares in the short run and an incomplete recovery over the 10-year period after first birth. This results in the most striking pattern seen in the right-hand side of Figure 4: the absence of an association between the GGI rank and the motherhood relative earnings loss. This finding arguably puts into doubt the idea that gender norms coming from one's background shape the differences seen in our sample of child migrants and children of immigrants.

A natural question is then what may explain this result? Performing an analysis of fatherhood penalties, using the same classification and methods as above, reveals a GGI gradient in fatherhood impacts similar to what we see for mothers (see Figures B.1 and B.5, and Table B.1). While trajectories for fathers do sometimes follow the mothers' pattern of a clear (although smaller) drop followed by recovery, other groups exhibit a negative long-term trend starting (or accelerating) around the time of the birth of one's first child. Sweden is a rare case of having a fatherhood penalty in earnings (Kleven et al., 2019*a*; Sundberg, 2023), and it seems that this phenomenon is present also among fathers of immigrant origin. We do, however, emphasize that there are cases where pre-trends may be a concern for the interpretation of the estimates.[11] This could signal that the identifying assumption of exogenous timing of parenthood is not fulfilled in certain socioeconomic and demographic strata. If so, the result may be a general warning flag regarding using this well-established approach when comparing across subgroups. Another possibility is that people originating in gender unequal (and low-GDP) contexts with on average poorer economic status are more frequently exposed to negative shocks, and that becoming a parent reduces their ability to accommodate these events (or to benefit from opportunities).[12]

6 Conclusions

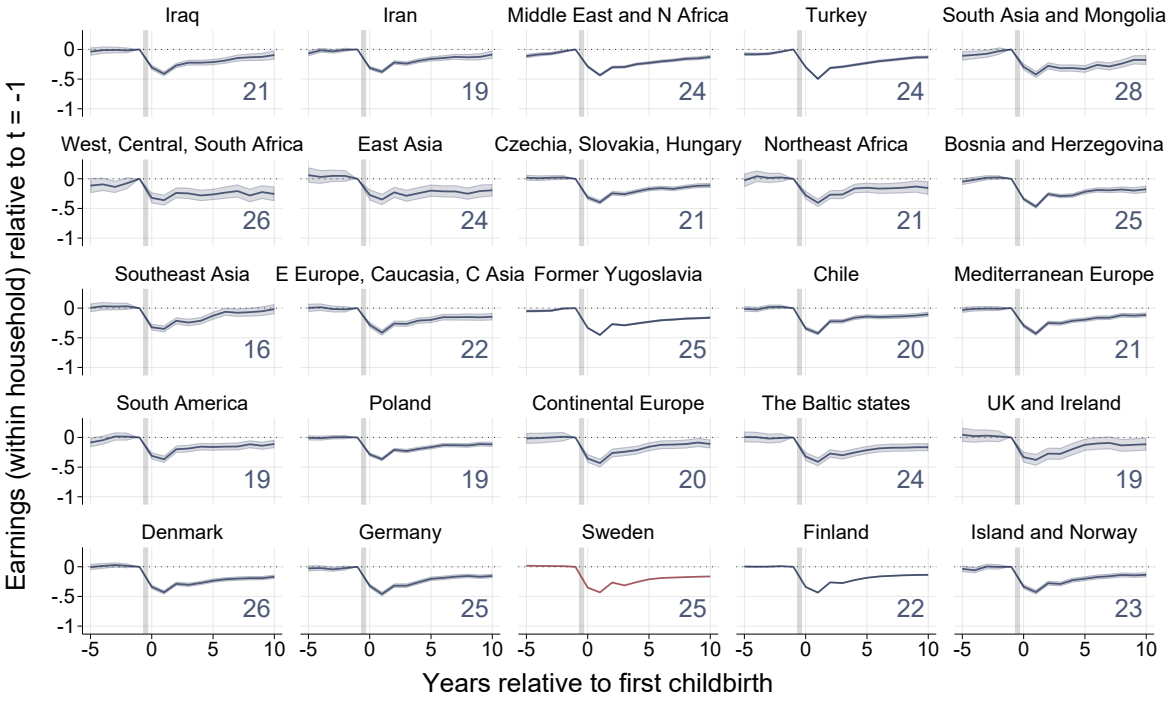
The consequences of parenthood for women's labor market outcomes are in focus for a very active field of research. The so-called motherhood penalty has emerged as an empirical regularity across countries and socioeconomic groups. Our study contributes to this literature by investigating similarities and differences in the impact of parenthood among mothers and fathers sharing a common institutional and economic context in a comparatively gender equal society, while potentially entering adulthood with differing norms regarding gender roles

[10] This is the main outcome variable used in Angelov, Johansson and Lindahl (2016).

[11] This can also be seen in C.2 where those originating in the least gender equal parts of the world show the greatest long-term losses, but also more signs of pre-trends.

[12] Note, though, that since we focus on people living in Sweden at least since they were 10, we do not expect concerns of assimilation profiles highly relevant for first-generation adult migrants to play a major role.

Figure 4: Earnings within household



through their background in different parts of the world.

We show that the main sample consisting of child migrants and children of immigrants in Sweden show pre-parental similarities not only with first generation adult migrants sharing their geographic origin, but also with the gender equality indicators seen among the populations of these countries. Thus, descriptions using our data appear to confirm previous research suggesting that there is a link between source country characteristics and migrant outcomes, potentially reflecting deeply rooted cultural norms and values. With this perspective, it is striking how similar the impact of motherhood is across groups of very different background in terms of gender equality. The earnings trajectories follow very similar profiles, and all country of origin groups experience long-term losses. One interpretation is that welfare state and labor market institutions shape behavior and limit the influence e.g. of inherited norms and values.

Nevertheless, our baseline findings suggest a significant negative association between the gender equality rank of the source region and the size of the child penalty in earnings. This association cannot fully be explained by other characteristics included in the analysis, is present also across crudely defined groups, and seen also in employment and wages. Furthermore, matched comparisons between native and foreign-background mothers similar in age and pre-child economic status indicates that differences in motherhood penalties are related to gender equality background in qualitatively similar ways.

That could possibly have been the end of the investigation, confirming expectations on the influence of origin related norms and concluding that the shared context matters too. However, further analysis gives strong reasons to be cautious in drawing conclusions, and possibly also signaling methodological caveats for the type of event-study approaches common in the literature. First, there is variation in the group-specific estimates suggesting substantial differences between people originating in different but with respect to gender equality similar countries. Second, and more importantly, the within household loss of earnings shares experienced by all groups shows basically no association with the gender equality classification. Our finding that estimates of long-term fatherhood penalties are also negatively associated with the GGI go against expectations based on traditional gender norms affecting household-level optimizations and parental bargaining.

Our interpretation is that motherhood penalties are arguably more similar than different across groups characterized by highly diverse backgrounds reflected in pre-child outcomes. This suggests that reforms affecting common conditions in the host context are likely to have similar impacts in groups with varying background. Findings also suggest that differential responses to parenthood related to cultural background are not a main driver of gender earnings gaps being particularly large in some immigrant communities. Finally, our results regarding fatherhood penalties also point to the need for a better understanding of selection into parenthood in different socioeconomic and demographic groups and the possibility that some restrictions related to parenthood are more influential in groups of immigrant background with on average poorer labor market positions.

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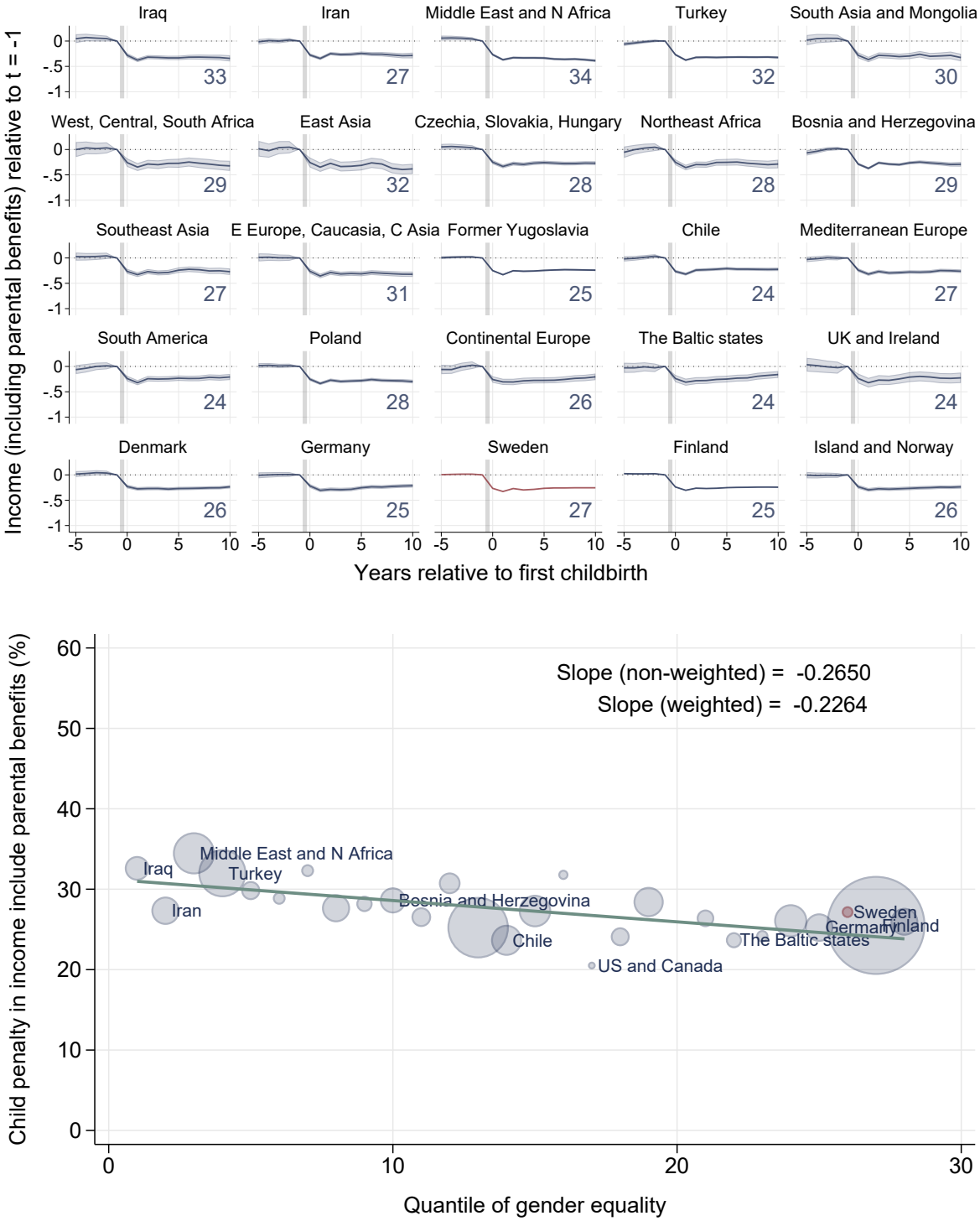
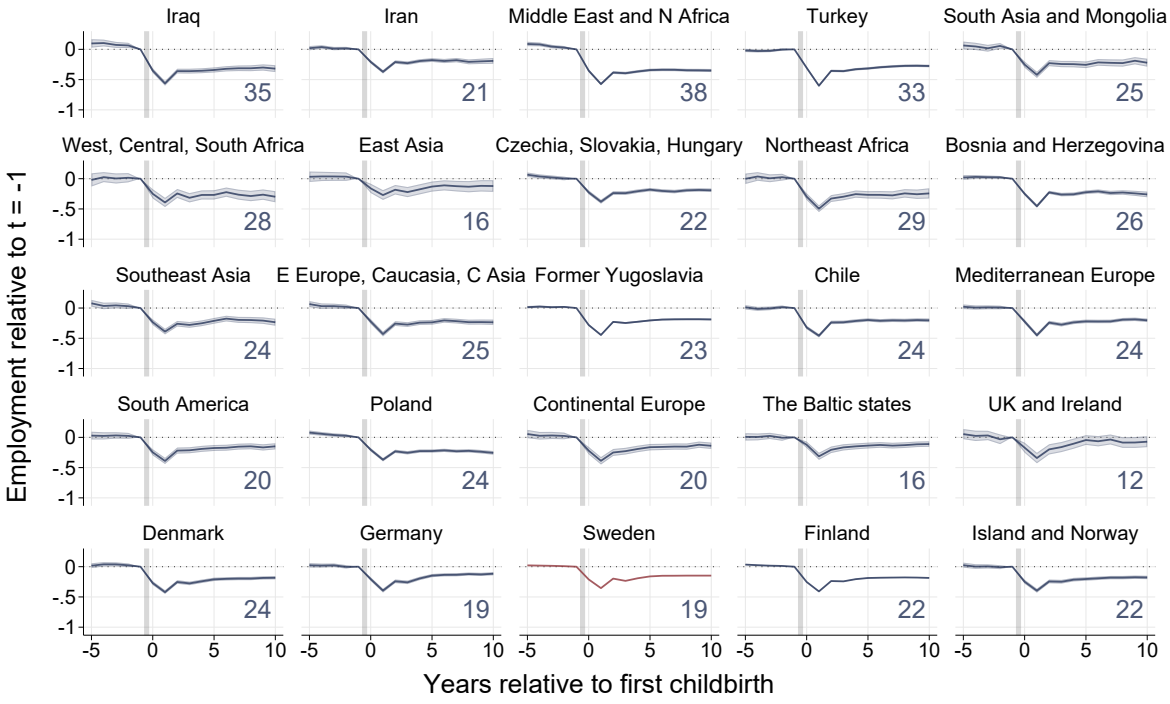
Appendix A Variations on motherhood penalties

Figure A.1: Motherhood penalty – earnings and parental benefits



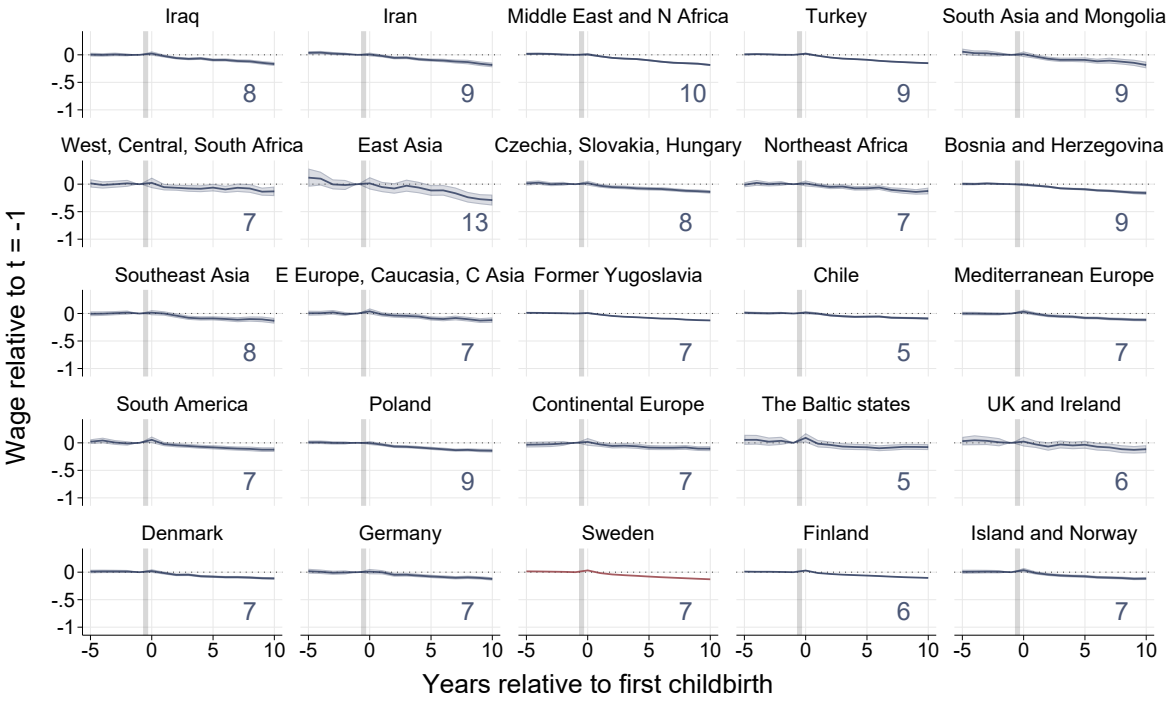
Notes: The upper graph shows the estimated child penalties in income (including parental benefits) for the main sample, by region of (parental) origin. See Section 3 for details. The lower graph displays the 10-year earnings penalty by the GGI rank of the source region. Circle size is proportional to the number of observations (except for Sweden). The regression line represents a (non-weighted) linear prediction.

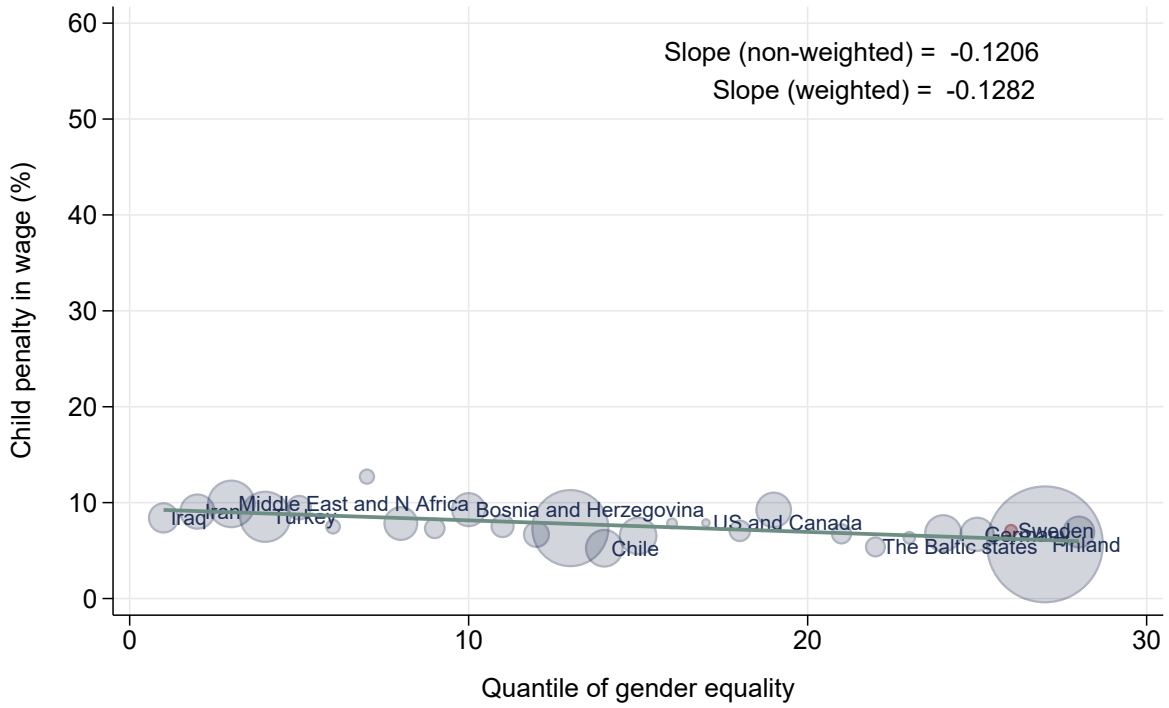
Figure A.2: Motherhood penalty – employment



Notes: The upper graph shows the estimated child penalties in employment for the main sample, by region of (parental) origin. Employment is defined as not being in the last two deciles in the income distribution in a given year. See Section 3 for details. The lower graph displays the 10-year earnings penalty by the GGI rank of the source region. Circle size is proportional to the number of observations (except for Sweden). The regression line represents a (non-weighted) linear prediction.

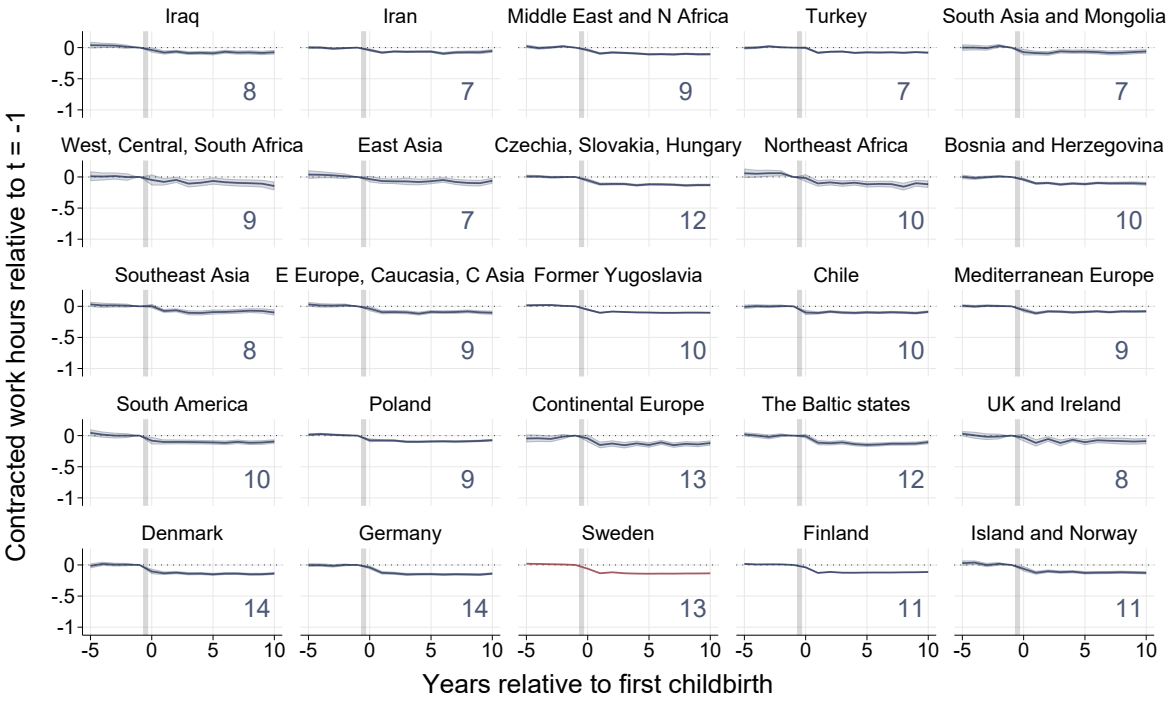
Figure A.3: Motherhood penalty – wages





Notes: The upper graph shows the estimated child penalties in contracted wages for the main sample, by region of (parental) origin. See Section 3 for details. The lower graph displays the 10-year earnings penalty by the GGI rank of the source region. Circle size is proportional to the number of observations (except for Sweden). The regression line represents a (non-weighted) linear prediction.

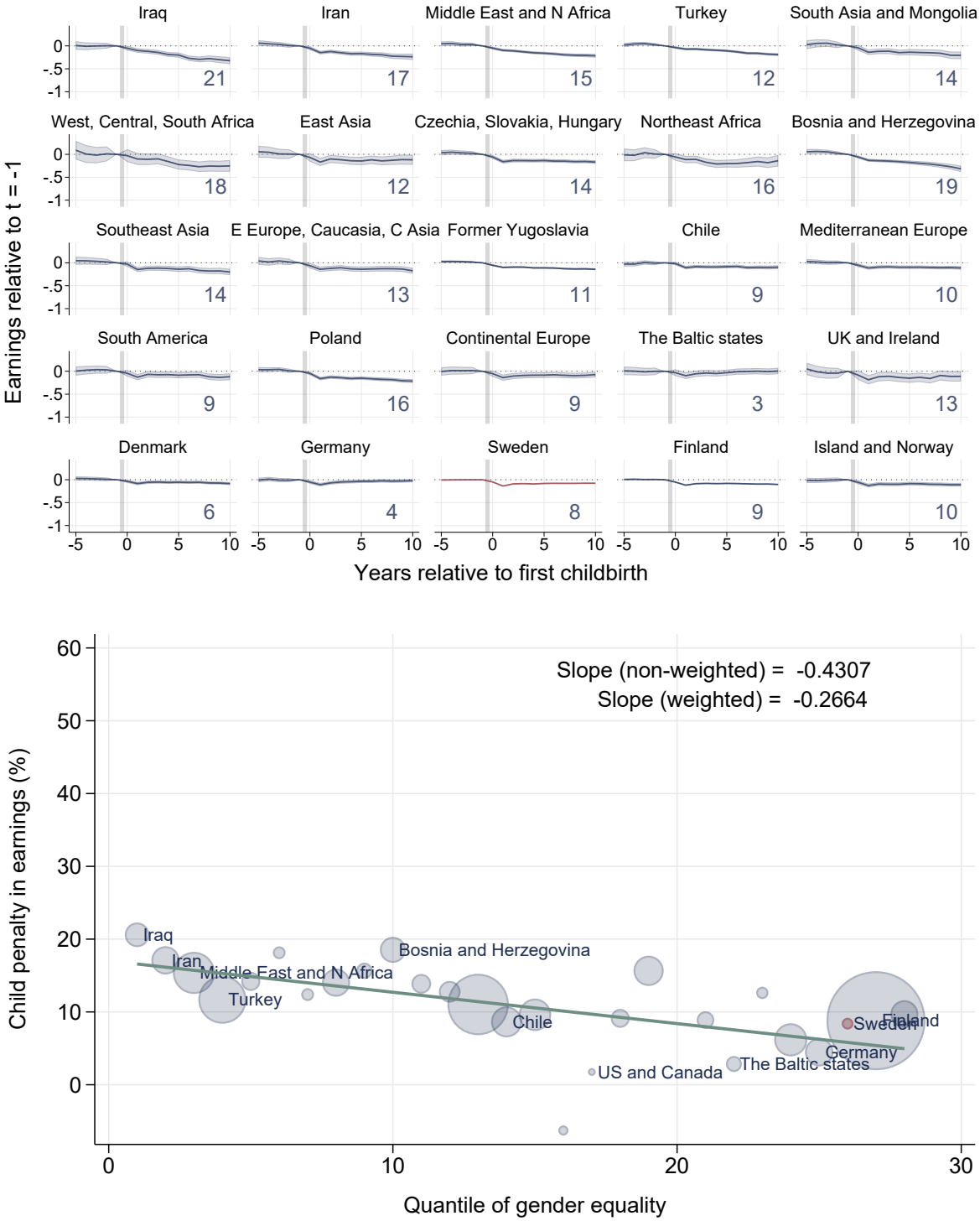
Figure A.4: Motherhood penalty – hours



Notes: The upper graph shows the estimated child penalties in contracted work hours for the main sample, by region of (parental) origin. See Section 3 for details. The lower graph displays the 10-year earnings penalty by the GGI rank of the source region. Circle size is proportional to the number of observations (except for Sweden). The regression line represents a (non-weighted) linear prediction.

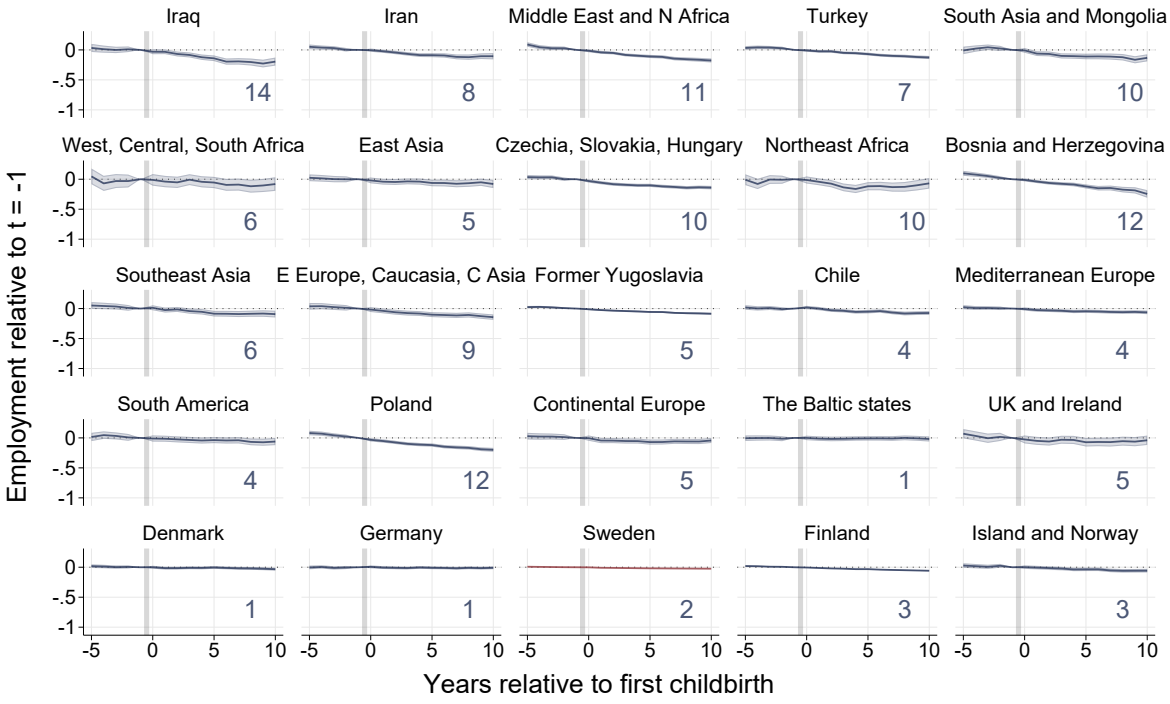
Appendix B Fatherhood penalties

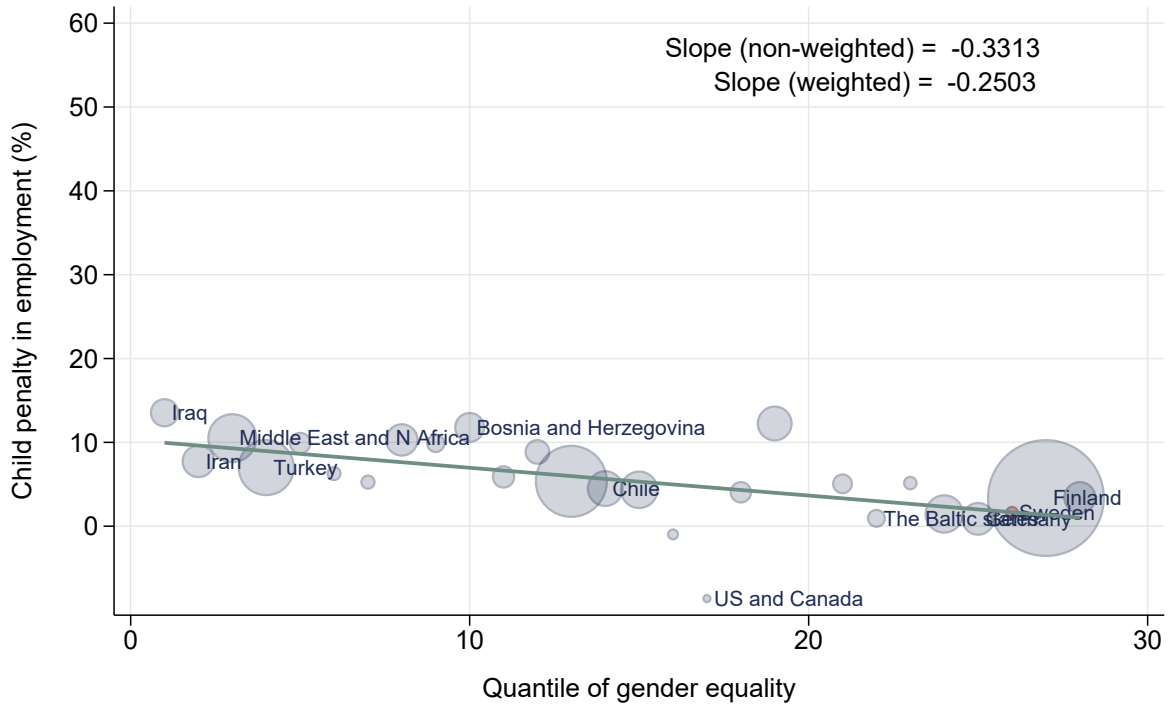
Figure B.1: Fatherhood penalty – earnings



Notes: The upper graph shows the estimated child penalties in earnings for men, by region of (parental) origin. See Section 3 for details. The lower graph displays the 10-year earnings penalty by the GGI rank of the source region. Circle size is proportional to the number of observations (except for Sweden). The regression line represents a (non-weighted) linear prediction.

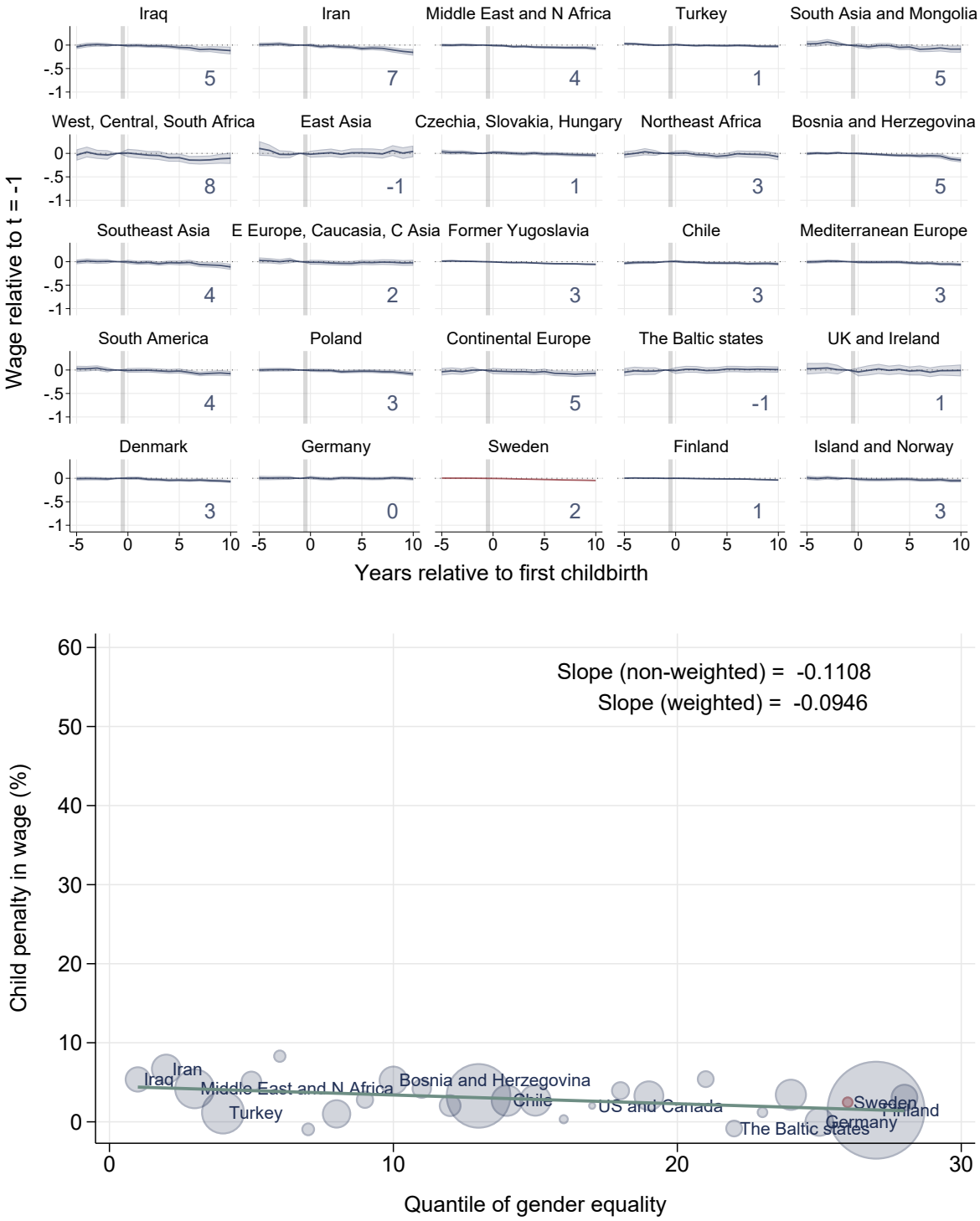
Figure B.2: Fatherhood penalty – employment





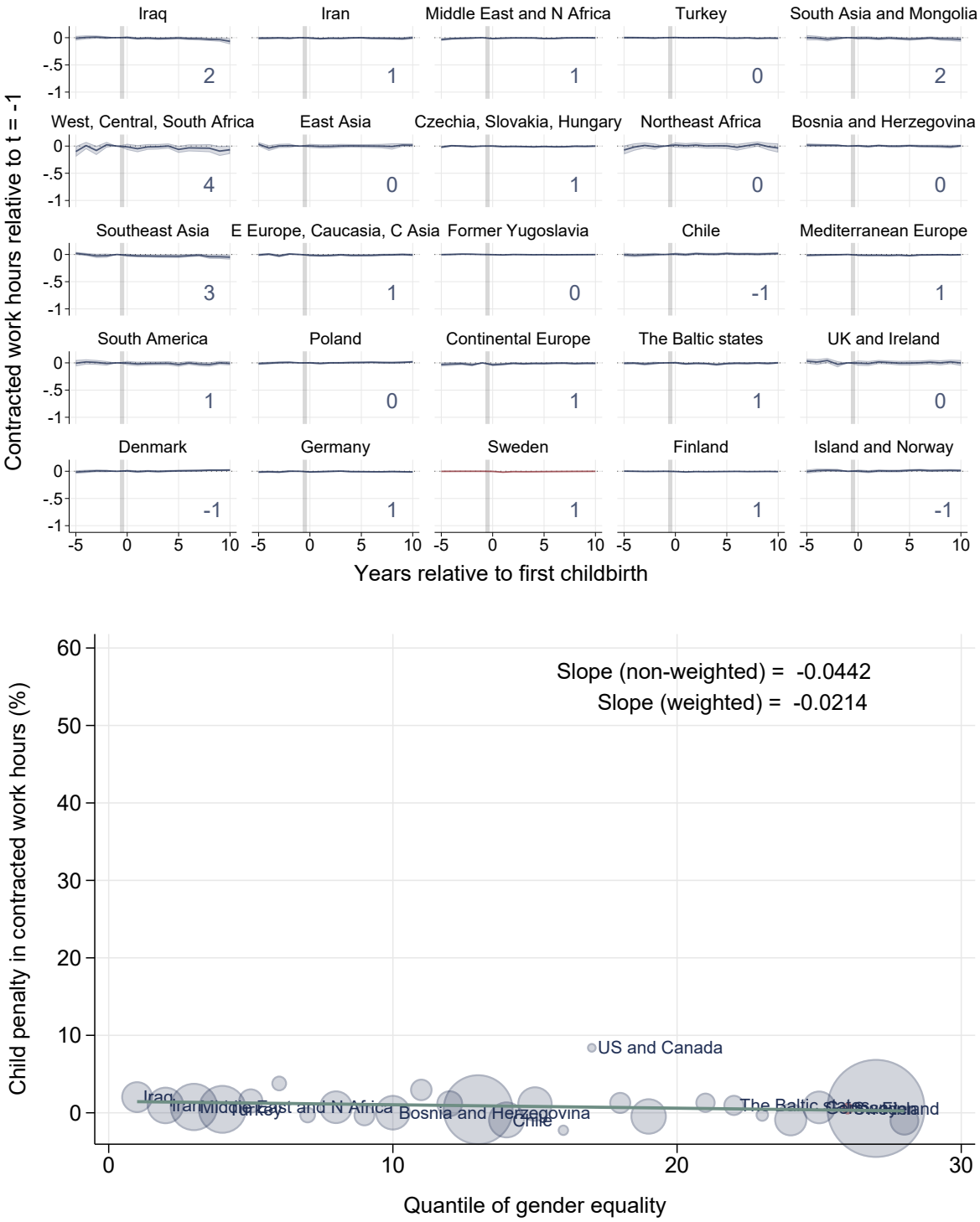
Notes: The upper graph shows the estimated child penalties in employment for men, by region of (parental) origin. Employment is defined as not being in the last two deciles in the income distribution in a given year. See Section 3 for details. The lower graph displays the 10-year earnings penalty by the GGI rank of the source region. Circle size is proportional to the number of observations (except for Sweden). The regression line represents a (non-weighted) linear prediction.

Figure B.3: Fatherhood penalty – wages



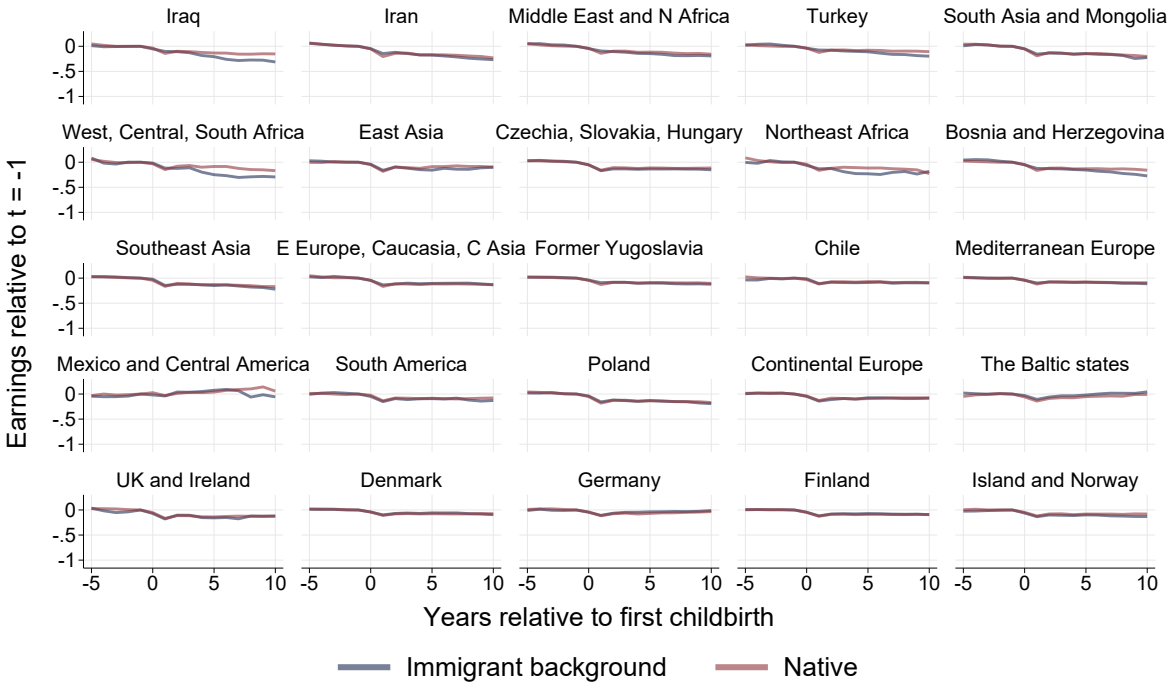
Notes: The upper graph shows the estimated child penalties in contracted wages for men, by region of (parental) origin. See Section 3 for details. The lower graph displays the 10-year earnings penalty by the GGI rank of the source region. Circle size is proportional to the number of observations (except for Sweden). The regression line represents a (non-weighted) linear prediction.

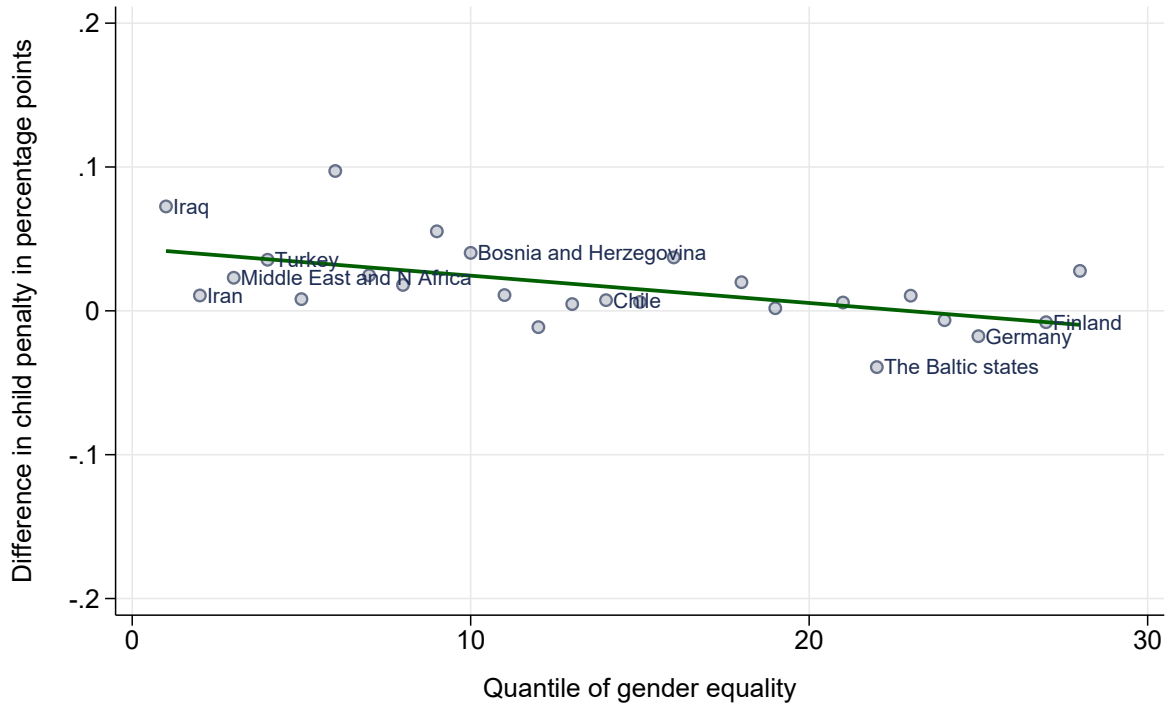
Figure B.4: Fatherhood penalty – hours



Notes: The upper graph shows the estimated child penalties in contracted work hours for men, by region of (parental) origin. See Section 3 for details. The lower graph displays the 10-year earnings penalty by the GGI rank of the source region. Circle size is proportional to the number of observations (except for Sweden). The regression line represents a (non-weighted) linear prediction.

Figure B.5: Comparison with natives with similar income level—Men





Notes: The upper figure shows the results from out matched specification where we have matched each regional group to a sample of natives with similar characteristics. The lower figure shows the estimated difference in percentage points between the estimated child penalties in earnings for our main analysis sample (with an immigrant background) and the matched sample of natives. A positive difference means that the child penalty is higher for the group with an immigrant background, and a negative difference means the opposite.

Table B.1: Fathers' earnings: GGI – other source country characteristics

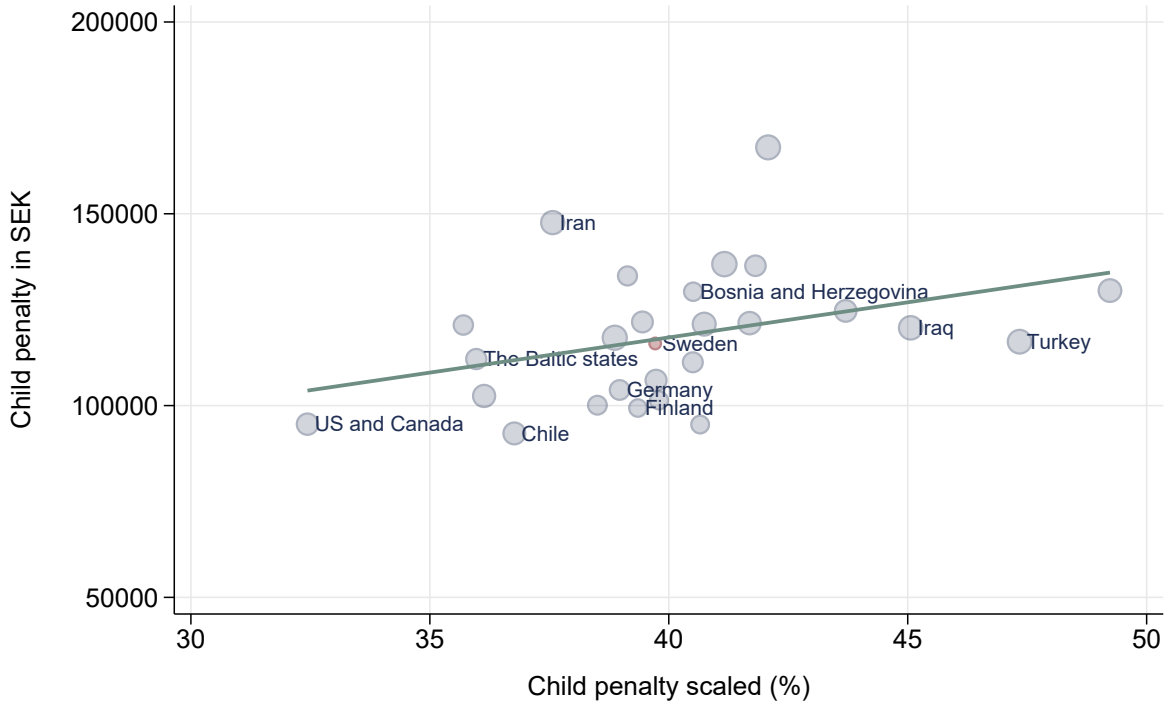
	(1) Income	(2) Income	(3) Income	(4) Income	(5) Income	(6) Income
Post × GGI	1099.7***			703.9***	1042.3***	708.6***
	(50.49)			(90.66)	(86.86)	(98.34)
Post × GDP		1640.9***		706.5***		1055.8***
		(77.50)		(139.1)		(158.7)
Post × Fertility			-1202.7***		-86.47	359.6**
			(65.02)		(111.8)	(128.3)
GGI	✓			✓	✓	✓
GDP		✓		✓		✓
Fertility			✓		✓	✓
Year	✓	✓	✓	✓	✓	✓
Year × GGI	✓			✓	✓	✓
Year × GDP		✓		✓		✓
Year × Fertility			✓		✓	✓
Age	✓	✓	✓	✓	✓	✓
Age × GGI	✓			✓	✓	✓
Age × GDP		✓		✓		✓
Age × Fertility			✓		✓	✓
Event time dummies	✓	✓	✓	✓	✓	✓
Observations	862881	862881	862881	862881	862881	862881

Standard errors in parentheses, * p < 0.1, ** p < 0.05, *** p < 0.01.

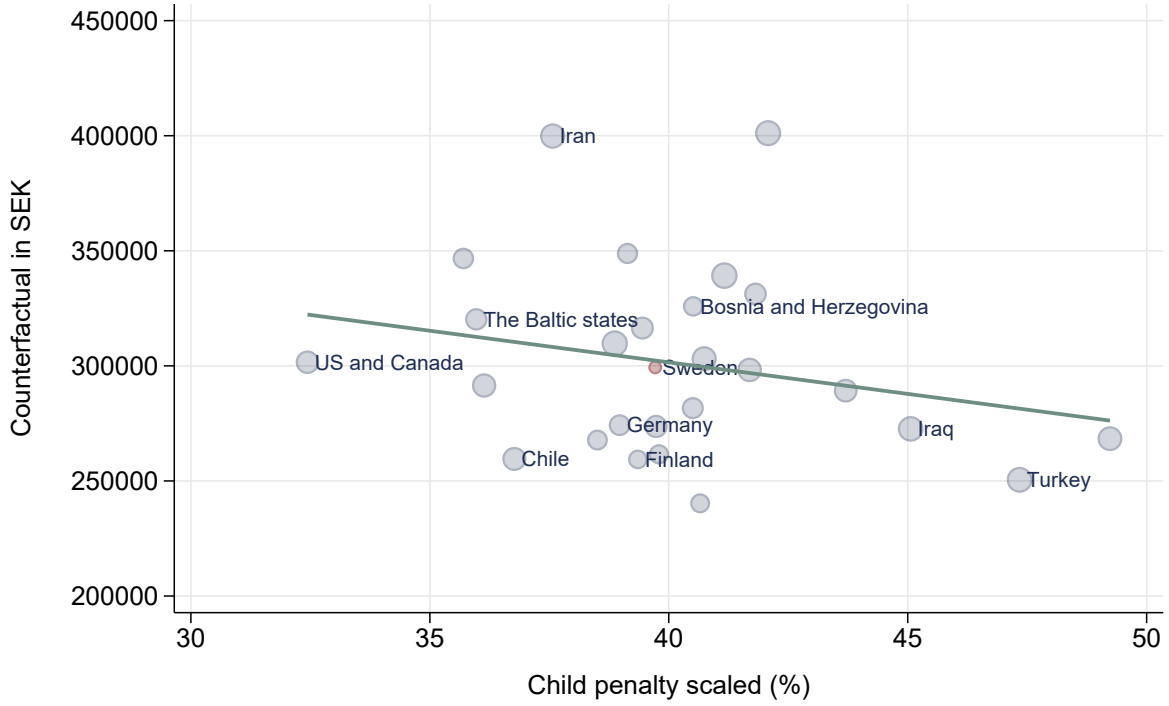
Notes: This table shows the regressions following Specification 2. Post is a dummy variable for being being in a time post childbirth. GGI, GDP, and Fertility is a rank variable for source region characteristics. Event time dummies are dummy variables for event time, where event is birth of the first child. Age and Year are indicator variables.

Appendix C Additional figures and tables

Figure C.1: Earnings in absolute and relative terms and counterfactual earnings



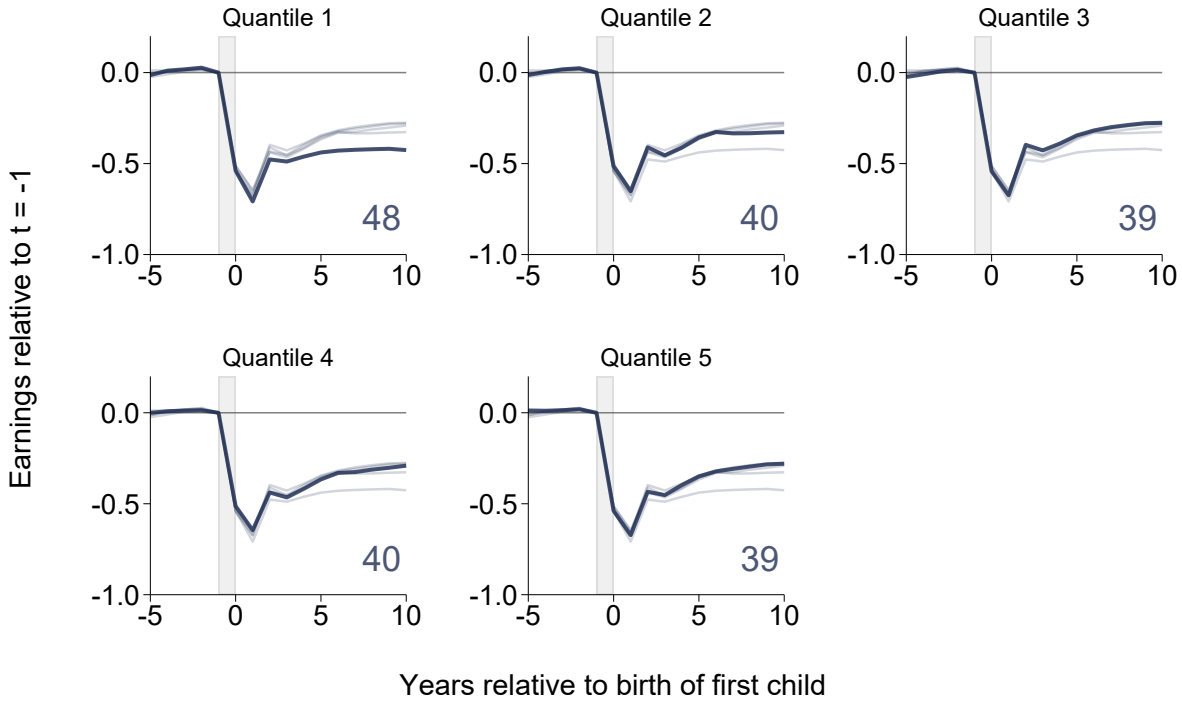
(a) Women's child penalties in SEK relative to %



(b) Women's counterfactual earnings relative child penalties

Notes: The figure shows the baseline effects of child penalties. The upper panel relates the child penalty in absolute terms (SEK) to the child penalties in relative terms (%). The lower graph relates counterfactual earnings to the child penalty in relative terms (%).

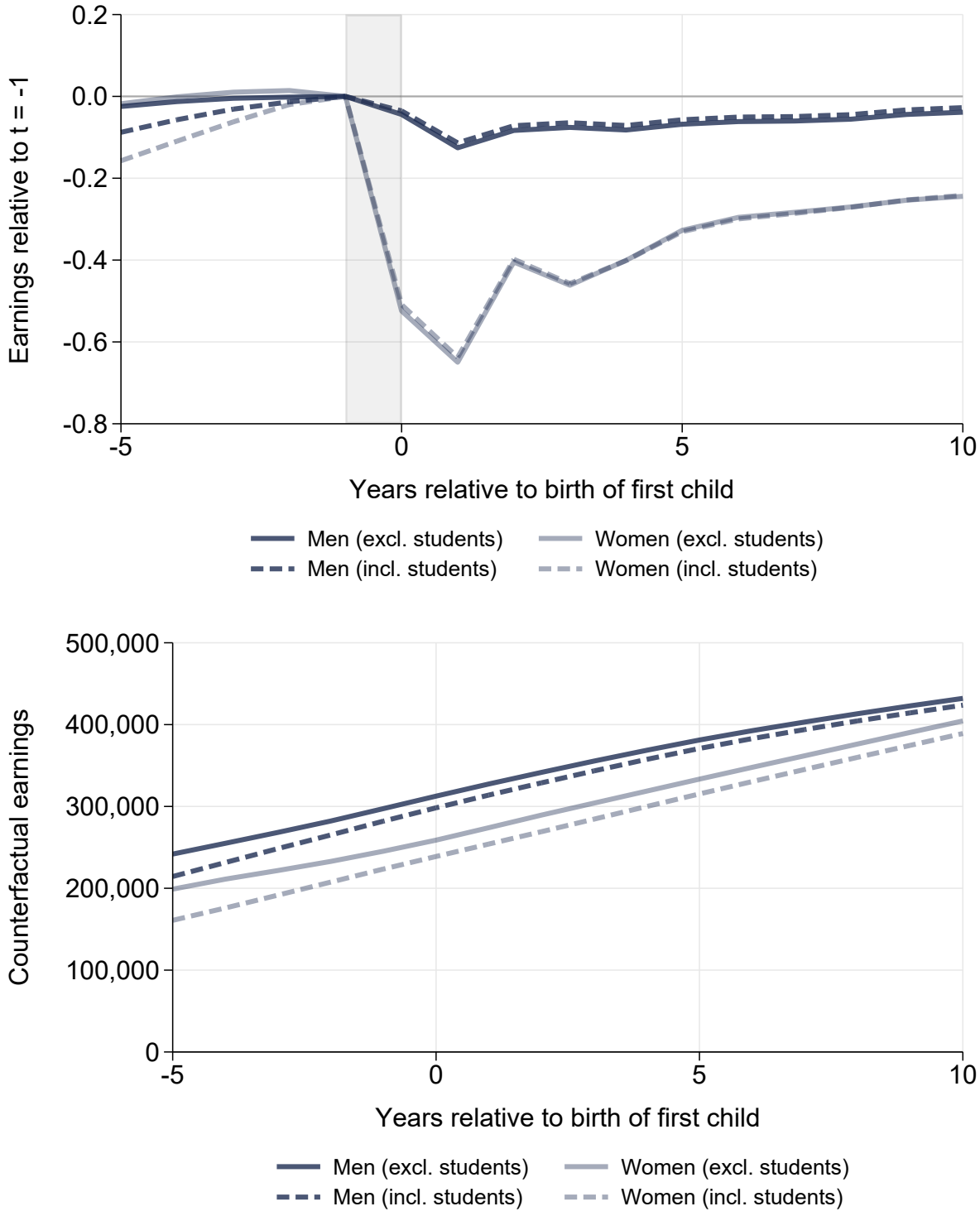
Figure C.2: Earnings. Sample divided by quintile of GGI



(a) Women

Notes: The figure the estimated child penalties in earnings for the main sample, by region of (parental) origin. The quintiles are based on the rank of the GGI for (parental) source region, ranging from the lowest GGI to the highest.

Figure C.3: Student restriction



Notes: The figures shows a comparison when running the main Equations 1a and 1b when including our excluding students from the population. The upper figure shows the estimated child and the lower figure shows the estimated counterfactual earnings.

Table C.1: Descriptive Statistics—Women

	Years of Education	Quantile of Income	Quantile of HH Income	Number of Children	Single Household
Iraq	11.71	16.91	22.33	2.071	0.209
Iran	12.85	29.82	36.45	1.687	0.249
Middle East and N Africa	11.57	25.26	29.45	2.265	0.198
Turkey	11.24	31.46	31.98	2.192	0.174
South Asia and Mongolia	12.15	28.21	36.28	1.950	0.151
West, Central, South Africa	12.01	34.61	43.03	1.953	0.328
East Asia	13.89	35.42	46.56	1.753	0.138
Czechia, Slovakia, Hungary	12.79	48.66	53.98	1.883	0.229
Northeast Africa	10.75	33.39	37.54	2.411	0.447
Bosnia and Herzegovina	12.24	33.36	38.74	1.912	0.140
Southeast Asia	11.37	31.78	43.56	1.747	0.197
E Europe, Caucasia, C Asia	13.75	36.52	45.11	1.723	0.224
Former Yugoslavia	11.86	39.81	42.93	1.991	0.200
Chile	11.46	35.87	39.78	1.929	0.342
Mediterranean Europe	12.83	45.91	51.24	1.935	0.169
Mexico and Central America	12.93	34.93	43.79	1.814	0.253
US and Canada	14.18	48.18	56.92	1.995	0.147
South America	12.67	36.05	45.03	1.826	0.270
Poland	12.84	40.19	46.43	1.761	0.226
Oceania	13.39	44.51	52.44	2.057	0.151
Continental Europe	13.64	51.52	57.80	2.012	0.162
The Baltic states	13.77	48.34	54.81	1.865	0.173
UK and Ireland	13.40	50.61	58.06	1.958	0.139
Denmark	11.85	43.30	49.32	2.007	0.222
Germany	12.95	52.00	57.78	1.981	0.167
Sweden	12.28	50.39	55.43	2.051	0.182
Finland	11.82	48.37	52.81	1.977	0.238
Island and Norway	12.24	48.32	54.09	2.019	0.211
Total	12.26	49.32	54.40	2.042	0.186

Notes: The table includes foreign born individuals with an age at immigration ≤ 10 and second generation immigrants (both parents foreign born, region of ancestry is source country of the mother). The country groups are listed in ascending order according to a weighted Global Gender Gap Index (2020). Sweden includes "natives" (born in Sweden and both parents born in Sweden). **Quantile of Income** is the income percentile for a given year, two years prior to the birth of the mother's first child. **Quantile of HH Income** is the average of the income percentiles of the parents. **Number of Children** is the total number of children within 8 years from mother's first child (father's children preceding the birth of mother's first child excluded). **Single Household** is equal to one when the parent is registered as a "single household with a child aged ≤ 18," 8 years from the birth of mother's first child, and zero otherwise.

Table C.2: Descriptive Statistics—Men

	Years of Education	Quantile of Income	Quantile of HH Income	Number of Children	Single Household
Iraq	11.66	27.57	22.39	2.129	0.232
Iran	12.38	37.58	33.45	1.758	0.262
Middle East and N Africa	11.33	31.22	29.63	2.284	0.236
Turkey	10.94	32.14	30.63	2.193	0.187
South Asia and Mongolia	12.16	41.34	33.52	2.043	0.173
West, Central, South Africa	12.04	38.35	37.84	1.987	0.412
East Asia	13.92	46.89	40.88	1.819	0.184
Czechia, Slovakia, Hungary	12.56	57.23	52.09	1.933	0.233
Northeast Africa	11.18	37.12	32.61	2.462	0.459
Bosnia and Herzegovina	11.85	42.19	37.25	1.953	0.162
Southeast Asia	10.94	42.41	36.46	1.984	0.267
E Europe, Caucasia, C Asia	12.65	48.26	43.50	1.838	0.242
Former Yugoslavia	11.59	45.66	41.71	2.033	0.215
Chile	11.23	38.37	36.74	1.958	0.427
Mediterranean Europe	12.12	48.35	47.67	1.962	0.213
Mexico and Central America	12.34	37.59	39.18	1.887	0.381
US and Canada	13.93	50.54	51.41	1.967	0.172
South America	12.29	42.38	41.83	1.916	0.360
Poland	12.47	50.04	44.65	1.817	0.262
Oceania	13.63	50.54	51.13	2.025	0.158
Continental Europe	13.50	58.11	55.62	1.981	0.165
The Baltic states	13.35	63.76	58.21	1.963	0.160
UK and Ireland	13.14	51.30	52.07	1.971	0.154
Denmark	11.72	52.46	48.10	1.965	0.218
Germany	12.80	61.34	56.40	1.959	0.186
Sweden	12.02	61.22	55.12	2.007	0.188
Finland	11.40	55.89	50.23	1.937	0.274
Island and Norway	12.06	56.41	51.95	1.939	0.241
Total	12.00	59.60	53.73	2.005	0.195

Notes: See notes for Table C.1

Table C.3: Descriptive Statistics—Women (1st gen. at age 45)

	Years of Education	Quantile of Income	Quantile of HH Income	Number of Children	Single Household
Iraq	12.05	26.35	27.36	1.953	0.198
Iran	13.13	43.08	44.22	1.664	0.292
Middle East and N Africa	11.33	25.54	26.96	2.326	0.216
Turkey	10.16	31.67	33.62	2.532	0.221
South Asia and Mongolia	11.88	34.08	37.99	1.906	0.154
West, Central, South Africa	12.07	42.59	45.19	2.086	0.363
East Asia	13.96	40.47	48.43	1.395	0.155
Czechia, Slovakia, Hungary	13.52	49.05	52.03	1.652	0.278
Northeast Africa	10.51	33.39	36.66	2.886	0.400
Bosnia and Herzegovina	12.00	47.37	50.11	1.471	0.144
Southeast Asia	10.98	38.15	44.36	1.813	0.260
E Europe, Caucasia, C Asia	14.16	45.43	47.65	1.250	0.274
Former Yugoslavia	11.29	39.38	42.24	1.887	0.219
Chile	11.74	44.08	49.05	2.243	0.401
Mediterranean Europe	13.46	46.65	53.89	1.687	0.192
Mexico and Central America	13.32	45.20	51.25	1.842	0.293
US and Canada	14.79	45.27	56.56	1.738	0.156
South America	13.12	42.91	50.48	1.693	0.310
Poland	12.91	44.39	46.59	1.469	0.299
Oceania	13.63	44.20	56.07	1.797	0.195
Continental Europe	14.36	44.34	53.13	1.469	0.146
The Baltic states	14.36	46.61	49.72	1.234	0.203
UK and Ireland	13.73	47.27	58.08	1.746	0.159
Denmark	13.15	42.41	48.85	1.842	0.207
Germany	14.22	48.81	54.96	1.535	0.157
Finland	12.68	54.39	58.27	2.126	0.301
Island and Norway	12.73	50.63	56.67	2.101	0.255
Total	12.32	40.07	43.72	1.886	0.246

Notes: The table includes foreign born individuals at age 45. The country groups are listed in ascending order according to a weighted Global Gender Gap Index (2020). Sweden includes "natives" (born in Sweden and both parents born in Sweden). **Quantile of Income** is the income percentile for a given year, two years prior to the birth of the mother's first child. **Quantile of HH Income** is the average of the income percentiles of the parents. **Number of Children** is the total number of children within 8 years from mother's first child (father's children preceding the birth of mother's first child excluded). **Single Household** is equal to one when the parent is registered as a "single household with a child aged ≤ 18," 8 years from the birth of mother's first child, and zero otherwise.

Table C.4: Descriptive Statistics—Men (1st gen. at age 45)

	Years of Education	Quantile of Income	Quantile of HH Income	Number of Children	Single Household
Iraq	12.21	29.29	25.56	2.230	0.167
Iran	12.80	43.77	39.53	1.742	0.262
Middle East and N Africa	11.40	29.71	26.69	2.500	0.184
Turkey	10.39	33.98	32.40	2.744	0.199
South Asia and Mongolia	12.32	41.40	34.30	2.114	0.127
West, Central, South Africa	12.48	43.76	40.98	2.480	0.350
East Asia	14.62	48.52	42.68	1.343	0.132
Czechia, Slovakia, Hungary	12.76	51.08	45.64	1.707	0.267
Northeast Africa	11.37	39.16	32.41	3.092	0.347
Bosnia and Herzegovina	12.01	53.52	48.93	1.634	0.133
Southeast Asia	10.53	43.50	37.90	2.276	0.277
E Europe, Caucasia, C Asia	13.26	46.78	42.44	1.280	0.218
Former Yugoslavia	11.58	45.07	41.11	2.151	0.214
Chile	11.55	51.15	46.87	2.506	0.435
Mediterranean Europe	12.20	50.24	48.36	1.904	0.252
Mexico and Central America	12.83	49.74	48.44	2.257	0.391
US and Canada	14.40	53.89	52.05	1.854	0.210
South America	12.92	49.67	46.14	2.017	0.371
Poland	12.43	47.88	42.97	1.346	0.246
Oceania	13.78	57.99	55.87	1.911	0.223
Continental Europe	14.06	59.81	53.98	1.647	0.167
The Baltic states	13.43	46.45	42.11	1.015	0.187
UK and Ireland	13.20	56.60	53.97	1.859	0.216
Denmark	12.82	44.53	42.42	1.765	0.211
Germany	14.36	60.69	53.71	1.526	0.164
Finland	11.45	56.16	50.73	2.047	0.330
Island and Norway	12.60	56.46	52.31	1.951	0.247
Total	12.16	43.30	39.24	2.103	0.229

Notes: See notes for Table C.3

Table C.5: Countries and Regions

1.	Sweden	
2.	Finland	
3.	Denmark	
4.	Norway and Iceland	
5.	UK and Ireland	
6.	Germany	
7.	Mediterranean Europe	Greece, Italy, Malta, Monaco, Portugal, San Marino, Spain
8.	Continental Europe	Andorra, Austria, Belgium, France, Liechtenstein, Luxembourg, The Netherlands, Switzerland
9.	US and Canada	
10.	Bosnia and Herzegovina	
11.	Former Yugoslavia	Croatia, Kosovo, Macedonia, Serbia, Montenegro, Slovenia, Yugoslavia
12.	Poland	
13.	The Baltic states	Estonia, Latvia, Lithuania
14.	E Europe, Caucasus and C Asia	Albania, Armenia, Azerbaijan, Belarus, Bulgaria, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Romania, Russia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan
15.	Czechia, Slovakia and Hungary	
16.	Mexico and Central America	
17.	Chile	
18.	South America	Argentina, Bolivia, Brazil, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay, Venezuela
19.	Northeast Africa	Djibouti, Eritrea, Ethiopia, Somalia, South Sudan, Sudan
20.	Middle East and North Africa	Algeria, Bahrain, Cyprus, Israel, Jordan, Kuwait, Lebanon, Libya, Morocco, Palestine, Qatar, Saudi Arabia, Syria, Tunisia, United Arab Emirates, Yemen
21.	West, Central, South Africa	Angola, Benin, Botswana, Burkina Faso, Burundi, Cabo Verde, Cameroon, Central African Republic, Chad, Comoros, Democratic Republic of the Congo, Ivory Coast, Egypt, Equatorial Guinea, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, South Africa, Swaziland, Tanzania, United Republic of Togo, Uganda, Zambia, Zimbabwe
22.	Iran	
23.	Iraq	
24.	Turkey	
25.	East Asia	China, Hong Kong, Japan, Korea, Taiwan
26	Southeast Asia	Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam
27.	South Asia and Mongolia	Afghanistan, Bangladesh, Bhutan, Brunei, Cambodia, India, Maldives, Mongolia, Nepal, Oman, Pakistan, Sri Lanka, Timor-Leste
28.	Oceania	Australia, New Zealand, Fiji, Kiribati, Micronesia, Nauru, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Vanuatu

Notes: This table shows the countries included for the regions that we use in our analysis.

Table C.6: Descriptive statistics on pre-parenthood characteristics for matched sample

	Immigrant background								Native		
	Matched					Unmatched			Matched		
	Number	Fraction	Income	Education	Age	Income	Education	Age	Income	Education	Age
Iraq	3182	0.819	204428	12.42	24.91	202550	12.55	25.06	206278	12.46	25.00
Iran	4998	0.817	296983	13.82	27.65	290744	13.89	27.84	291043	13.83	27.67
Middle East and N Africa	8926	0.823	198301	12.22	24.76	198582	12.34	24.92	199760	12.26	24.98
Turkey	12381	0.835	192969	12.09	25.07	193203	12.16	25.22	194076	12.14	25.14
South Asia and Mongolia	1472	0.777	268025	13.45	26.72	258426	13.54	26.88	263167	13.47	26.81
West, Central, South Africa	694	0.814	227770	12.70	26.04	226027	12.76	26.30	227961	12.76	26.11
East Asia	767	0.813	298830	13.50	27.97	284586	13.50	28.30	287307	13.60	28.03
Czechia, Slovakia, Hungary	3957	0.837	251851	12.99	27.84	247380	13.13	28.34	247680	12.94	27.69
Northeast Africa	1405	0.843	214385	12.32	25.59	212726	12.40	25.73	215053	12.52	25.61
Bosnia and Herzegovina	4264	0.878	237906	13.00	24.62	239003	13.10	24.73	236644	12.96	24.88
Southeast Asia	2498	0.863	225768	12.82	26.30	225084	12.92	26.47	228243	12.78	26.28
E Europe, Caucasia, C Asia	2177	0.807	260106	13.10	26.87	255590	13.27	27.30	255900	13.17	26.90
Former Yugoslavia	20112	0.840	207930	12.30	25.80	206415	12.42	26.10	209266	12.29	25.82
Chile	5568	0.876	198791	12.05	25.45	198249	12.17	25.81	201241	12.22	25.39
Mediterranean Europe	4353	0.801	221337	12.45	27.08	219699	12.58	27.61	220443	12.53	26.98
Mexico and Central America	472	0.857	207710	12.37	25.40	207044	12.46	25.63	211820	12.44	25.34
South America	1765	0.816	214947	12.57	26.63	213560	12.69	27.05	217556	12.73	26.52
Poland	5383	0.813	265619	13.31	27.15	258909	13.43	27.58	262891	13.31	27.15
Continental Europe	1127	0.804	226981	12.60	28.30	224664	12.80	28.91	229028	12.67	28.14
The Baltic states	801	0.692	283352	13.48	29.96	270896	13.68	31.03	281037	13.43	29.63
UK and Ireland	727	0.786	270892	13.22	28.08	263675	13.38	28.80	262962	13.21	27.95
Denmark	4683	0.866	195338	11.90	26.39	194504	12.05	26.88	196292	12.03	26.32
Germany	3370	0.807	229236	12.39	28.19	225844	12.60	28.94	227352	12.40	28.05
Finland	57643	0.860	208971	11.99	26.37	208648	12.11	26.82	209331	12.10	26.32
Island and Norway	3651	0.850	204454	11.99	26.46	202213	12.14	26.99	204715	12.12	26.37
Total	26493	0.842	216382	12.32	26.21	215265	12.44	26.59	216421	12.38	26.20

Notes: This table shows pre-parenthood characteristics for the matched sample of individuals. The first column shows the number of observations. Note that individuals are matched in the pre-parenthood period and are matched on all five years (if the individual is included in all years in the pre-period.) The fraction shows the percentage of individuals that are successfully matched to a native. Income is annual earnings given in SEK (in 2018 price levels). Education is given as years of education. Regional groups are ranked according to GGI.

Table C.7: Correlations: Mothers, 1gen and countries of origin

	Educ. 2nd gen	Income 2nd gen	HH Income 2nd gen	# Children 2nd gen	Single HH 2nd gen	Educ. 1st gen	Income 1st gen	HH Income 1st gen	# Children 1st gen	Single HH 1st gen	GGI rank	GGI index	GDP	Fertility
Educ. (2nd gen)	1.00													
Income (2nd gen)	0.51**	1.00												
HH Inc. (2nd gen)	0.63***	0.97***	1.00											
# Children (2nd gen)	-0.51**	-0.09	-0.24	1.00										
Single HH (2nd gen)	-0.54**	-0.25	-0.29	0.24	1.00									
Educ. (1st gen)	0.92***	0.63***	0.73***	-0.47*	-0.41*	1.00								
Income (1st gen)	0.49**	0.80***	0.82***	-0.48*	-0.12	0.62***	1.00							
HH Inc. (1st gen)	0.58**	0.85***	0.90***	-0.40*	-0.23	0.69***	0.94***	1.00						
# Children (1st gen)	-0.80***	-0.34	-0.46*	0.76***	0.58**	-0.76***	-0.48*	-0.46*	1.00					
Single HH (1st gen)	-0.47*	-0.21	-0.24	0.02	0.92***	-0.39*	0.02	-0.12	0.48*	1.00				
GGI rank	0.32	0.82***	0.81***	-0.08	-0.15	0.50**	0.72***	0.78***	-0.25	-0.11	1.00			
GGI index	0.23	0.82***	0.82***	-0.09	-0.06	0.38	0.78***	0.81***	-0.18	-0.01	0.94***	1.00		
GDP	0.45*	0.82***	0.78***	0.03	-0.45*	0.59**	0.57**	0.67***	-0.27	-0.42*	0.78***	0.68***	1.00	
Fertility	-0.52**	-0.73***	-0.71***	0.38	0.60**	-0.56**	-0.68***	-0.71***	0.59**	0.44*	-0.65***	-0.64***	-0.76***	1.00

Notes: This table shows the countries included for the regions that we use in our analysis.