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Economic Incentives or Social Norms? Labor Supply Differentials Between East and West German Mothers

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Abstract

This paper quantifies the contributions of social norms and economic incentives to the 350-hour annual gap in maternal labor supply between East and West Germany. Using a collective model of family formation and labor supply estimated on GSOEP data from 2000–2017, we find that the working-mother stigma accounts for 73 percent of the gap. Economic factors partially offset the norm: higher Western wages raise the opportunity cost of staying home, so equalizing wages in West to the levels in East would nearly double the gap. We show that standard policy reforms may actually widen the regional disparity, and that their effectiveness is conditional on the norm being present: once removed, the same policies have negligible effects.

JEL classification

J01, J08, J12, J13, J22

Keywords

social norms, economic incentives, marriage, cohabitation, working mothers

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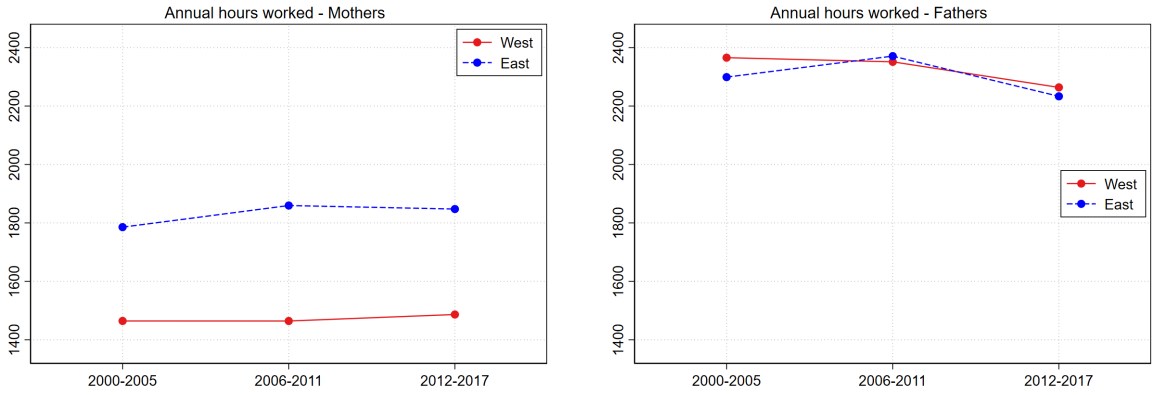
1 Introduction

Mothers in East Germany work approximately 1,800 hours per year—350 hours more than their West German counterparts. Remarkably, however, no such regional difference exists in fathers' annual hours worked, as illustrated in Figure 1.[1]

Figure 1: Labor supply of parents across regions in Germany



Source: GSOEP waves 2000-2017, Liebig et al. (2018). Note: Sample with children includes all mothers and fathers, born in Germany and with at least one child under 12.

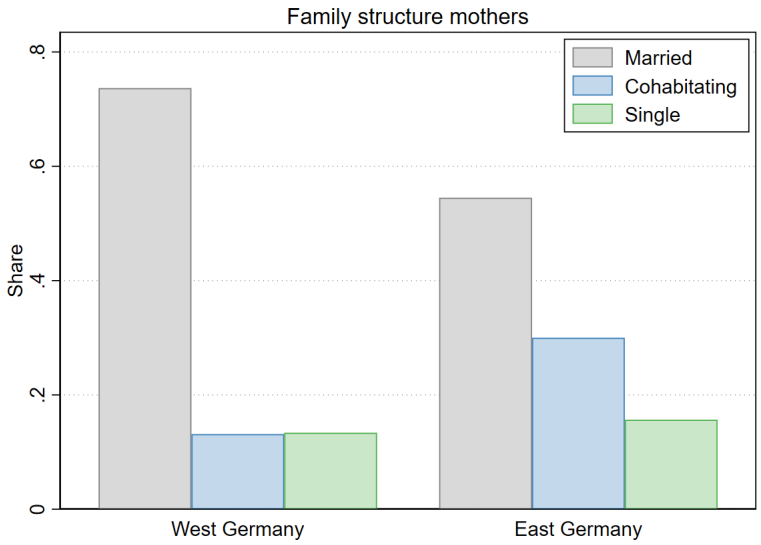
There is strong and consistent evidence that social norms play an independent role. In East Germany, decades of socialist policies and ideology actively promoted the norm that women—including mothers—should participate in the labor market on equal terms with men, fostering a culture of full-time maternal employment that persists today (Rosenfeld, Trappe, and Gornick 2004; Bauernschuster and Rainer 2012; Campa and Serafinelli 2019; Beblo and Görges 2018; Wyrwich 2017; Boelmann, Raute, and Schonberg 2024; Maier 1993). In contrast, in West Germany, working mothers were stigmatized for prioritizing employment over childcare, discouraging maternal labor force participation in ways that continue to influence maternal labor supply choice. There is also evidence of a stigma against non-marital parenting, perpetuated by religion and especially pronounced in West Germany, which may account for the lower share of cohabiting mothers in this region (Klärner and Knabe 2017; Klüsener and Goldstein 2016; Kühhirt 2012). Figure A.3 further demonstrates that both regions exhibit similar family structures among childless women, supporting the argument that stigma is specifically directed at mothers in non-marital parenting arrangements.

One important and unexplored channel through which this gap may emerge is family structure. East German mothers are much less likely to be married (55% versus 75% in the West),

[1]Figure A.2 in Appendix A shows that the gap is converging when all women are considered for the comparison, indicating that the persistence of the work hours gap is specific to mothers with young children.

more likely to cohabit (30% versus just above 10%), and remain single at roughly the same rate (around 15%), as shown in Figure 2. Family arrangement matters for maternal labor supply because it shapes the intra-household bargaining process through which leisure, childcare, and consumption are allocated—and that process operates very differently across married, cohabiting, and single households (Becker 1973; Graefe and Lichter 1999; Smock 2000; Bumpass and Lu 2000; Gemici and Laufer 2011; Lundberg, Pollak, and Stearns 2016). Differences in the composition of family arrangements across regions therefore translate, mechanically, into differences in maternal labor supply.

Figure 2: Family Structure across regions in Germany



Source: GSOEP waves 2000-2017, Liebig et al. (2018). Note: Sample includes all mothers, born in Germany, and with at least one child under 12.

Economic factors influence the gap in maternal labor supply across regions, either directly or through their effect on family arrangements. Wages are lower in the East, childcare costs are higher in the West, and taxation and property rights treat married and cohabiting couples very differently—creating distinct incentives for family formation and for maternal employment across regions. Yet the respective contributions of social norms and economic incentives to gaps in female labor supply have not been quantified. Even less is known about what specific policy reforms can realistically achieve to reduce this gap in the presence of strong social norms.

Answering these questions requires a structural model, since labor supply decisions and family formation choices are jointly determined by the same underlying norms and economic factors and cannot be cleanly separated in reduced-form data. We therefore build a collective model of family formation and labor supply in which individuals meet potential partners, draw a

match-quality shock, and choose whether to marry, cohabit, or remain single. Couples then allocate consumption, labor supply, and childcare through an intra-household Nash bargaining process in which each partner's outside option — shaped by divorce law, asset division rules, and child support obligations — determines their bargaining power. The model incorporates two region-specific stigmas, against working mothers and against non-marital parenting, that enter as utility costs and affect both labor supply directly and family formation indirectly. We estimate the model structurally on GSOEP data from 2000–2017 (Liebig et al. 2018), targeting work hours, childcare hours, and the composition of family arrangements by region and family type. We then use the estimated model to quantify the contributions of each channel and evaluate a series of policy counterfactuals.

Our analysis yields four sets of findings. First, social norms account for the dominant share of the gap: eliminating the working-mother stigma in the West reduces the East–West gap in annual maternal working hours by 73 percent. The stigma against non-marital parenting contributes a further 7 percent, operating indirectly through its effect on the composition of family arrangements.

Second, economic incentives play an important but counterintuitive role. Higher wages in the West partially compensate mothers for the disutility of defying the working-mother norm, such that equalizing wages across regions would nearly double the gap rather than narrow it. This result illustrates that economic incentives and social norms interact: in the presence of a strong stigma, wages act as a partial offset to the norm's disincentive effect, and removing that offset deepens the distortion. Differences in professional childcare costs and the cost of living also contribute to the gap, though modestly and in the same direction: equalizing either widens the gap slightly.

Third, standard policy reforms designed to raise female labor supply produce mixed results. Extending joint taxation to cohabiting couples raises labor supply in both regions symmetrically, leaving the gap unchanged or larger. The only reform that reliably narrows the gap is extending marital asset rights to cohabiting couples upon separation, which reduces it by 8 percent by strengthening the bargaining position of West German mothers within the household.

Fourth, the effectiveness of economic policy instruments is conditional on the norm being present. Reducing the working-mother stigma dominates all standard economic policy instruments in closing the maternal labor supply gap, and conventional reforms have limited effectiveness in comparison. Furthermore, in the absence of norms, the same economic policies become nearly ineffective, as mothers are already at the labor supply level that economic fundamentals alone would dictate.

This paper contributes to the literature on the determinants of behavioral differences between East and West Germany, and more broadly on the interaction between social norms and economic incentives in shaping female labor supply. It does so by structurally estimating cultural norm parameters within a collective household model, which allows us to decompose the maternal labor supply gap into its cultural and economic components, quantify how norms condition the effectiveness of economic incentives, and evaluate specific policy reforms.

This paper extends the literature exploring the influence of social norms on female labor supply. Existing work has documented the persistent influence of norms through the epidemiological approach — using migrant data to show that origin-country norms shape female labor supply across generations (Fernández and Fogli 2009; Blau, Kahn, and Papps 2011) and that immigrant women assimilate to the norms of their region of residence (Bredtmann and Otten 2025). Structural models have been used to quantify the role of norms in explaining the rise in female labor force participation (Fogli and Veldkamp 2011) and in demographic transitions (De la Croix and Perrin 2018). Closer to our setting, Boelmann, Raute, and Schonberg (2024) use internal migration between East and West Germany after reunification to show that East German gender-egalitarian norms are persistent, while West German traditional norms are not — West German mothers adjust their behavior toward that of East German peers even after returning to the West. We contribute to this literature by providing direct structural estimates of two distinct norm parameters exploiting the cultural divide between East and West Germany.

The structural estimation of social norm parameters within quantitative models remains rare. Myong, Park, and Yi (2021) is the closest precedent, estimating the stigma against non-marital birth and unequal childcare division to explain partnership and fertility patterns in South Korea. We extend this approach by investigating the effects that norms have on maternal labor supply through their impact on family structure. More broadly, norms typically constrain people's choice set to a close neighborhood of past behaviors.[2] They may sometimes generate a welfare gain if they help select a superior equilibrium (Nunn 2022; Bezin, Chabé-Ferret, and de la Croix 2024), but can also backfire when the prescribed behavior no longer coincides with the individually optimal action in the new environment (Nunn 2022).

We finally contribute to the growing literature on the interaction between social norms and economic policy by quantifying how norms condition the effectiveness of specific family policy reforms. There is growing evidence that policies targeting social norms are highly

[2]Social norms are intended as the set of "customary beliefs and values that ethnic, religious, and social groups transmit fairly unchanged from generation to generation" (Guiso, Sapienza, and Zingales 2006).

cost-effective (Benartzi et al. 2017) and that policies relying solely on changes in economic incentives may be ineffective unless accompanied by interventions that challenge prevailing social norms (Dahl, Løken, and Mogstad 2014). The sharp contrast between the success of Spain's mandatory paternity leave and the near-failure of the UK's voluntary Shared Parental Leave scheme illustrates that addressing both financial incentives and workplace norms is essential for policy effectiveness (Farre et al. 2025; Clifton-Sprigg et al. 2025). Chabé-Ferret (2019) shows that adherence to cultural norms around fertility is strongest when the economic cost of deviating from them is low, suggesting that modest policy changes may have limited traction in the presence of deeply held norms. We contribute to this literature by showing structurally that reducing the working-mother stigma dominates all standard economic policy instruments in closing the maternal labor supply gap, and that conventional reforms — joint taxation, wage equalization, childcare costs — have limited effectiveness in comparison, precisely because norms create distortions that economic incentives alone cannot fully correct.

Section 2 documents the differences in female labor supply, family arrangements, wages, and attitudes between East and West Germany. Section 3 introduces the collective model of family formation and labor supply. Section 4 describes the structural estimation strategy and presents the estimated parameters. Section 5 reports the counterfactual experiments. Section 6 concludes.

2 Description of the East-West divide

This section documents the East-West differences in maternal hours worked and the key variables that our model uses to account for them: family arrangements, childcare, and wages. We also present survey and historical evidence on the social norms that motivate our modeling choices.

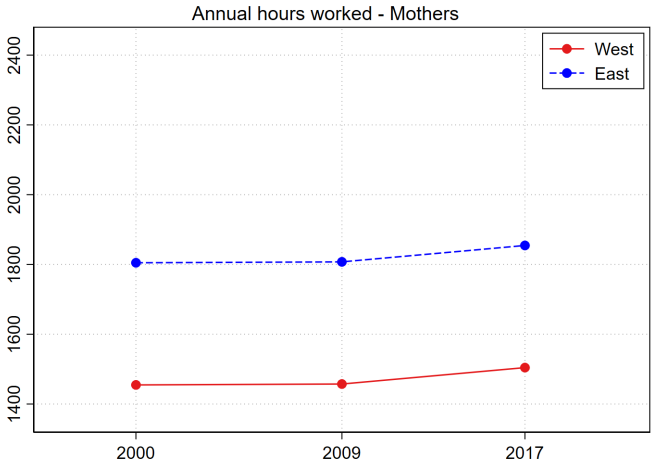
We focus on the intensive margin of labor supply among employed mothers.[3] Our working sample includes mothers in gainful employment (at least 720 annual hours, the official German threshold), with no more than three children and no more than 14 hours of reported daily childcare — restrictions that remove less than 7% of the original sample.[4] Since our model assumes one child, we control throughout for a flexible function of the number and age of

[3]Figure A.1 shows that the extensive margin tells a qualitatively similar story: mothers' participation is substantially higher in the East, while fathers' participation is virtually identical across regions. Interestingly, the participation gap has been narrowing over time as West German mothers gradually converge toward East German levels, even though the gap in hours worked has remained remarkably stable.

[4]We retain only mothers who are the household head or the spouse of the household head, and exclude women born outside Germany in order to focus on within-country cultural differences.

children and for year-of-survey fixed effects, ensuring that the East-West gaps we document are not driven by differences in fertility or the business cycle. Figure 3 reproduces Figure 1 on this restricted, fertility-adjusted sample; the picture is qualitatively unchanged.

Figure 3: Adjusted hours worked by mothers across regions in Germany

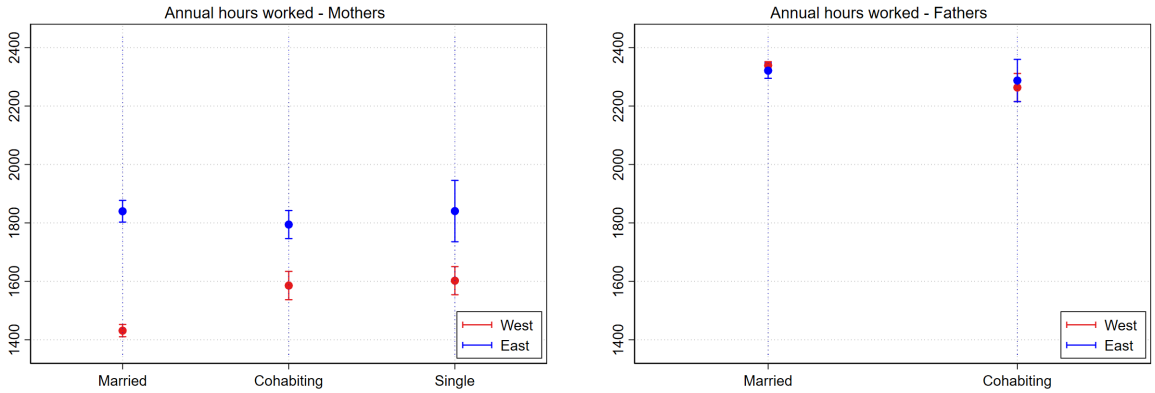


Source: GSOEP waves 2000-2017, Liebig et al. (2018). Note: Sample includes all mothers, born in Germany with at least one child under 12, in the labor force with a minimum of 720 annual hours worked, no more than 3 children and 14 hours of childcare per day. Figures are adjusted for a flexible function of the number and age of children and year of survey fixed effects.

2.1 Hours worked and family arrangements

The family arrangements differ substantially across East and West Germany, as illustrated by Figure 2, we examine the gap in hours worked by family type. Figure 4 indicates that the East-West gap in maternal hours worked is the largest among married mothers, and markedly less pronounced among cohabiting and single mothers. This suggests that the intra-household resource allocation process differs between married and cohabiting partners, particularly in the distribution of leisure. In the theoretical model, we incorporate features that can replicate these patterns and rationalize the underlying mechanisms, allowing us to quantify the contribution of variation in family arrangements to the regional work-hours gap. As previously noted, we do not observe any gap in the hours worked by fathers, either married or cohabiting. We omit the figure for single fathers, as they represent a negligible number of occurrences.

Figure 4: Adjusted hours worked by family type across regions in Germany



Source: GSOEP waves 2000-2017, Liebig et al. (2018). Note: Sample includes all mothers and fathers, born in Germany with at least one child under 12, in the labor force with a minimum of 720 annual hours worked, no more than 3 children and 14 hours of childcare per day. Figures are adjusted for a flexible function of the number and age of children and year of survey fixed effects.

2.2 Childcare

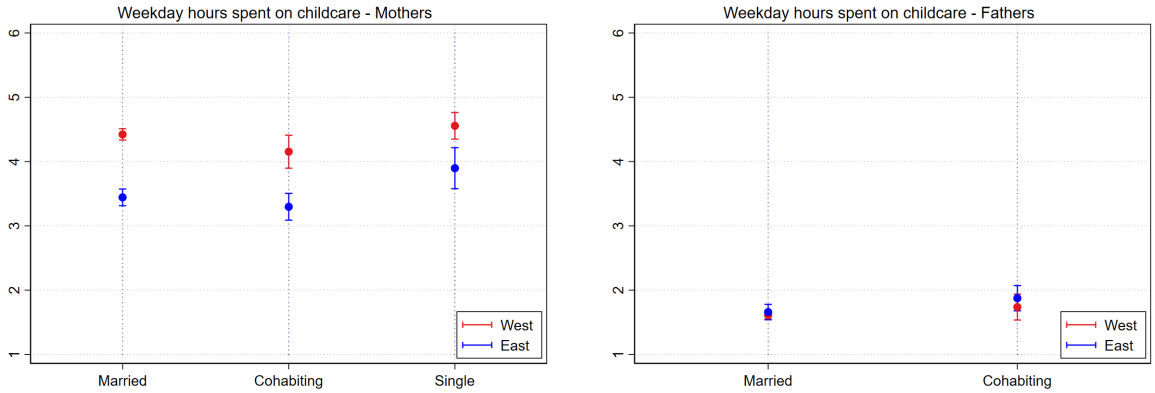
Figure 5 shows average hours of childcare per child reported by mothers and fathers, by family type and region.[5] The most striking feature is that West German mothers systematically provide more childcare than their Eastern counterparts in every family arrangement, whereas fathers' childcare time shows no regional difference and negligible difference by marital status. The regional gap in childcare is somewhat larger for mothers in a marriage, but is still substantial for cohabiting and single mothers. This mirrors the gaps we observe in hours worked. Interestingly, married mothers do not spend noticeably more time on childcare than cohabiting or single mothers in both regions. Thus, married women reduce their labor supply without compensating by taking on significantly more childcare. Combining Figures 4 and 5, we find that cohabiting women consume only about 90% of the leisure enjoyed by married women. The difference in hours spent on home production (tasks excluding childcare) is much smaller both by region and marital statuses (Fig A.5 in appendix A).

2.3 Wages

Figure 6 shows average log potential wages by education and gender for both regions, estimated on childless men and women and controlling for a polynomial in age and year-of-survey fixed effects. As expected, potential wages are higher in the West than in the East. Strikingly, East Germany exhibits almost no gender wage gap, whereas a clear gender wage gap appears

[5]The overall picture does not change if we consider total childcare instead of childcare per child (see figure A.4).

Figure 5: Childcare by family type across regions in Germany

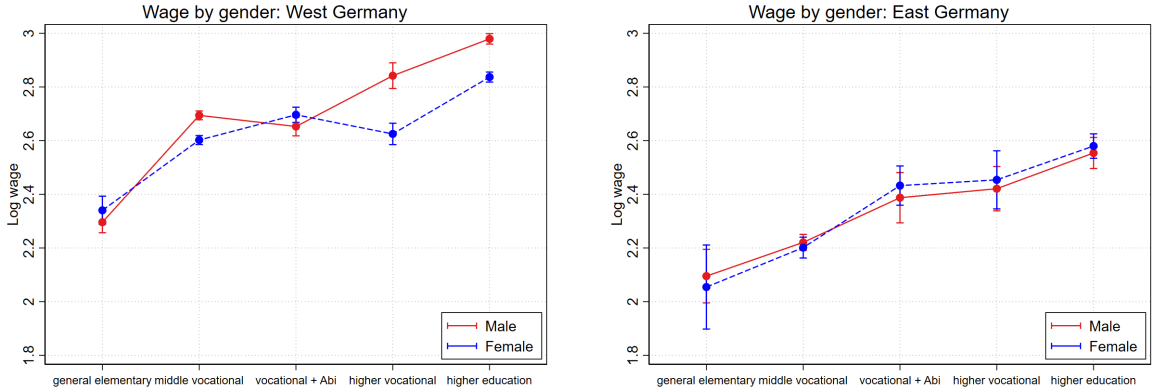


Source: GSOEP waves 2000-2017, Liebig et al. (2018). Note: Sample includes all mothers and fathers, born in Germany with at least one child under 12, in the labor force with a minimum of 720 annual hours worked, no more than 3 children and 14 hours of childcare per day. Figures represent the number of hours of childcare reported divided by the number of children in the household and are adjusted for a flexible function of the number and age of children and year of survey fixed effects.

in West Germany, especially at the top of the education distribution.

These descriptive patterns motivate the inclusion of both a regional wage differential and a gender wage gap in the structural estimation. However, the wage specification used in the structural model (Table B.5) imposes a common gender wage gap across regions, as it includes separate dummies for region and gender but no interaction between the two. Figure 6 shows that this is a simplification: the gender wage gap is substantially larger in the West. We return to the implications of this constraint in Section 5.

Figure 6: Potential wages by education across regions in Germany



Source: GSOEP waves 2000-2017, Liebig et al. (2018). Note: Sample includes all childless men and women, born in Germany, in the labor force with a minimum of 720 annual hours worked. Figures represent the log wage by education adjusted for a polynomial in age and year of survey fixed effects. Abi is short for Abiture, the German high school exam.

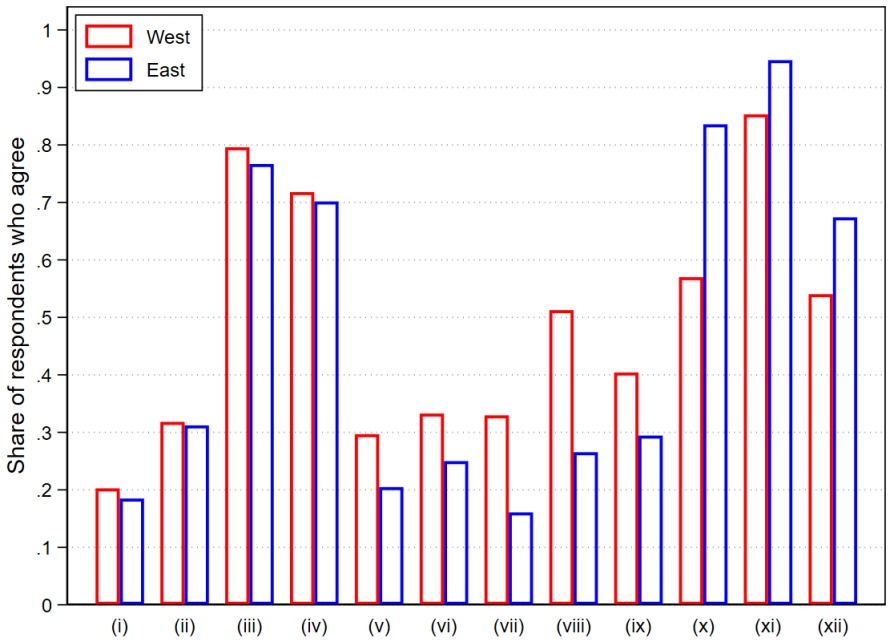
2.4 Social norms: survey evidence and historical origins

The difference in attitudes towards gender roles and family formation across the two regions is illustrated in Figure 7, which reports the share of respondents in the 2012 wave of the German General Social Survey (GESIS 2019) who agree with twelve statements on marriage and gender roles. On the dimensions most relevant to our analysis — the role of mothers in the labor market and the desirability of marriage as a prerequisite for family formation — the East-West gap is striking, ranging between 10 and 25 percentage points. A substantially larger share of West Germans agree that women should prioritize home and children over work, and that children should be raised by married couples. By contrast, statement (xii) — whether one parent can raise a child as well as two — shows comparatively weak regional divergence and high agreement in both regions. This pattern confirms that the stigma in West Germany is directed specifically at mothers who work outside the home and at couples who raise children in non-marital unions, rather than at single motherhood per se — a distinction supported by the near-identical shares of single mothers across regions (approximately 15% in both East and West). It motivates our modeling choice to capture two region-specific stigmas — against working mothers and against cohabiting mothers — rather than a broader stigma against any form of non-traditional family structure.

The historical origins of these attitudinal differences are well documented. The German Democratic Republic actively promoted women's labor force participation — including among mothers — through progressive policies (equal pay, investment in female education, legalized contraception and abortion, and widespread public childcare) and explicit propaganda that portrayed non-working mothers as "Schmarotzer" (parasites). Family policy in the GDR was nevertheless contradictory: pro-natalist housing policies encouraged early marriage, while other measures — most notably the "Babyjahr", a year of paid maternity leave granted to single mothers after the first birth but only to married women after the second until 1986 — actively facilitated single parenthood and contributed to rising non-marital birth rates (Konietzka and Kreyenfeld 2002; Nazio and Blossfeld 2003). In contrast, the Federal Republic reinforced traditional gender roles by institutionalizing marriage and the position of women as primary caregivers, most notably through generous tax advantages for married couples (*Ehegattensplitting*), extended parental benefits for stay-at-home mothers, and very limited public childcare (Arránz Becker, Lois, and Nauck 2010; Ondrich, Spieß, and Yang 2002).

Although East Germany adopted the economic, political, and legal institutions of the West after reunification, deep cultural legacies persisted (Perelli-Harris and Bernardi 2015; Klärner 2015). Differences in female labor force participation and non-marital births in fact predated

Figure 7: Attitudes towards marriage and gender roles across regions in Germany



Source: German General Social Survey, 2012 wave (GESIS 2019). Note: We report the share of respondents who completely agree or tend to agree with the following statements:
(i) "It's more important for a wife to help her husband with his career than to pursue her own career";
(ii) "Married people are generally happier than unmarried people";
(iii) "It is all right for a couple to live together without intending to get married";
(iv) "Divorce is usually the best solution when a couple can't seem to work out their marriage problems";
(v) "A married woman should not work if there are not enough jobs to go round and her husband is also in a position to support the family";
(vi) "Even if both parents work full-time, it is still better if the mother has main responsibility for looking after the home and children";
(vii) "It is much better for everyone concerned if the man goes out to work and the woman stays at home and looks after the house and children";
(viii) "A small child is bound to suffer if his or her mother goes out to work";
(ix) "People who want children ought to get married";
(x) "A child actually benefits if his or her mother has a job rather than just concentrating on the home";
(xi) "A working mother can establish just as loving and secure a relationship with her children as a mother who doesn't work";
(xii) "One parent can bring up a child as well as two parents together".

the partition, reflecting long-standing cultural differences between a Protestant secularized North East and a Catholic South West in which the church promoted marital births and stay-at-home mothers (Becker, Mergele, and Woessmann 2020; Klüsener and Goldstein 2016; Wyrwich 2017; Arránz Becker, Lois, and Nauck 2010).

3 Model

In this section, we develop a collective household model of endogenous family formation and maternal labor supply that rationalizes the stylized facts documented in Section 2. The model captures both the direct utility costs and the indirect effects (operating through family structure) of region-specific stigmas against working mothers and cohabitating mothers.[6] We focus on the intensive margin of labor supply among households needing childcare who face region- and marital-status-specific social and economic constraints.

Agents in our economy are characterized by a set of four exogenous variables $\{i, R, e, a\}$. Where $i \in \{f, m\}$ is gender (male or female), $R \in \{E, W\}$, region of residence (East or West Germany), e, education level, and a assets.

Individuals encounter potential partners through a random matching process. Upon matching, individuals in each pair draw a couple specific match quality shock and choose marital status: marriage, cohabitation, or remain single. ($J \in \{M, C, S\}$).

We assume that when partners come in contact, it immediately leaves them with a child.[7] Afterwards, parents can choose to live as a married couple, a cohabiting couple or separately. Separation leaves mothers with child custody and child support payments from the father.[8] We start by describing the optimization problem faced by single mothers, then turn to that of couples, and finish by examining the choice of marital arrangements.

We adopt a static model rather than a dynamic life-cycle framework. Our goal is not to trace individual women's labor-supply trajectories over time, but to explain cross-sectional differences in maternal labor supply at a given point in time. While any individual woman's

[6]Non-marital births are common in Germany, and many single mothers in both regions in the sample may also belong to this group. There is a difference in the non-marital birth rates between East and West Germany. Jirjahn and Chadi (2020) suggests that this difference may be driven by cultural factors. However, for the purposes of our analysis, the proportion of single mothers is approximately equal across East and West Germany (around 15%), indicating that any residual stigma against single motherhood does not vary meaningfully across regions. Consequently, a separate stigma parameter for single mothers is not included. The socially relevant stigmas that differ across regions and that the model is designed to capture are directed at working mothers (μ_R) and non-marital cohabiting mothers (ρ_R).

[7]We do not model endogenous fertility decisions because we focus on labor supply gap due to the social stigmas and not due to fertility differentials. These stigmas may also operate via effect on fertility rates but we are interested in their direct effect on the choice of work hours and through choice of family arrangements. Our sample data shows that fertility differences affect the total maternal labor supply across marital statuses. Nonetheless, the regional gap remains at around 350 hours per year with and without fertility differential considerations. The work hours reduce for mothers with more than one child of under 12 in the both regions but leaves the annual work hours gap unaffected.

[8]The data shows that the custody of children goes to the mother in about 90% of cases, and very few single fathers with child custody are observed in the data. Besides, the paper focuses on the East-West maternal work-hours gap, therefore, we choose to disregard the case of single fathers.

family structure may evolve (through union formation, divorce, or transitions between cohabitation and marriage), the distribution of family types in each region can be viewed as being in steady state. We argue that these persistent differences in the composition of marital and cohabitation statuses between East and West Germany also contribute to the stable annual gap in aggregate maternal labor supply.

3.1 Singles

The utility function of a single mother is given by:

$$V^i_{S,R} \equiv U^f_{S,R} = \ln(c^f_{S,R}) - (\lambda + \mu_R)\frac{(h^f_{S,R})^{1+\theta}}{1+\theta} - \epsilon x^f_{S,R} \tag{1}$$

Where c^f_S is private consumption, and h^f_S is the fraction of time worked on the market (i.e., labor supply). λ is the general disutility of labor parameter, while μ_R captures the region-specific additional disutility associated with working for mothers with young children, which comes from social stigma. Note that this parameter can take a negative value if working mothers are viewed positively in a society. θ is the "Frisch elasticity" parameter. x^f_S is the fraction of time spent on childcare at home, and we assume a linear disutility function for the time spent on childcare with parameter ϵ.

Raising a child requires ϕ amount of childcare. The childcare production technology for single mothers is given as follows

$$A_S(x^f_{S,R})^\delta(x^P_{S,R})^{1-\delta} = \phi \tag{2}$$

where A_S is the parameter determining the efficiency of the childcare production technology. x^P is the amount of professionally provided childcare purchased at market price, x^f the childcare provided at home by the mother and δ is the elasticity parameter.[9] Single mothers face the following budget constraint:

$$(1 - T_S)w^f_R(e^f)\, h^f_{S,R} + \alpha_R(e^m)\, w^m_R(e^m) + a^f_{S,R} = c^f_{S,R} + \tau_R x^P_{S,R} + F_{S,R}, \tag{3}$$

where T_S is the income tax rate for single parents, $w^i_R(e^i)$ for $i \in \{f, m\}$ is the potential hourly wage of gender i as a function of own education e^i, $a^f_{S,R}$ are the mother's assets, τ_R is the unit price of professional childcare, and $F_{S,R}$ is the fixed cost of household amenities.

[9]We adopt a Cobb–Douglas technology because it naturally captures imperfect substitutibility between maternal time and market-provided childcare. In addition, this specification guarantees an interior solution in which both inputs are essential to produce the required childcare quantity ϕ.

Child support received by the mother is a fraction $\alpha_R(e^m)$ of the father's full-time potential earnings $w_R^m(e^m)$, where α_R depends on the father's education level e^m.

Single mothers also face the following time constraint:

$$h_{S,R}^f + x_{S,R}^f + l_{S,R}^f \quad = \quad 1, \tag{4}$$

Eq (4) states that total available time, normalised to 1, must be split between supplying labor (h^f), providing childcare (x^f), and leisure (l^f).

The optimization problem of the single mother household is given as follows:

$$\max_{c_{S,R}^f, x_{S,R}^f, x_{S,R}^P, h_{S,R}^f} (1) \quad \text{s.t.} \quad (2) \quad (3) \quad \text{and} \quad (4)$$

3.2 Couples

The utility function of an individual i in a couple (whether married or cohabiting) is given by

$$U_{J,R}^i = \ln(c_{J,R}^i) - (\lambda + \mu_R)\frac{(h_{J,R}^i)^{1+\theta}}{1+\theta} - \epsilon x_{J,R}^i + \Gamma_J - \rho_{J,R}, \tag{5}$$

where $J \in \{M, C\}$. The term $\Gamma_J \sim LogNormal(\overline{\Gamma}, \sigma_\Gamma^2)$ is a couple-specific match-quality shock that the utility value of companionship. Low realizations of Γ reduce the total surplus from the union, so the partner who values union more must compensate the other by accepting a lower share of consumption or a higher burden of market work and childcare.

The childcare linear disutility parameter rationalizes an important feature of the data. Since women get the child custody, with $\epsilon > 0$, union formation becomes strictly more valuable to some mothers than remaining single. This is because it allows sharing childcare burden, increasing gains from union formation. Consequently, if a woman is matched with a partner who values the union less than she does, she may need to compensate him by ceding bargaining power (i.e., accepting a lower share of household resources). This mechanism generates intra-household inequality in consumption and leisure even when partners have identical wages, education, and assets.

Finally, $\rho_{J,R}$ is a region-specific parameter that represents the additional stigma associated with raising children in a cohabiting rather than marital union. It directly affects cohabitation rates across regions. We normalize both $\mu_R = 0$ and $\rho_R = 0$ for men. Additionally, $\rho_{M,R} = 0$ for married individuals. The literature shows that average match quality is typically lower

in cohabitation than in marriage (Blasutto 2024). This aligns with the empirical pattern documented in Section 2: cohabiting women supply more market hours than married women while providing a similar amount of childcare, implying they enjoy strictly less leisure. Our model generates this feature endogenously. On average, women rank union formation higher than staying single as mothers. When match quality is low (as is common in cohabitation), women transfer bargaining power to men to induce union formation, which results in higher female labor supply and less leisure.

The childcare production technology for a couple is

$$A_J \left[\eta^f (x^f_{J,R})^\psi + (1-\eta^f)(x^m_{J,R})^\psi \right]^{\frac{\delta}{\psi}} (x^P_{J,R})^{1-\delta} = \phi, \tag{6}$$

where $\eta^f \in (0,1)$ is the weight placed on the mother's childcare time and $\psi > 0$ is the elasticity of substitution between maternal and paternal home childcare.

The couple is subject to the following constraints:

$$(1-T^f_J) w^f_R h^f_{J,R} + (1-T^m_J) w^m_R h^m_{J,R} + a^f_R + a^m_R = c^f_{J,R} + c^m_{J,R} + \tau_R x^P_{J,R} + F_{J,R}, \tag{7}$$

$$h^i_{J,R} + x^i_{J,R} + l^i_{J,R} = 1 \qquad \forall i \in \{f, m\}. \tag{8}$$

Equation (7) shows that union formation allows partners to share the cost of professional childcare and household amenities and to pool their assets. The tax rate T_J is union-specific. In Germany, married couples can benefit from joint taxation (Ehegattensplitting), which substantially lowers the effective tax burden when earnings are unequal. Cohabiting couples, by contrast, are taxed individually as singles. This difference in tax treatment contributes to variation in labor supply across family arrangements.[10]

Couples maximize a weighted sum of their individual utilities:

$$V_{J,R} = \beta^f_{J,R} U^f_{J,R} + (1-\beta^f_{J,R}) U^m_{J,R}, \tag{9}$$

where $\beta^f_{J,R} \in (0,1)$ is the Pareto weight on the woman's utility and reflects her bargaining power in the intra-household allocation.

[10]To capture the fiscal advantage of marriage, we assign married couples a lower effective tax rate than cohabiting couples. This approximation reproduces the key incentive for marriage while keeping the model tractable.

The couple's maximization problem is therefore

$$\max_{c^f_{J,R}, c^m_{J,R}, h^f_{J,R}, h^m_{J,R}, x^f_{J,R}, x^m_{J,R}, x^P_{J,R}} \quad V_{J,R} \qquad \text{subject to (6), (7), (8).}$$

The woman's bargaining power $\beta^f_{J,R}$ is determined endogenously via symmetric Nash bargaining. When a couple meets, they consider marriage, cohabitation, or remaining single. Once chosen, the marital/cohabitation status is permanent. We do not explicitly model divorce; instead, we use the divorce outcome as the threat point in the Nash bargaining problem for married couples.

Threat points If the couple divorces, marital assets $(a^m_R + a^f_R)$ are split equally, the mother receives child support, and both parents optimize their labor supply and childcare under the resulting budget constraints. Importantly, divorced fathers provide only monetary child support, whereas the mother bears the entire childcare burden. This creates strongly asymmetric outside options for mothers and fathers in the divorce state, which further strengthens the mother's bargaining position inside marriage.

$$\begin{aligned} U^f_{D,R} &= \ln\Big(\alpha_R(e^m) w^m_R(e^m) + (1 - T_S) w^f_R(e^f) h^f_{D,R} + \tfrac{1}{2}(a^m_R + a^f_R) - \tau_R x^f_{D,R} - F_{D,R}\Big) \\ &\quad - (\lambda + \mu_R)\frac{(h^f_{D,R})^{1+\theta}}{1+\theta} - \epsilon x^f_{D,R}, \qquad (10) \\ U^m_{D,R} &= \ln\Big((1 - T_S) w^m_R(e^m) h^m_{D,R} - \alpha_R(e^m) w^m_R(e^m) + \tfrac{1}{2}(a^m_R + a^f_R) - F_{D,R}\Big) \\ &\quad - \lambda\frac{(h^m_{D,R})^{1+\theta}}{1+\theta}. \qquad (11) \end{aligned}$$

For cohabiting couples, the threat point (separation) does *not* involve asset sharing. The corresponding utilities are

$$U^f_{D',R} = \ln\Big(\alpha_R(e^m)w^m_R(e^m) + (1-T_S)w^f_R(e^f)h^f_{S,R} + a^f_R - \tau_R x^f_{S,R} - F_{D',R}\Big) - (\lambda+\mu_R)\frac{(h^f_{S,R})^{1+\theta}}{1+\theta} - \epsilon x^f_{S,R}, \tag{12}$$

$$U^m_{D',R} = \ln\Big((1-T_S)w^m_R(e^m)h^m_{S,R} - \alpha_R(e^m)w^m_R(e^m) + a^m_R - F_{D',R}\Big) - \lambda\frac{(h^m_{S,R})^{1+\theta}}{1+\theta}. \tag{13}$$

The symmetric Nash bargaining problems are then

$$\max_{\beta_M}\Big(U^m_{M,R}(\beta_M) - U^m_{D,R}\Big)\Big(U^f_{M,R}(\beta_M) - U^f_{D,R}\Big), \tag{14}$$

$$\max_{\beta_C}\Big(U^m_{C,R}(\beta_C) - U^m_{D',R}\Big)\Big(U^f_{C,R}(\beta_C) - U^f_{D',R}\Big). \tag{15}$$

Equal sharing of marital assets upon divorce (available only in marriage) strengthens the outside option — and thus the bargaining power — of the financially weaker partner. Although divorce is not explicitly modeled, incorporating these fallback options generates another mechanism that contributes to variation in labor supply across marital statuses.[11]

Given $\beta^f_{J,R}$ and the state variables $\{a^i_R, e^i, R\}$, the couple's joint maximization problem can be solved to obtain $U^m_{J,R}(\beta^f_{J,R})$ and $U^f_{J,R}(\beta^f_{J,R})$. The bargaining weight $\beta^f_{J,R}$ is the value that maximizes the respective Nash product above.

3.3 Partnership choices

Individuals meet potential partners through a stochastic matching process. A union is formed only if both parties agree. Upon meeting, a child is born; if no union is formed, the mother retains custody and receives child support. Conditional on the match, the pair jointly chooses consumption c^i, market hours h^i, home childcare x^i, and professional childcare x^P (for $i \in \{f, m\}$) as described above. The woman accepts the proposed union only if her utility in the union exceeds her utility as a single mother. The matched partner must also find the allocation individually rational. Conditional on mutual agreement, the couple chooses

[11] We borrow this mechanism from the labor-economics literature on intra-household bargaining, where the utilities each spouse would obtain upon divorce serve as threat points that shape bargaining power within marriage, even though actual separation is never realized in the model (Manser and Brown 1980; McElroy and Horney 1981). A similar approach is adopted in Docquier and Iftikhar (2024) and Iftikhar and Zaharieva (2019).

between marriage and cohabitation by selecting the status that delivers the highest symmetric Nash product.

Owing to the highly non-linear nature of the optimization problems, closed-form solutions do not exist and all results are obtained numerically. The following section describes how the model parameters are identified and estimated, and Section 5 uses the estimated model to conduct the counterfactual experiments.

4 Structural estimations

We have 42 parameters in total. We divide these parameters into two groups: 1) taken directly from data, and 2) internally estimated by targeting set moments in the data. The following section explains the estimations of the parameters in detail.

4.1 Parameters taken from data

Wages

The German education system is structured into five distinct categories. These are 1) elementary, 2) middle vocational, 3) vocational + Abitur, 4) higher vocational, and 5) higher education. Abitur is the German high school diploma, while higher education means a college or university degree. To compute average wages by gender, region, and education level, we estimate the following Mincer regression,

$$w_{k,i,e,R} = c_0 + c_1 i + c_2 e + c_3 R, \tag{16}$$

where "i" denotes gender, "e" denotes education level, and "R" denotes region for individual "k". To estimate (16), we use GSOEP data on single childless individuals from 2000-2017. We have 19,389 observations of single men and women; the results are detailed in table B.5 in appendix B.

The wages of childless individuals may serve as a more reliable proxy for the potential pre-childbirth wages of mothers. Post-childbirth or post-union wages could capture the motherhood wage penalty or negative selection into lower-paying part-time employment following family formation.

Assets

The ratio of mean household assets between West and East Germany, $\frac{a_W}{a_E}$ is calibrated directly from the Sample Survey of Income and Expenditure of Germany. As of January 1, 2018, average gross financial assets per household stood at 63,100 Euros in the former West Germany and 40,300 Euros in the former East Germany, yielding a ratio of $\frac{a_W}{a_E} \approx 1.56$. Assets enter the model through two channels: they affect mothers' labor supply via the standard wealth effect, and they shape intra-household bargaining power by influencing the fallback utilities of each partner in the event of separation.

Tax rates, cost of living, child support

The vector $\{t_J, \alpha_R(e), F_R\}$ is calibrated directly from empirical data. In Germany, tax policies include specific relief mechanisms, such as the *Entlastungsbetrag für Alleinerziehende*, which provides tax relief to single parents with child custody (typically mothers), thereby reducing their effective tax rates. In contrast, single fathers without custody and cohabiting partners are subject to individual taxation at standard rates set by the tax authorities. Married couples, however, enjoy distinct tax advantages through joint filing and income splitting (*Ehegattensplitting*), leading to lower effective tax rates relative to cohabiting individuals. These differences in tax rates across family unions may influence incentive to enter marriage and the labor supply decisions of German mothers post union formation.

To streamline computations while accounting for the tax benefits of marriage, we utilize average effective tax rates for singles and married couples, as reported in the OECD Tax and Benefit Systems Report for Germany (2024). Specifically, the average effective tax rate for single mothers is 30.0%. Single fathers without custody and cohabitating individuals face an average effective tax rate of 47.8%, while married couples are subject to an average effective tax rate of 32.9%. In general, the law favorably taxes a married couple if the secondary earner contributes no more than 40% to the household income. In our sample, 78% of married women in West contribute less than 40% to the household total income. In East, about 66% of the married women contribute at most 40% to the household income. For cohabiting women, 56% contribute less than 40% to the household income in both East and West Germany. Thus, using average tax rates is a reasonable simplification for computational ease, as, on average, married women are the secondary earners and the total household income is taxed in a way that reduces overall tax liabilities.

The cost of living parameter (F) is normalized to 1 for single mothers residing in Eastern Germany. The ratio of living costs for single individuals relative to cohabitating(married) in

East and West Germany, denoted as $\frac{F_{S,R}}{F_{C(M),R}}$, is computed using data from the Continuous Household Budget Surveys conducted by Destatis for the period 2000–2017.[12] This ratio captures regional and marital status differences in consumption expenditure.

The parameter $\alpha_R(e)$, representing the fraction of single fathers' wages allocated to child support, is estimated for each education category (e) using data from the Düsseldorf Table for 2017. The Düsseldorf Table, regularly updated and published by the Düsseldorf Higher Regional Court, provides guidelines on child maintenance obligations. Detailed information on the child support assignment is presented in Appendix B, Table B.4.

4.2 Parameters Estimated by Simulated Method of Moments (SMM)

We estimate a total of 18 structural parameters. Some parameters are common across regions and family unions $\{\lambda, \sigma^2_\Gamma, \phi, A_S, A_M, \psi, \eta^f, \delta, \epsilon, \nu\}$, and the others vary by region, marital status or both$\{\bar{a}_R, \sigma^2_R, \rho_R, \mu_R, F_{J,R}, \tau_R\}$. We pin down the values of these parameters using the simulated method of moments (SMM). For this purpose, 25 empirical moments are obtained from the GSOEP sample described in section 2. These moments include the shares of single, cohabitating, and married women in East and West (six moments); average daily hours worked by mothers, by marital status and region (six moments); average daily hours of childcare in professional facilities, by marital status and region (six moments); average daily hours of childcare provided by mothers, by marital status and region (six moments); and the correlation in education levels between partners for married couples and for cohabiting couples in the full sample. The correlation coefficient varies very little between marital status and regions. Therefore, we target the correlation for the full sample (one moment). Overall, we do not find education gradient in assortative matching between marriage and cohabitation. This is in line with Perelli-Harris and Lyons-Amos (2016), which suggests that apart from cultural background, other socioeconomic characteristics-such as education and wealth-are not strongly correlated with the cohabitation.

For the moments on work hours (h^f) and at home childcare(x^f), we use the following regression for $y \in \{h^f, x^f\}$ on our GSOEP sample,

$$y^f = R * J + year + n0 + n3 + n7 + n12 + n \tag{17}$$

[12]Data on consumption expenditure are not available for all years. We use the average of the available years to compute the ratio.

Where R is the dummy for the region, J is marital status, and $n0, n3, n7, n12$ represents the number of children up to one, three, six, and 11 years old, respectively. We also control for year-fixed effects with *year* and total fertility with n. The regression results are reported in appendix B.

Equation (17) generates predicted values for work hours h^f and childcare hours provided by mothers x^f with one child aged up to one year old, by marital status and region. We employ this regression-based approach to derive these conditional moments, rather than using raw empirical moments directly from the data, to account for confounding differences in labor supply and daycare utilization attributable to endogenous fertility choices and the presence of children in varying age groups within the household. For instance, if married women are more likely to have additional children or younger children than their cohabiting or single counterparts, observed differences in work and daycare hours may stem primarily from these variations in household fertility and child age profiles rather than from marital status per se. We claim that otherwise similar women—differing only in marital status—exhibit distinct patterns in work and daycare hours, with such disparities being particularly pronounced in West Germany. Furthermore, we focus on the youngest age cohort for these target moments, as children up to one year old typically require substantially more maternal care than older children. Consequently, any regional gaps in mothers' labor supply behavior at this stage are more likely to reflect underlying norms-related structural parameters in the model. For professional childcare, we utilize average per-child hours in formal centers.

We minimize the following objective function to estimate the structural parameters,

$$f(\Theta) = (d - \Theta)W(d - \Theta)' \tag{18}$$

Where d is the vector of 25 empirical moments described above, and Θ is the vector of simulated moments. W is the diagonal weight matrix with $\frac{1}{d^2}$ as elements.

In the simulation, 50,000 women are drawn from each education category. Each woman is matched with a potential husband of the same education level with probability ν. The assets of each spouse are independently drawn from a log-normal distribution with mean $\overline{a}_R$ and variance σ_R^2. The match-quality shock Γ is drawn from a log-normal distribution with mean of one and variance σ_γ^2, common across regions. We then calculate the simulated moments for each family union by averaging working hours, home childcare hours, and professional childcare hours. Panel B of Table 1 lists the estimated parameters. The identification of parameters is discussed in Appendix C.

Table 2 reports the average values of β, women's bargaining power within a couple, by

family union type and region. As discussed in Section 3, β is an endogenous outcome of the Nash bargaining problem. These estimates yield two key insights. First, cohabiting women in Germany have a lower share of household resources than their married counterparts. This pattern holds in both regions and is consistent with prior literature suggesting that cohabitation is associated with lower welfare for women relative to marriage (e.g., (Smock 2000; Bumpass and Lu 2000; Avellar and Smock 2005; Tach and Eads 2015; Le Bourdais et al. 2016)). Second, cohabiting mothers in the West exhibit considerably lower bargaining power than their counterparts in the East. This differential accounts for the larger childcare burden and correspondingly lower leisure time among cohabiting mothers in the West. We later demonstrate that eliminating the cohabitation stigma in the West raises the bargaining power of cohabiting mothers there, bringing the value of β closer to that observed in the East.

4.2.1 Model Fit

The estimated model closely matches the family structures and labor supply patterns among working mothers in Germany. First, East German mothers tend to have significantly lower marriage rates and higher rates of cohabitation. Second, mothers in East Germany work much more than their West German counterparts. Third, West German mothers allocate more time to childcare than their Eastern counterparts across all family union types; in particular, married West German mothers work less but provide more home childcare than their Eastern counterparts.

The regional differences in marriage and cohabitation rates are primarily driven by the stigma attached to cohabitation, which is substantially higher in the West ($\rho_W = 0.40$) than in the East ($\rho_E = 0.17$). Similarly, the markedly stronger social norm against working mothers in the West ($\mu_W = 2.87$ versus $\mu_E = 0.00$) largely accounts for the significant gap in mothers' market labor supply across regions. Finally, the lower cost of professional childcare in the East ($\tau_E = 0.354$) relative to the West ($\tau_W = 0.590$) explains why West German mothers allocate more time to home childcare. This is consistent with historical evidence showing that, prior to reunification, East Germany maintained substantially greater childcare availability than West Germany.

In Section 5, we conduct a series of counterfactual simulations to quantify the contribution of each social-norm parameter to the observed differentials in maternal labor supply between East and West Germany.

Table 1: Model parameters

Panel A: Parameters directly estimated from data		
Parameter	Symbol	Value
Ratio of household cost of West to East	$\frac{F_W}{F_E}$	1.24
Ratio of household cost of couples to singles	$\frac{F_C}{F_S}$	1.85
Ratio of $\overline{a}_W$ to $\overline{a}_E$	$\frac{\overline{a}_W}{\overline{a}_E}$	1.56
Income tax rates for single mothers	τ_S	0.300
Income tax rates for cohabiting couples and single fathers	τ_C	0.478
Income tax rates for married	τ_M	0.329
Child support in East (fraction of father's labor income)	$\alpha_E(e)$	0.237,0.196,0.163,0.163,0.133
Child support in West (fraction of father's labor income)	$\alpha_W(e)$	0.153,0.144,0.131,0.132,0.115
Gender wage gap	c_1	-0.11
Return to schooling	c_2	0.0,0.355,0.42,0.53,0.68
Wage gap between East and West	c_3	-0.376
Panel B: Estimated Parameters from SMM		
Parameter	Symbol	Value
Mean of asset distribution for West	$\overline{a}_W$	2.30
Variance of asset distribution for West[a]	σ^2_W	0.75
Cohabitation stigma for West	ρ_W	0.40
Cohabitation stigma for East	ρ_E	0.17
Working mother stigma for West (East)[b]	μ_W	2.87 (0.00)
Single household maintenance Cost	$F_{S,E}$	0.635
Cost of professional childcare West	τ_W	0.590
Cost of professional childcare East	τ_E	0.354
Parameters Common Across the Regions		
Disutility of labor	λ	5.23
Variance of match quality distribution	σ^2_Γ	0.85
Cost of home childcare production	ϕ	0.36
Home childcare production productivity single mothers	A_S	1.66
Home childcare production productivity for married couples[c]	A_M	0.90
Elasticity of substitution in home childcare production	ψ	0.85
Share of maternal time in home childcare production	η^f	0.60
Share in the Cobb-Douglas childcare production technology	δ	0.75
Childcare disutlity parameter	ϵ	3.50
Assortative matching parameter	ν	0.44

[a] σ^2_E, the variance of the asset for East, is set equal to σ^2_W
[b] μ_E, the stigma parameter for working mothers in East is normalized to be zero
[c] A_C, Home childcare production productivity for cohabitating couples, is normalized to be one.
[d] θ, the Frisch elasticity of labor supply, is set to 2, following standard macroeconomic literature.

Table 2: The Mean of β: Women's bargaining power across the regions and unions

Family type	West	East
Cohabiting	0.320	0.373
Married	0.472	0.478

Table 3: Target and Simulated Moments

Moments	East					
	Single		Cohabitating		Married	
	Data	Model	Data	Model	Data	Model
Shares in family structure	15.51	13.68	29.99	30.79	54.50	55.53
Average daily market work hours	6.51	6.88	6.24	6.25	6.34	5.76
Home childcare hours per day	6.05	6.47	5.24	5.98	5.39	6.31
Professional childcare hours per day	6.13	6.00	6.35	4.87	6.04	6.19
Moments	West					
	Single		Cohabitating		Married	
	Data	Model	Data	Model	Data	Model
Shares in family structure	13.19	15.75	13.13	13.00	73.68	71.18
Annual work hours	5.56	5.73	5.35	5.23	4.80	4.79
Home childcare hours per day	6.50	6.59	6.29	6.13	6.39	6.44
Professional childcare hours per day	5.69	5.92	5.96	4.67	5.57	5.96

4.3 Channels

We briefly describe the expected direction of each channel before turning to the quantitative results.

Working-mother stigma μ_R. The stigma against working mothers enters the utility function as an additional disutility of market work for women. A higher μ_W directly reduces maternal labor supply in the West. It also operates through bargaining: by raising the marginal cost of work for women relative to men, it shifts the Nash bargaining solution in favor of husbands, who can negotiate lower female labor supply in exchange for greater home childcare provision. Both channels push in the same direction and unambiguously widen the East–West gap.

Non-marital parenting stigma ρ_R. The cohabitation stigma operates primarily through family composition. A higher ρ_W suppresses cohabitation rates in the West; since cohabiting mothers supply more market hours than married ones, this compositional shift reduces West German maternal labor supply. The effect on bargaining power within cohabiting couples is theoretically ambiguous: the stigma reduces the woman's net surplus from cohabitation, lowering her Pareto weight, but men who prefer cohabitation must compensate reluctant women by transferring resources in their fvaor. The net direction is determined quantitatively.

Economic channels. Regional and gender wage differentials affect maternal labor supply through standard substitution effects and through their impact on outside options, which in turn shape bargaining power. Higher wages raise the opportunity cost of home childcare and strengthen women's fallback position, both of which increase labor supply. Joint taxation and access to marital assets upon separation affect the relative attractiveness of marriage versus cohabitation and therefore

influence labor supply indirectly through family composition and bargaining. The cost of professional childcare and cost of living generate income and substitution effects whose net direction on the East–West gap is theoretically ambiguous. Section 5 quantifies the contribution of each channel.

5 Quantitative analysis

This section presents a series of counterfactual experiments designed to quantify the contribution of each mechanism described in Section 4.3 to the observed East–West gap in maternal working hours. In every experiment, the baseline for comparison is the East–West difference in average annual maternal working hours in the benchmark model, normalized to 100 percent.

The regional gap in average annual maternal labor supply (approximately 350 hours) is the difference between the East and West aggregate hours, computed as the weighted sum of hours worked by marital status in each region:

$$\text{Hours Gap} = \left(p_{S,E}\bar{h}^f_{S,E} + p_{C,E}\bar{h}^f_{C,E} + p_{M,E}\bar{h}^f_{M,E}\right) - \left(p_{S,W}\bar{h}^f_{S,W} + p_{C,W}\bar{h}^f_{C,W} + p_{M,W}\bar{h}^f_{M,W}\right),$$

where $p_{J,R}$ denotes the share of mothers in family arrangement $J \in \{S, C, M\}$ (single, cohabiting, married) in region $R \in \{E, W\}$, with $\sum_J p_{J,R} = 1$, and $\bar{h}^f_{J,R}$ is the average annual hours worked by mothers of type J in region R. The results are displayed in Figures 8 and 9; we discuss them in detail below.

5.1 Working mother stigma μ

In the first experiment we set the working-mother stigma parameter μ_W for West to zero.[13] As Figure 8 shows, eliminating the regional difference in the stigma against working mothers reduces the East–West gap in maternal labor supply to 27 percent of its benchmark value. West German mothers increase their market hours by approximately 16 percent (Figure 9a), because the removal of the stigma lowers the marginal disutility of paid work. Home childcare hours remain essentially unchanged, confirming that women primarily substitute between market work and leisure. The elimination of the working-mother stigma has no noticeable effect on family structure: the share of mothers by marital status is unaffected. This is intuitive, since the stigma applies to all mothers irrespective of marital status and therefore does not alter the relative attractiveness of marriage versus cohabitation. Consequently, the increase in labor supply occurs uniformly across all marital groups (Figure 9b).

[13] In the benchmark model, μ_E is normalized to be zero.

5.2 Non-marital parenting stigma ρ

In this experiment we reduce the cohabitation stigma parameter ρ in the West to the East German level. As Figure 8 shows, this narrows the East–West gap in maternal labor supply by 7%, bringing it to 93 percent of its benchmark value. The gap reduction primarily operates through a composition effect. Lowering the stigma raises the share of cohabiting mothers in the West by 151 percent and reduces the share of married mothers by approximately 25 percent (Figure 9b). Because cohabiting mothers in the West supply more market hours than married mothers, this shift in family-structure composition accounts for the bulk of the narrowing of the regional gap. Equalizing ρ across regions also strengthens the bargaining power of cohabiting mothers in the West, raising β from 0.32 to 0.37. This indicates that the stigma against cohabitation reduces cohabiting women's share of household resources and favors cohabiting men.

5.3 Regional wage gap

To quantify the role of the regional wage gap we set wages in the East equal to those in the West. In this hypothetical East German economy, wages are higher than in the benchmark. As Figure 8 shows, the resulting East–West gap in maternal labor supply nearly doubles relative to the benchmark. The higher wage raises the opportunity cost of home childcare, inducing East German mothers to reduce home childcare hours and increase their use of professional childcare. Average maternal labor supply in the East rises by slightly more than 14 percent across all marital statuses (Figure 9c). The wage increase also alters family structure, raising the share of married mothers in the East by approximately 7 percent while lowering the share of cohabiting mothers by 14 percent.

The symmetric experiment — setting West German wages equal to the lower East German level — widens the gap too, though slightly less, to approximately 170 percent of its benchmark value. This is because wages in the West, while higher than in the East, are not sufficiently high to fully compensate mothers for the disutility imposed by the working-mother stigma. Removing the wage premium therefore causes West German mothers to reduce their labor supply substantially. Taken together, the two experiments imply that better wages in the West are an important counterweight to the stigma: higher wages provide an incentive that partially offsets the disincentive effect of the norm, keeping the gap smaller than it would otherwise be.

5.4 Gender wage gap

In this experiment we eliminate the gender wage gap in both regions while keeping the regional wage gap at the benchmark level. As Figure 8 shows, eliminating the gender wage gap increases the East–West gap by three percentage points, from 100 to 103 percent of its benchmark value.

The widening occurs because higher female wages increase maternal labor supply in both regions through the standard substitution effect, but the response is substantially larger in the East — around 14 percent on average across marital statuses (Figure 9e) — than in the West, where the increase is approximately 7 percent (Figure 9d). The asymmetry reflects the dampening effect of the working-mother stigma: in the West, the disutility cost of market work partially offsets the substitution incentive created by higher wages, muting mothers' labor supply response. Cohabitation rates increase slightly in both regions while the shares of other family arrangements decline.

It should be noted that our wage specification constrains the gender wage gap to be equal across regions (Table B.5), whereas Figure 6 shows that the gender wage gap is in fact substantially larger in the West than in the East. By not allowing this regional difference to operate as a direct economic channel, the model likely attributes to the working-mother stigma some variation that a richer wage specification would assign to economic incentives. Our estimate that social norms account for 73 percent of the gap should therefore be interpreted as an upper bound on the contribution of norms rather than a point estimate.

5.5 Joint taxation

In this policy experiment we extend the lower tax rates currently enjoyed by married couples (via Ehegattensplitting) to cohabiting couples as well, effectively subjecting both marital statuses to the same preferential tax treatment. As shown in panels 9f and 9g of Figure 9, this reform raises maternal labor supply in both married and cohabiting unions. The share of cohabiting mothers increases while the share of married mothers declines in both regions. Cohabitation becomes relatively more attractive because the tax advantage previously exclusive to marriage can now be obtained through cohabitation, thereby increasing the union surplus associated with cohabitation.

Maternal labor supply therefore rises in both regions, widening the East–West gap in annual working hours to 110 percent of its benchmark value (Figure 8). These results imply that a policy reform equalizing the tax treatment of cohabitation and marriage would increase female labor supply nationwide but would simultaneously enlarge the regional gap in mothers' working hours between East and West Germany.

5.6 Marital assets

In this policy experiment we grant cohabiting partners the same access to marital assets upon separation as married couples, thereby making the two union types equivalent in terms of legal property rights. Although our model does not explicitly incorporate divorce or separation, the theoretical framework already distinguishes threat points between married and cohabiting unions; this feature allows us to capture the effect of marital-asset protection on maternal labor supply and

the regional work-hours gap.

Equalising asset rights, while leaving cohabiting couples subject to the higher tax rates faced by independent tax units (i.e., without access to *Ehegattensplitting*), renders cohabitation far less attractive than marriage for most potential partners. As a result, the cohabitation rate falls to zero in both regions. Single-motherhood rates rise sharply — to 40 percent in the West and 60 percent in the East (Figure 9h and 9i) — while marriage rates increase by approximately 41 percent in the East and 9 percent in the West. These compositional shifts raise the share of married mothers in both regions. Because married mothers supply fewer market hours than cohabiting or single mothers, maternal labor supply declines in both regions. Consequently, the East–West gap in annual working hours narrows to 92 percent of its benchmark value.

The elimination of cohabitation is an extreme outcome that warrants caution in interpretation. It reflects the combination of asset equalization without any compensating change in tax treatment, which renders cohabitation strictly dominated by marriage for almost all couples, and the fact that the model compares steady states rather than tracing a gradual adjustment path. The directional result — that strengthening cohabiting mothers' outside option narrows the gap — is nonetheless informative, and the 92 percent figure should be read as an upper bound on the gap-narrowing effect of such a reform.

5.7 Cost of professional childcare

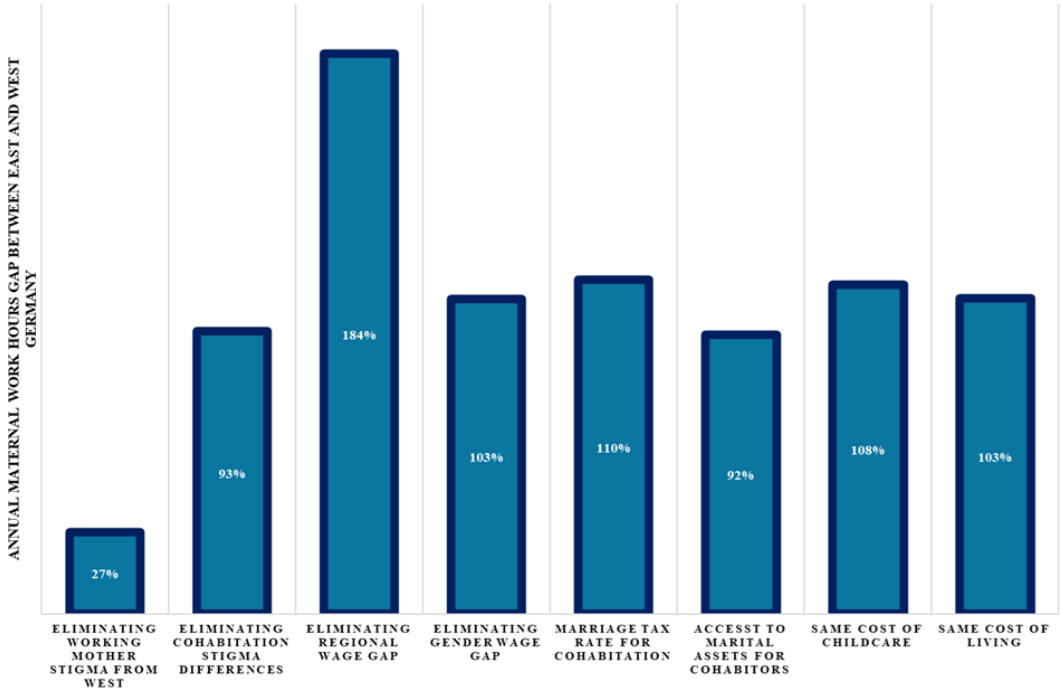
In this experiment we examine the effect of professional childcare costs on the regional gap in maternal working hours. The empirical literature on the impact of childcare costs (or subsidised availability) on female labor supply is ambiguous.[14] Setting the price of professional childcare in the West equal to that in the East ($\tau_W = \tau_E$) widens the East–West gap in maternal working hours from 100 percent to 108 percent of its benchmark value. West German mothers respond by increasing their consumption of professional childcare and devoting more time to leisure, which reduces their market hours relative to the benchmark economy. These findings are consistent with those reported by Bauernschuster and Schlotter (2015), who observe that the introduction of a legal entitlement to a kindergarten place in 1996 increased childcare use among mothers, although two-thirds of them utilize childcare for reasons unrelated to employment.

Figure A.1 shows that the labor force participation rate among women with childcare requirements have converged across the two regions. Therefore, it is not surprising that with heavily subsidized childcare (Felfe and Lalive 2018) and high childcare attendance rates (above 90% for children between 3-6 years old) a further decline in daycare cost does not have high substitution effects and

[14] See, e.g., Gelbach (2002), Blau (2007), Berlinski et al. (2011), Nollenberger and Rodríguez-Planas (2011), and Schlosser (2011) for positive effects and Fitzpatrick (2010), Lundin et al. (2008), and Havnes and Mogstad (2011) for negligible or negative effects.

mothers do not respond much to such changes.[15]

Figure 8: Counterfactual/Policy experiments: Maternal labor supply gap



Notes: The benchmark East–West gap in average annual maternal working hours is normalized to 100%. Each bar reports the size of the regional gap as a percentage of the benchmark after the corresponding counterfactual experiment. Values below 100% indicate a narrowing of the gap relative to the benchmark; values above 100% indicate a widening. The experiments are: (1) elimination of the working-mother stigma in the West ($\mu_W = 0$); (2) equalization of the cohabitation stigma across regions ($\rho_W = \rho_E$); (3) equalization of wages across regions; (4) elimination of the gender wage gap; (5) extension of joint taxation (*Ehegattensplitting*) to cohabiting couples; (6) extension of marital asset rights to cohabiting couples; (7) equalization of professional childcare costs across regions; (8) equalization of the cost of living across regions.

5.8 Cost of living

In this experiment we eliminate the regional difference in the cost of living by setting the cost-of-living in West Germany equal to that in East Germany. The resulting income effect reduces West German mothers' market hours by approximately 1 percent. Consequently, the East–West gap in maternal working hours widens to 103 percent of its benchmark value. Family structure remains essentially unchanged, since the cost-of-living adjustment applies uniformly across all marital statuses.

[15]Source: `https://www.destatis.de/EN/Themes/Society-Environment/Social-Statistics/Day-Care-Children/Tables/attendance-rates-children-daycare-year.html`

5.9 Role of policy in the absence of norms

In this section we examine how the working-mother stigma conditions the effectiveness of two policy interventions analyzed above: extending joint taxation to cohabiting couples and eliminating the gender wage gap. To isolate this interaction, we repeat both experiments under the counterfactual in which the working-mother stigma is completely removed in West Germany ($\mu_W = 0$). Both simulations are conducted for West Germany only, as the stigma against working mothers is present exclusively in the West. Figure 10 compares the policy effects on West German maternal labor supply in the absence of the stigma with those obtained in the benchmark economy ($\mu_W > 0$).

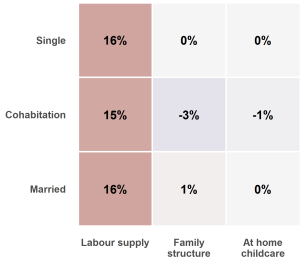
In both experiments the policies have negligible effects on maternal labor supply once the stigma is removed, compared to the substantial effects observed in the benchmark. This result reflects a specific feature of these two policies: their apparent effectiveness in the baseline stems from the distortion created by the stigma itself. The working-mother norm suppresses maternal labor supply below the level that economic fundamentals alone would dictate — a wedge that arises precisely because the norm persists into an environment where the behavior it prescribes is no longer individually optimal (Nunn 2022). Policies that raise the return to work — such as lower taxes or higher wages — are effective in the baseline precisely because they partially offset this norm-induced suppression. Once the stigma is removed, mothers already supply labor at the level consistent with economic fundamentals, and the same policies have little additional room to operate.

This does not imply that economic policies are ineffective in general in the absence of norms. Rather, it suggests that the effectiveness of policies that work *with* the norm — by raising the return to work in an environment where norms are suppressing it — is fundamentally conditional on the norm being present. Policies that instead target distortions unrelated to norms may behave differently and retain their effectiveness regardless of the normative environment.

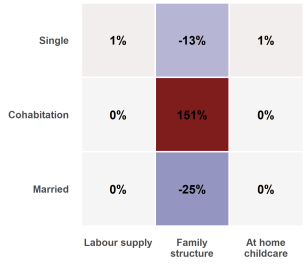
The broader implication for policy sequencing is that interventions targeting economic incentives and those targeting social norms are complements rather than substitutes. Policies that raise the return to work are most effective when norms are present and creating room for them to operate; policies that shift norms directly expand the scope for economic interventions to have lasting effects.

Figure 9: Counterfactual/Policy experiments: Maternal labor supply gap details

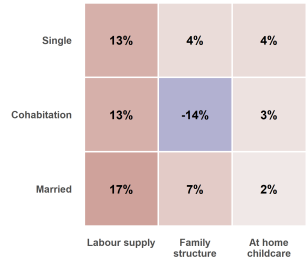
(a) No working mother stigma - West



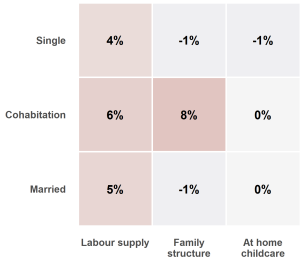
(b) No cohabitation stigma differences - West



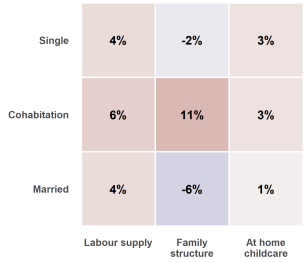
(c) No regional wage gap - East



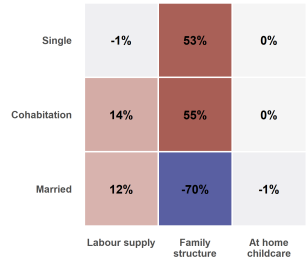
(d) No gender wage gap - West



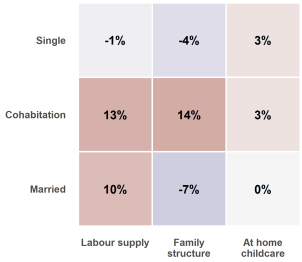
(e) No gender wage gap - East



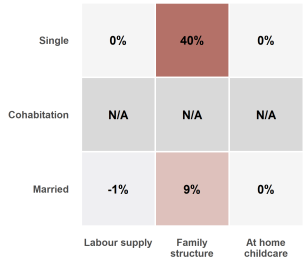
(f) Access to joint taxation for cohabitation - West



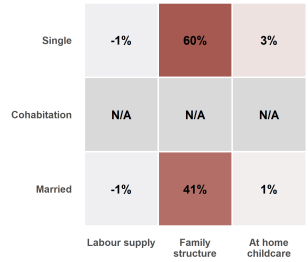
(g) Access to joint taxation for cohabitation - East



(h) Access to marital assets for cohabitation - West

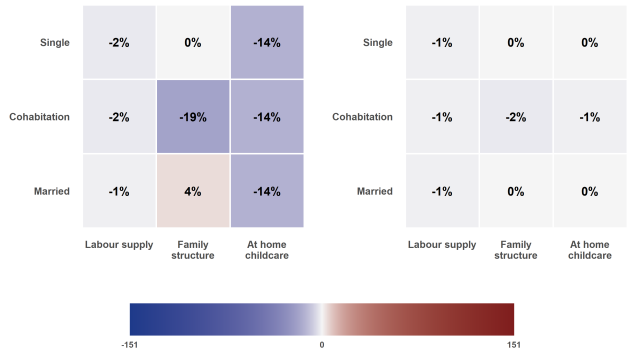


(i) Access to marital assets for cohabitation - East



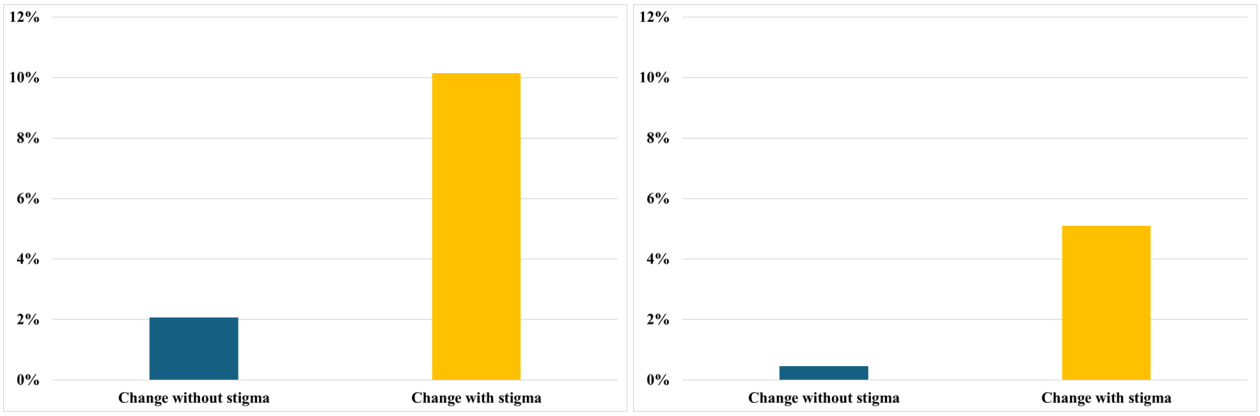
(j) Same childcare cost - West

(k) Same cost of living - East



Notes: Each matrix presents the average percentage changes in labor supply, family structure, and at-home childcare by marital status for each counterfactual scenario. N/A in panels h and i indicates the absence of couples willing to cohabit, since access to marital property and tax benefits renders marriage the most attractive form of union.

Figure 10: Counterfactual/Policy experiments without working mother stigma in West Germany



(a) Joint taxation for all couples

(b) No gender wage gap

Notes: Each panel compares the effect of a policy intervention on West German maternal labor supply in the benchmark economy ($\mu_W > 0$, dark bar) and in a counterfactual economy in which the working-mother stigma has been eliminated ($\mu_W = 0$, light bar). Panel (a) shows the response to extending joint taxation (*Ehegattensplitting*) to cohabiting couples. Panel (b) shows the response to eliminating the gender wage gap. Both experiments are conducted for West Germany only, as the working-mother stigma is present exclusively in the West. The comparison illustrates the extent to which the effectiveness of each policy is conditional on the presence of the norm.

6 Conclusions

This paper asks how much of the 350-hour annual gap in maternal labor supply between East and West Germany can be explained by social norms, what the role of economic incentives is, and what specific policy reforms can realistically achieve in the presence of strong norms. To answer these questions, we build and estimate a collective model of family formation and labor supply that incorporates two region-specific stigmas — against working mothers and against non-marital parenting — using GSOEP data from 2000–2017.

Our quantitative results yield three central findings. First, social norms account for the dominant share of the gap: eliminating the working-mother stigma in the West reduces the East–West gap in annual maternal working hours by 73 percent. The stigma against non-marital parenting contributes a further 7 percent, operating indirectly through its effect on the composition of family arrangements. Second, regional economic conditions play an important but offsetting role. Higher wages in the West partially compensate mothers for the disutility of defying the working-mother norm, such that equalizing wages across regions would nearly double the gap rather than narrow it. Third, differences in professional childcare costs and the cost of living contribute modestly, and in the same direction: equalizing either widens the gap.

Policy experiments reveal a more complex picture than a simple accounting of the gap would suggest.

Several reforms that raise maternal labor supply nationwide simultaneously widen the East–West gap. Extending joint taxation to cohabiting couples raises female labor supply in both regions symmetrically, leaving the gap larger. Eliminating the gender wage gap increases labor supply more in the East than in the West, because the working-mother stigma dampens the substitution response in the West. The only reform that reliably narrows the gap is extending marital asset rights to cohabiting couples upon separation, which strengthens the bargaining position of West German mothers within the household.

We also show that the effectiveness of economic policy instruments is fundamentally conditional on the presence of the working-mother stigma. When the stigma is eliminated, both joint taxation and the gender wage gap have negligible effects on maternal labor supply. This occurs because these policies are effective in the baseline precisely by offsetting the norm-induced suppression of labor supply; once the distortion is removed, little room remains for them to operate. This finding has direct implications for policy sequencing: interventions targeting economic incentives and those targeting social norms are complements rather than substitutes, and the scope for economic policy is sharpest when norms are present and creating the distortions that policy can correct.

Taken together, these results imply that the East–West gap in maternal labor supply is not an inevitable legacy of reunification but a reflection of the interplay between culturally rooted stigmas and Germany's regional economic structures. Social norms are not a background condition that economic policy can work around: they are the dominant source of the gap and the reason that several seemingly well-targeted reforms either fail or backfire. Addressing them directly is a precondition for economic policy to function as intended.

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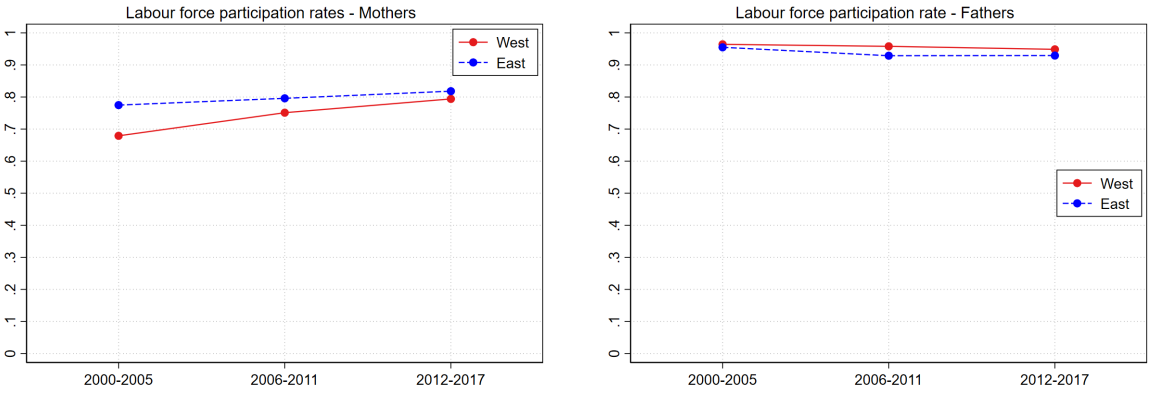
Online Appendix

Appendix A. Figures

Figure A.1: Labor force participation across East and West Germany

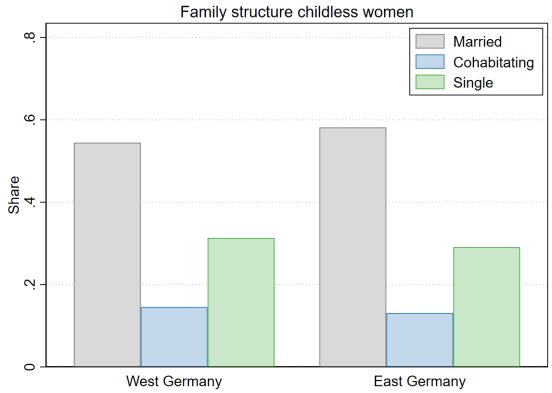


Source: GSOEP waves 2000-2017, Liebig et al. (2018). Note: Sample includes all mothers and fathers, born in Germany with at least one child under 12.

Figure A.2: Comparison of labor supply of all women across regions in Germany

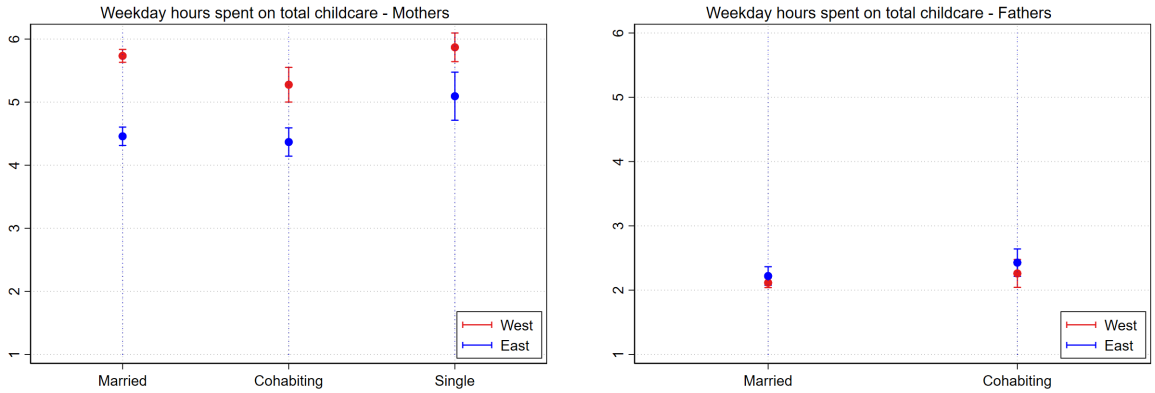
Source: GSOEP waves 2000-2017, Liebig et al. (2018). Note: Sample includes all women (including childless and with children) born in Germany.

Figure A.3: Family structure comparison of childless women



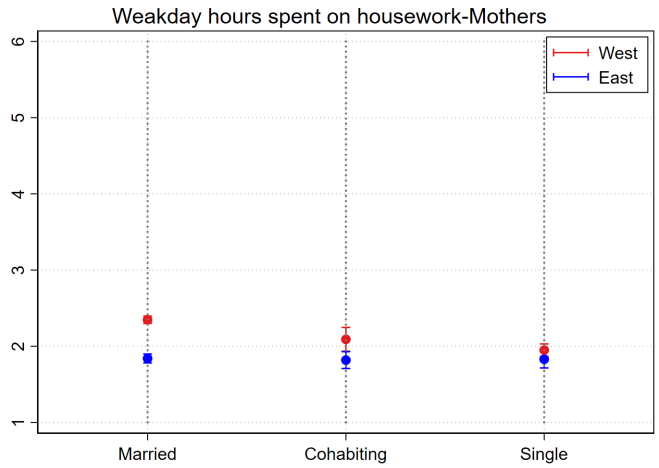
Source: GSOEP waves 2000-2017, Liebig et al. (2018). Note: Sample includes all childless women born in Germany. Figure reports the share of childless women by marital status in East and West Germany.

Figure A.4: Childcare by family type across regions in Germany



Source: GSOEP waves 2000-2017, Liebig et al. (2018). Note: Sample includes all mothers and fathers, born in Germany with at least one child under 12, in the labor force with a minimum of 720 annual hours worked, no more than 3 children and 14 hours of childcare per day. Figures represent the number of hours of childcare reported for all children in the household and are adjusted for a flexible function of the number and age of children and year of survey fixed effects.

Figure A.5: Childcare by family type across regions in Germany



Source: GSOEP waves 2000-2017, Liebig et al. (2018). Note: Sample includes all mothers and fathers, born in Germany with at least one child under 12, in the labor force with a minimum of 720 annual hours worked, no more than 3 children and 14 hours of childcare per day. Figures represent the number of hours spent on household work other than childcare on a weekday and are adjusted for a flexible function of the number and age of children and year of survey fixed effects.

Appendix B. Moments for structural estimation

Table B.4: Median Monthly Labor Income for Men

Education Level	East			West		
	Income	t-Dusseldorf Class	α	Income	t-Dusseldorf Class	α
General Elementary	1,632.028	1,501 – 1,900	0.237	2,879.641	2,701 – 3,100	0.153
Middle Vocational	2,065.440	1,901 – 2,300	0.196	3,264.418	3,101 – 3,500	0.144
Vocational & Abitur	2,601.226	2,301 – 2,700	0.163	3,825.152	3,501 – 3,900	0.131
Higher Vocational	2,596.852	2,301 – 2,700	0.163	4,006.849	3,901 – 4,300	0.132
Higher Education	3,974.980	3,901 – 4,300	0.133	5,285.130	from 5.101*	0.115

Note: (*: This table shows the child support rates by education of the father. We calculated the median income for fathers in each education category. Based on the median income, we determine the child support rates for fathers using Düsseldorf 2017 income classification. It provides the child support guidelines for income ranges up to 5,100 Euro per month. For incomes above this threshold, we use the rates applied to the income 4700-5100 of Düsseldorf table class.)

Table B.5: Regression for Wage per Hour

Variable	Coefficient	S.E.
Region: East	-5.204	0.159***
Sex: Woman	-1.934	0.117***
Education: Middle Vocational	4.337	0.259***
Education: Vocational & Abitur	5.205	0.299***
Education: Higher Vocational	6.360	0.336***
Education: Higher Education	9.896	0.266***
Constant	12.253	0.248***

Source: GSOEP waves 2000-2017, Liebig et al. (2018). Note: Sample includes all childless men and women age 20–65. There are a total of 19389 observations. The benchmark category is a man from West Germany with elementary education. * for $p \leq 0.1$, ** for $p \leq 0.05$, and *** for $p \leq 0.01$.

Table B.6: Regression for Annual Work Hours

Variable	Coefficient	S.E.
East Germany	233.974	62.365***
Married	-180.049	29.093***
Cohabiting	-20.799	36.391

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Table B.6 – continued from previous page

Variable	Coefficient	S.E.
East Germany # Married	171.259	66.463**
East Germany # Cohabiting	-27.712	72.010
Constant	1723.982	38.863***

Source: GSOEP waves 2000-2017, Liebig et al. (2018). Note: The regression includes year fixed effects (2001–2017) and controls for a flexible function of children between age 0–12 and fertility. There are a total of 12,088 observations. The benchmark category is a single mother from West Germany. * for $p \leq 0.1$, ** for $p \leq 0.05$, and *** for $p \leq 0.01$.

Table B.7: Regression for At-home Childcare per Weekday

Variable	Coefficient	S.E.
East Germany	-0.440	0.244*
Married	-0.242	0.145*
Cohabiting	-0.406	0.204**
East Germany # Married	-0.530	0.259**
East Germany # Cohabiting	-0.528	0.317*
Constant	6.494	0.199***

Source: GSOEP waves 2000-2017, Liebig et al. (2018). Note: The regression includes year fixed effects (2001–2017) and controls for a flexible function of children between age 0–12 and fertility. There are a total of 9,429 observations. The benchmark category is a single mother from West Germany. * for $p \leq 0.1$, ** for $p \leq 0.05$, and *** for $p \leq 0.01$.

Appendix C. Identification

In this subsection we provide a detailed illustration of the identification of model parameters within the Simulated Method of Moments (SMM) estimation. There is not a one-to-one correspondence between target moments and structural parameters as all parameters are estimated together. However, below we discuss the role of most important target moments in identifying specific structural parameters.

λ, the labor disutility parameter, is identified by the average working hours in each region. A higher λ corresponds to reduced labor supply, as it increases the disutility of work. This parameter affects labor supply uniformly across regions and does not influence the differential in working hours between regions.

The working mother stigma parameter, μ_R, is identified by the gap in working hours between regions. A decrease in μ_W reduces the disparity in labor supply between East and West by mitigating the stigma effect in the West region.

The mean non-labor income, $\overline{a}_R$, influences labor supply through the wealth effect, leading to a reduction in working hours across family structures and regions. Additionally, $\overline{a}_R$ affects the distribution of family structures by affecting the division rule in cases of couple separation. Note that μ_R, on the other hand, has a negligible impact on the composition of family types.

The household maintenance cost for single mothers in the East, $F_{S,E}$, affects labor supply through the wealth effect. An increase in $F_{S,E}$ raises household costs for single mothers in the East, leading to an increase in working hours to offset these costs. In comparison, a decrease in $\overline{a}_R$ increases working hours. It must be noted that once $F_{S,E}$ is pinned down, the household maintenance costs for other family types and regions, $F_{J,R}$, are computed using data on the relative cost of living across regions and family types.

δ, is determined by the ratio of home childcare hours to professional childcare hours. The home childcare productivity parameter for single mothers, A_S, affects both home and professional childcare hours exclusively for single mothers. Conversely, a higher A_J, the childcare productivity parameter for mothers in unions, decreases childcare hours for partnered mothers without affecting single mothers.

The parameter η^f, representing the share of women's childcare hours, is identified by home childcare hours for cohabitating and married couples. A larger η^f increases home childcare hours for couple type J, with no effect on single mothers. This parameter has minimal influence on mothers' working hours, as women adjust their leisure time to accommodate childcare responsibilities.

τ_R, the cost of the professional childcare for the region R, is determined by the difference in the professional childcare hours across the regions. An increase in τ_R leads to a decrease in professional childcare hours and an increase in home childcare hours and working hours. On the other hand,

as ψ, the degree of substitution parameter between men and women in producing home childcare, gets increased, the home childcare production function gets more effective, so that this leads to a decrease in both professional childcare hours and mothers' childcare hours. Moreover, ψ does not affect those for single mothers.

ϵ, the disutility parameter for childcare and ϕ, the cost of raising a child, are separately identified. An increase in ϵ and a decrease in ϕ lead to a decrease in mothers' home childcare hours. However, the increase in ϵ leads to an increase in professional childcare hours, whereas the decrease in ϕ leads to a decrease in the professional childcare hours

The variance of match quality, σ_Γ, is identified by the shares of marriage, cohabitation, and single households in the data. The match quality parameter, Γ, captures the non-economic value of a match, with its mean, $\bar{\Gamma}$, normalized to one. The cohabitation stigma parameter, ρ_R, is identified by the regional gap in the share of cohabitating women. An increase in σ_a, the standard deviation of non-labor income, reduces the share of marriages while increasing cohabitation, driven by risk-sharing considerations in divorce. Conversely, an increase in σ_Γ increases the share of single-mother households while reducing the share of marriages.