Article:

Nicoletti, Cheti orcid.org/0000-0002-7237-2597, Francesconi, Marco and Cavapozzi, Danilo (2021) The Impact of Gender Role Norms on Mothers' Labor Supply. Journal of Economic Behavior and Organization. 113–134. ISSN 0167-2681

https://doi.org/10.1016/j.jebo.2021.03.033

The Impact of Gender Role Norms on Mothers' Labor Supply*

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March 24, 2021

Abstract

We study whether mothers' labor supply is shaped by the gender role attitudes of their peers. Using detailed information on a sample of UK mothers with dependent children, we find that having peers with gender-egalitarian norms leads mothers to be more likely to have a paid job and to have a greater share of the total number of paid hours worked within their household, but has no sizable effect on hours worked. Most of these effects are driven by less educated women. A new decomposition analysis allows us to estimate that approximately half of the impact on labor force participation is due to women conforming gender role attitudes to their peers', with the remaining half being explained by the spillover effect of peers' labor market behavior. These findings suggest that an evolution towards gender-egalitarian attitudes promotes gender convergence in labor market outcomes. In turn, a careful dissemination of statistics on female labor market behavior and attitudes may accelerate this convergence.

JEL Classification: J12, J16, J22, J24, J31, Z13
Keywords: Culture; Norms; Gender; Identity; Peer effects

*We are grateful to three anonymous referees, the Editor (Russell Smyth), Sonia Bhalotra, Alison Booth, Thomas Cornelissen, and Kjell Salvanes for their constructive comments. Seminar and workshop participants at several universities provided useful suggestions.

1 Introduction

A large economic literature shows that culture — broadly defined to account for beliefs, values, preferences, attitudes and social norms which can be transmitted from one generation to another or through social interactions — affects a wide range of economic behaviors, from social capital and trust to entrepreneurship and savings, and from school and neighborhood choices to female labor supply and fertility (Guiso, Sapienza, and Zingales, 2006; Manski, 2000; Bisin and Verdier, 2011; Alesina and Giuliano, 2014). Several studies document that inherited gender norms are a key determinant of women's labor market outcomes (e.g., Fernández, Fogli, and Olivetti, 2004; Bertrand, 2011; Fernández, 2011; Alesina, Giuliano, and Nunn, 2013; Olivetti, Patacchini, and Zenou, 2020). Other studies emphasize the strong influence of peers on female labor market decisions (e.g., Maurin and Moschion, 2009; Mota, Patacchini, and Rosenthal, 2016; Nicoletti, Salvanes, and Tominey, 2018). This paper breaks new grounds combining both dimensions of culture, the slow-moving component inherited through intergenerational transmissions and the fast-moving component that operates through social interactions, to understand the labor market decisions of young mothers.[1]

Cultural norms may affect female labor market behavior in a number of ways, of which we emphasize two.[2] One channel is through information or social learning. Some women may be uncertain about the effect of market work on their children's well-being, the quality of their family relationships and, more generally, their work-life balance. They may therefore look to same-sex adults (such as their own mothers) and to peers for valuable information (Fernández, 2007, 2013; Fogli and Veldkamp, 2011). The other channel is social pressure or conformity. Some women may perceive to receive a boost to their utility if they make labor market decisions that conform to the social norms defining their own cultural identity and self-image, even if these are in opposition to the mainstream's and may even imply pecuniary penalties in the labor market (Akerlof and Kranton, 2000, 2010).

Information and social pressure channels operate jointly through primary socialization decisions inside the family of origin as well as secondary socialization processes that take place where women develop their main social interactions (e.g., schools, neighborhoods, clubs, and workplaces), both of which underpin identity formation.[3] As primary edu-

[1]The distinction between fast- and slow-moving components is briefly discussed in Guiso, Sapienza, and Zingales (2006) in p. 25. Bisin and Verdier (2011) provide further relevant discussions on related aspects of cultural transmission and socialization.

[2]By norms (or, alternatively, attitudes and values), we refer to society's informal rules about appropriate or acceptable behavior. Our focus is on gender role norms, but, throughout the paper, we use the terms 'gender role', 'social', and 'cultural' interchangeably.

[3]These two types of socialization correspond to what Bisin and Verdier (2011) call direct vertical (or

cators, parents may sanction gender role identities and establish role models that shape their daughters' future choices. As adolescents or young adults, women can look at other females close to them in age or residence (such peers and neighbors) to firm up their own identity. Primary and secondary forms of socialization are correlated but only imperfectly. School mates, friends, peers, neighbors, and coworkers could either reinforce or weaken the early socialization effort of parents. It is possible therefore that each component exerts its independent impact on women's labor supply decisions.

Our analysis concentrates on women with dependent children. This focus has policy relevance. Economists have long claimed that motherhood is a channel likely to lead to sizeable gender pay differentials (Gronau, 1973; Mincer and Polachek, 1974; Weiss and Gronau, 1981; Mincer and Ofek, 1982). More recently, empirical evidence has shown that the arrival of the first child is associated with a large pay gap which often persists over a long time period, many years after the child's birth (Angelov, Johansson, and Lindahl, 2016; Bütikofer, Jensen, and Salvanes, 2018). As a result, several studies have advocated the importance of public policies to safeguard mothers' careers around childbirth, with special emphasis given to maternal leave mandates (e.g., Baker and Milligan, 2008; Lalive and Zweimüller, 2009; Lalive et al., 2014). Knowing the extent to which gender norms shape the labor market behavior of mothers with young children therefore is important, as it enables us to assess whether policy interventions can be effective or undone by social attitudes and gender role identities.

In this paper, we are interested in the causal impact of culture on maternal labor market decisions. As in Fortin (2005), Fortin (2015) and Fernández (2007), we identify culture with women's gender role attitudes. The first two studies, however, focus on own individual attitudes among women in 25 OECD countries or women in the United States. The third isolates the effect of culture by examining female descendants of immigrants to the US, linking their labor supply to the attitudes reported by individuals in their father's country of birth.[4] Our analysis, instead, focuses on all women in the United Kingdom

parental) socialization and olique/horizontal socialization, respectively. The former is the result from interactions between children and members of their parents' population (the slow-moving component of culture), while the latter is due to interactions between members of the children population (the fast-moving component).

[4]More specifically, Fortin (2005) investigates the relationship between own gender role attitudes and work values on women's (but not necessarily mothers') labor market outcomes in advanced economies. Unlike ours, this analysis does not aim to identify a causal impact. Fortin (2015) addresses the endogeneity of individual attitudes using a strategy based on two different instrumental variables: the first is given by extraneous attitudes (i.e., attitudes towards premarital sex and political views), whereas the second is given by the AIDS scare, which is posited to affect gender role values but not labor force participation. Both studies find that women with traditional (egalitarian) gender role values are less (more) likely to be employed. Finally, Fernández (2007) avoids the endogeneity issue using work attitudes other than the focal woman's (i.e., the attitudes of women from the same country as the focal woman's father) and finds that women whose country of ancestry is more traditional tend to work fewer hours.

(not only on second-generation immigrants) and on the cultural norms expressed by their peers who live in the UK (not by women in the country of parental ancestry), where peers are defined by women of the same age, with the same education, and from the same country of birth as the focal woman.

One of the contributions of this paper, therefore, is to unpack social norms looking at the role played by peers through their gender identity norms. Most of the existing related literature focuses on peers' labor supply, rather than peers' gender role attitudes. For instance, Maurin and Moschion (2009) and Mota, Patacchini, and Rosenthal (2016) operationalize peers with neighbours, and find evidence of a positive and significant effect of neighbors' labor market participation on women's own participation decision. Nicoletti, Salvanes, and Tominey (2018) consider family networks (consisting of sisters and cousins) and find that an increase in mothers' working hours is magnified by family peers. Finally, Olivetti, Patacchini, and Zenou (2020) equate peers to mothers and school mates' mothers, and find that there are significant effects on a woman's hours worked from both her mother's hours and the average hours across school mates' mothers.

As mentioned above, using a measure of culture (e.g., work attitudes) expressed by individuals who live in the woman's country of ancestry has been advocated as a way of addressing identification issues, especially the potential problem of reverse causality. The assumption is that the variation in gender role values across countries is exogenous, once controlled for a set of characteristics of the second-generation female immigrants (Fernández, 2007; Fernández and Fogli, 2009; Fernández, 2011). In constructing our peers' groups, we follow the same insight, but relax the assumption of exogeneity of peers' gender role. Our innovation here is to estimate a two-stage least squares (2SLS) model which instruments peers' gender identity norms with the employment status of the peers' mothers when the focal woman's peer was 14 years old. This instrument is plausible given the evidence documenting that gender role attitudes are transmitted from mothers to children (e.g., Blau et al., 2013; Farré and Vella, 2013; Johnston, Schurer, and Shields, 2014) and direct systematic interactions between a woman and her peers' mothers are not very common.[5] This new estimation leverages on the slow-moving component of culture inherited through intergenerational transmission in the first stage, and, in the second stage, on the fast-moving component that operates through the social influence of peers.[6]

We provide a comprehensive analysis of the effect of gender role norms on mothers' labor market outcomes by examining both extensive and intensive margins of labor supply

[5]We shall deal with the issue arising from the potential correlation between peers' mothers' employment rate and the focal woman's mother's employment status by controlling for the latter.

[6]This approach can be seen as a novel application of the identification strategy of peer effects through partially overlapping peer groups (see Bramoullé, Djebbari, and Fortin, 2009; Lee, Liu, and Lin, 2010; De Giorgi, Pellizzari, and Redaelli, 2010).

and the intrahousehold share of paid hours worked by women. We find that a woman whose peers have more progressive (gender-egalitarian) attitudes is more likely to work and has a greater share of market hours as compared to her counterparts with more traditional peers. The magnitude of the effects is large. A one standard deviation increase in peers' gender role norms leads to a 9 percentage point increase in the probability of working (representing a 13% increase on average) and to a 2 percentage point increase in the share of paid work within the household (a 9% increase). We find instead no evidence of an impact on the intensive margin.

Interestingly, it is less educated women who drive most of the observed effects. Although on average they are less likely to work (e.g., Blundell et al., 2016; Blundell et al., 2018), low education women may offset their employment gap if they have progressive peers. If labor force participation is to be encouraged among less educated mothers, promoting gender equal norms might be effective. To do this we need to know more about the mechanisms behind our results.

Our final contribution is then to offer an economic interpretation of the impact of peers' gender identity norms on women's labor force participation. This is based on a model that focuses on two mediated effects. The first of these effects works through the influence that peers' gender role values have on the gender role attitudes of the focal woman. This is something that links our work back to Fortin's (2005, 2015) framework. The second mediated effect operates through the employment decisions of peers, something that links our model to the studies by Fernández (2007) and Fernández and Fogli (2009). Peers' gender role values affect peers' employment rate, which in turn may have a spillover effect on the focal woman, as documented by Maurin and Moschion (2009), Nicoletti, Salvanes, and Tominey (2018), and Olivetti, Patacchini, and Zenou (2020).

These two mediated effects are arguably explained by different channels. The former, the effect mediated by the focal woman's gender role attitudes, is likely driven by social pressure or conformity; the latter, the effect mediated through peers' employment decisions, is explained possibly by both social learning (information) and social pressure. We find that each of mediated effect can explain about half of the total effect, suggesting that social pressure is as least as strong as social learning. We also find that, once the two mediated effects are accounted for, there is no direct effect of peers' gender identity norms on labor force participation. Given these results, disseminating detailed statistics on female labor market outcomes and work attitudes may prove to be a cost effective way to promote labor market participation, especially among lower educated mothers. Such a dissemination could expedite both social learning and conformity processes, accelerating the trends in female labor market participation and facilitating the shift towards more gender-egalitarian norms. Labor market statistics are already routinely published by government-run statistical agencies and could also be included in the curriculum for personal, social, health and economic education across primary and secondary schools.

The rest of the paper is organized as follows. Section 2 discusses our empirical strategy and the main identification issues that need to be addressed. Section 3 describes the data, and Section 4 presents our results. Section 5 concludes.

2 Estimation and Identification Issues

2.1 The Effect of Gender Role Norms on Women's Labor Supply Outcomes

To assess the impact of gender identity norms on maternal labor supply, we consider the following mean regression model, which emphasizes the fast-moving component of culture operating through social interactions:

$$y_i = \alpha + \rho \overline{g}_{-i} + \mathbf{x}_i' \boldsymbol{\beta} + \varepsilon_i, \tag{1}$$

where the subscript i denotes focal women (or focal mothers) in our sample, $i = 1, ..., N$; y_i is a measure of woman i's labor supply; $\mathbf{x}_i$ is a vector of covariates, which includes the focal mother's age and age squared, a set of indicator variables for her birth cohort, level of education, country of residence, white ethnicity and urban residence, and total number of children by age group; $\overline{g}_{-i} = \frac{1}{J} \sum_{j \in \mathcal{J}} g_j$ is the leave-one-out mean of the gender role norms of the focal woman's peers (i.e., the average of g excluding the focal woman i), where $\mathcal{J}$ and J respectively denote the set and the number of peers of individual i; and ε_i is an error term with $E(\varepsilon_i | \mathbf{x}_i) = 0$. $\boldsymbol{\beta}$ is the vector of parameters on the covariates $\mathbf{x}$ and the scalar parameter α is the intercept. Our parameter of interest is the scalar parameter ρ, which measures the effect of peers' gender identity norms on the focal mother's labor supply. This is the total impact of social norms on y, capturing both direct and indirect effects as it becomes clearer in what follows.

We think of $\overline{g}_{-i}$ as group norms, i.e., the expected gender norms for a reference peer group the focal mother belongs to. Specifically, we consider the mean of the gender role attitudes of other women born in the same country and period, and with the same education level as the focal woman. This approach to define homogenous peers is standard and it is justified by the fact that comparisons with non-homogeneous peers are unlikely (Nicoletti, Salvanes, and Tominey, 2018). Country of birth has been already used to characterize cultural norms shared with peers (e.g., Guiso, Sapienza, and Zingales, 2006;

Fernández, 2007; Fernández and Fogli, 2009). After controlling for the variables in $\mathbf{x}$, which include country of residence, education and birth cohort, the variation in peers' gender role attitudes comes primarily from the variation in the country of origin. This in turn is driven by women who moved away form their country of birth, accounting for approximately 20% of the main sample. This group of movers is by four-fifths comprised of immigrants (i.e., women born outside the UK) and the remaining one-fifth by movers between constituent countries within the UK.

Because individuals do not choose their country of birth, we do not have to deal with the problem of endogenous peer membership, which typically plagues the estimation of peers effect models based on neighbours, friends, or co-workers. We are instead concerned with the possible endogeneity driven by unobserved correlated effects (Manski, 1993; Moffitt, 2001), i.e., the fact the focal woman and her peers may share similar unobserved characteristics and live in similar environments that are correlated with both gender identity norms and labor market decisions. An example is work ethics. If women born in the same country and with similar age and education had similar work ethics, then the effect of the gender role attitudes of peers, $\overline{g}_{-i}$, could be biased precisely because peers with comparable gender role values may have similar work ethics and ultimately make similar labor supply choices.

To address this potential endogeneity issue, we use an instrumental variable (IV) approach, whereby peers' gender role identities are instrumented with the employment status of the peers' mothers. This brings into the picture the slow-moving component of culture mentioned in the Introduction. More precisely, for each of the focal woman's peers, we define her mother's employment status as an indicator variable taking value 1 if the peer's mother worked when the peer was aged 14, and zero otherwise. Let e_j^m denote this indicator, where j denotes the peers in group $\mathcal{J}$. For each focal woman i, we then construct our instrument averaging this variable over all peers' mothers while excluding the focal woman's mother, $\overline{e}_{-i}^m = \frac{1}{J}\sum_{j\in\mathcal{J}} e_j^m$. The peers' mothers' work status is unlikely to influence the labor supply of the focal woman directly, because arguably there are no direct relevant interactions between the peers' mothers and the focal woman. This justifies the exclusion restriction for our instrument. The IV's relevance condition, which we will test, operates through the plausible intergenerational link between peers' mothers' employment status when their daughters were aged 14 and their daughters' gender role attitudes. Therefore, peers' mothers' employment rate, our IV, affects peers' gender identity norms, which in turn affects the focal woman's labor supply. Put differently, there is an indirect effect of the IV, $\overline{e}_{-i}^m$, on y_i through $\overline{g}_{-i}$, the peers' gender role values.[7]

[7] It is worth stressing that, differently from our approach, Olivetti, Patacchini, and Zenou (2020) estimate the direct effect of peers' mothers employment rate, $\overline{e}_{-i}^m$ in our notation, on the focal woman's

Besides correlated omitted variables, this IV strategy addresses also the potential issue of reverse causality (reflection), i.e., the possibility that the focal woman's labor supply decisions may affect her peers' gender identities, although this is unlikely in our case. Because the focal woman's mother can have characteristics similar to the peers' mothers', our instrumental variable could also capture the influence of the focal woman's mother employment status, e_i^m, rather than the effect of the peers' gender role norms, $\overline{g}_{-i}$. For this reason, in (1) we also control for e_i^m (as in Olivetti, Patacchini, and Zenou, 2020). This implies that our IV estimation exploits the variation in peers' social norms induced by the variation in the employment rate of the peers' mothers, net of the variation explained by the employment status of the focal woman's mother.

Notice that the focal woman's mother's employment status can be endogenous and therefore its estimated effect in (1) could be biased. This effect, however, is not the focus of our analysis. Controlling for e_i^m becomes a problem only if this variable were an endogenous mediator (or a 'bad control'), i.e., if $\overline{g}_{-i}$ had an effect on y_i through e_i^m. Since the focal woman's mother' employment status is observed when the focal woman was aged 14 and her peers' gender role norms are observed when she and her peers are adult, it is plausible to assume that the focal woman's mother's employment status be not a mediator. A possible direct solution to this bad control problem is to re-write the model in deviations from the leave-one-out group-specific mean, where the group is defined on the basis of the mother's employment status when the focal woman was aged 14. This approach allows us to avoid the bias induced by the presence of fixed effects in linear-in-mean peer effects models (e.g., Caeyers and Fafchamps, 2016; von Hinke, Leckie, and Nicoletti, 2019).[8]

2.2 Channels Explaining the Effect of Social Norms

The IV estimation of model (1) outlined in the previous subsection enables us to ascertain how changes in gender role norms can affect women's labor supply decisions but does not provide any information on the channels through which the effect of social norms operates.

work decisions, y_i. In their application, this is reasonable, since their peers' mothers are mothers of the high school classmates of the focal woman. Such mothers are highly likely to interact with, and influence, the focal woman directly. In our case, instead, the focal woman's peers are unlikely to have direct, personal interactions with her, for these are just women born in the same country and with the same birth cohort and education as the focal woman's, but they potentially live in different areas and neighborhoods and may have never shared the same family and friendship networks with the focal woman. In our case, therefore, it is plausible to assume that peers' mothers and focal women do not have (and never had) direct personal contacts.

[8]We performed this estimation of (1) as well as the estimation of the models we present next and always found results that are virtually identical to those in which we ignore the bad control issue. In Section 4, therefore, we refer to the estimates obtained with the more standard approach and do not present the estimates from the demeaned model.

In what follows, we illustrate how the total effect of gender norms can be additively decomposed into three components. Here, as well as in the decomposition analysis, we focus on paid employment status, although the same logic can be applied to all dimensions of labor supply.

Figure 1 provides a graphical representation of these three components, namely one direct effect and two mediated effects. The first mediated effect operates through the focal woman's own gender role attitudes, g_i: that is, peers' gender role norms affect the focal woman's own gender role attitudes, which in turn affect her own labor supply. In Figure 1, the effects of $\overline{g}_{-i}$ on g_i and of g_i on y_i are denoted with λ and ϕ, respectively, and represented by the first and second horizontal arrows. This mediated effect, therefore, is given by the product of λ and ϕ. As in Bénabou and Tirole (2011), the link between $\overline{g}_{-i}$ and g_i can reflect both a search for affective benefits (e.g., hedonic value of self-esteem) and identity investments as self-signals. When contemplating her labor market choices, a woman takes into account what kind of person each different attitude would make her and the desirability of those self-views, a form of rational cognitive dissonance reduction (Festinger and Carlsmith, 1959; Bem, 1972; Rabin, 1994; Akerlof and Kranton, 2000, 2010; Oxoby, 2003). Besides the instrumental value conveyed by peers' norms for self-signaling, their direct informational content on own attitudes is likely to be negligible. This means the first mediated effect is entirely attributable to conformity, whereby the focal woman's personal gender role attitudes reflect her peers' norms and these, in turn, have an effect on her own employment decision.

The second mediated effect, which operates through peers' employment decisions, is represented by the two slanted arrows in the bottom part of Figure 1, where $\overline{y}_{-i}$ denotes the leave-one-out average of the peers' employment status (which is a dummy taking value 1 for peers who work, and 0 otherwise). While ψ denotes the effect of peers' gender role attitudes on peers' employment status, θ captures the effect of peers' average employment status on the focal woman's employment (i.e., endogenous peers effect). This spillover effect, mediated by the peers' employment decision and given by $\psi\theta$, can be driven by either social pressure or information, or both. The need of information may be driven by the focal woman's uncertainty surrounding her employment choices, especially in the proximity of childbirth, so that she might want to observe her peers' behavior to extract relevant information to guide her own decisions (Fogli and Veldkamp, 2011). This can occur even if the focal woman does not have direct interactions with her peers.

Finally, the curved arrow in the top part of Figure 1 describes the direct impact of peers' gender role values on the focal woman's labor market participation decision, y_i. This direct effect, which is captured by η, can again be explained by social pressure through identity and dissonance reduction, as it is the case for $\lambda\phi$. Once the mediated effect that operates through $\overline{y}_{-i}$ is accounted for, this direct effect is unlikely to reflect any information mechanism, unless there are other determinants of maternal labor market behavior, which are conveyed by peers' decisions but are outside the model. In the empirical analysis shown in subsection 4.2, we will document that this direct effect has no bite on mother's employment decisions.

To estimate the direct effect η and the two mediated effects, $\lambda\phi$ and $\psi\theta$, we specify the following two expressions:

$$y_i = \delta + \theta\overline{y}_{-i} + \phi g_i + \eta\overline{g}_{-i} + \mathbf{x}_i'\boldsymbol{\gamma} + u_i \tag{2}$$

and

$$g_i = \kappa + \lambda\overline{g}_{-i} + \mathbf{x}_i'\boldsymbol{\pi} + v_i, \tag{3}$$

where u_i and v_i are error terms with $E(u_i|\mathbf{x}_i) = 0$ and $E(v_i|\mathbf{x}_i) = 0$. Based on (2), the effect of an increase in gender role norms g_i by one unit for all women will increase their labor supply directly by $\phi + \eta$, and, in steady state, this will be amplified to $\psi = \frac{\phi+\eta}{1-\theta}$, through the spillover effect of peers' employment decisions.[9]

By estimating (2) and (3), we can identify the direct effect of peers' gender norms on female employment, η, as well as the single components λ, ϕ, ψ and θ, which make up the mediated effects operating through the focal woman's gender role attitudes, $\lambda\phi$, and peers' labor supply, $\psi\theta$.

We expect η to be zero. This is because women are likely either to identify with their reference group, aligning their gender role attitudes to the reference group's norms, or to disassociate with their peers's values altogether. In the former case, peers' values are subsumed into own gender role attitudes; in the latter, peers' norms have no effect on the focal woman's employment decisions. In our main analysis, therefore, we estimate (2) assuming that there is no direct effect of $\overline{g}_{-i}$ on y_i, i.e., $\eta = 0$. We also relax this assumption and provide empirical evidence in its support.

To estimate equation (2) with a causal interpretation for θ and ϕ, proper account must be given to the potential endogeneity of the focal woman's gender role norms and of her peers' employment rate, g_i and $\overline{y}_{-i}$, respectively.

Two obvious concerns with g_i are that it may be correlated with unobservables which affect the woman's employment status and it may adapt to events and evolve over time,

[9] This can be easily seen after taking the average of each of variable in (2) across the focal woman's peers, so that in steady state we have $\overline{y}_i = \overline{y}_{-i}$ and $\overline{g}_i = \overline{g}_{-i}$. Thus, $\overline{y}_i = \delta + \theta\overline{y}_i + (\phi+\eta)\overline{g}_i + \overline{\mathbf{x}}_i'\boldsymbol{\gamma} + \overline{u}_i$. Solving this expression for $\overline{y}_i$ leads to $\overline{y}_i = \delta(1-\theta)^{-1} + (\phi+\eta)(1-\theta)^{-1}\overline{g}_i + \overline{\mathbf{x}}_i\boldsymbol{\gamma}(1-\theta)^{-1} + \overline{u}_i(1-\theta)^{-1}$.

albeit slowly. For example, social psychologists emphasize the tendency of individuals to change attitudes to avoid (or minimize) cognitive dissonance, i.e., the psychological stress caused by having values and beliefs that do not align with own personal behavior (Festinger, 1957). Berrington et al. (2008) find evidence of an adaptation of women's gender role attitudes to changes in their labor supply after childbirth. This suggests that there can be reverse causality, going from mothers' employment decisions to their gender identity norms.

To control for the potential endogeneity bias caused by unobservables and reverse causality, we use the focal woman's partner's gender role attitudes, g_i^p, as instrument for her own social norms, g_i. Each woman's gender identity values may be influenced by her partner's social norms, which she can easily assess within the marital relationship. Notice we do not assume that a man forces his partner's employment status to be aligned with his social norms. For this instrument to work, it is sufficient that the focal woman's gender role attitudes depend, in part at least, on g_i^p via assortative mating and intrahousehold bargaining (e.g., Becker, 1981; Kalmijn, 1994).[10] There is empirical support to this assumption, with evidence suggesting that wives adjust their preferences about household work and domestic responsibilities to their husbands' when they become mothers (e.g., Johnson and Huston, 1998; Baxter et al., 2015).[11]

As we already discussed above, the peers' mothers' employment rate, $\overline{e}_{-i}^m$, is a credible instrument for the peers' labor supply, $\overline{y}_{-i}$, because a mother's work status when her daughter was aged 14 is likely to affect the adult daughter's attitudes towards work and therefore her actual labor market decisions. Given that the peers are women born in the same country and with the same age and education but with possibly no direct links with the focal woman, personal interactions between the focal woman and her peers' mothers are unlikely. This means there may not be a direct link of $\overline{e}_{-i}^m$ to y_i (i.e., the exclusion restriction is likely to hold).

Finally, to estimate (3) we use a similar IV strategy to the one we just described and

[10]This approach explicitly emphasizes the importance of the husband's role. It is worth stressing, however, that we use g_i^p for instrumentation purposes only, so that we can limit the possibility of reverse causality. Another important strand of the literature focuses on the *direct* impact of partner's characteristics on female outcomes, including his gender role norms as well as his mother's gender role attitudes (e.g., Fernández, Fogli, and Olivetti, 2004; Bredtmann, Höckel, and Otten, 2020). But, unlike ours, such studies are not concerned with the causal impact of own gender role norms. In our framework, accounting for husbands' gender role norms directly would lead to a different model, which we leave for future research. Nevertheless, for completeness and comparability purposes, we also consider a series of robustness exercises where we include partner's characteristics (such as age and education) as well the working status of the focal woman's mother-in-law. The results from these additional analyses are discussed in subsection 4.2.

[11]Schober and Scott (2012) find that both partners (and not just women) may adjust their gender role attitudes towards female market work after childbirth. This is not of concern to our assumption, as long as men's prenatal gender role values continue to exert an influence on women's postnatal attitudes through their impact on maternal employment.

instrument $\overline{g}_{-i}$ with $\overline{e}^{m}_{-i}$.

3 Data

3.1 Samples and Variables

Our analysis is based on a sample of mothers drawn from the UK Household Longitudinal Study (UKHLS), which is a representative panel survey of UK households and individuals. We use data from sample years 2010/12 and 2012/14 (waves 2 and 4), when information on gender role attitudes was collected for all adults in sampled households. With our focus on mothers, we select adult women aged between 25 and 45, who have at least one child aged between 0 and 4 years, who are cohabiting or married, are either employed, unemployed, on maternity leave, in family care or at home, and co-reside with a male partner who is either employed or unemployed. These restrictions lead to sample of 2,656 focal mothers, which we refer to as our 'main sample'.[12]

We analyze three dependent variables as measures of the focal woman's labor supply, y_i: (i) an employment status indicator, which takes value 1 if the woman is employed or on maternity leave, and 0 if she is unemployed or inactive (in family care or at home), e_i; (ii) the number of weekly hours worked, h_i, which is defined only for the subsample of women who are employed and not on maternity leave (and which we refer to as the 'sample of working women');[13] and (iii) the woman's share of hours worked, s_i, that is, the number of weekly hours worked by the woman divided the total number of weekly hours worked by her and her partner, $\frac{h_i}{h_i+h_i^p}$, where h_i^p denotes the hours worked by the focal woman's partner. This last variable measure is defined only for the subsample of women who are not on maternity leave *and* have a partner in paid work, which we call 'sample of women with a working partner'.

Table 1 shows the summary statistics for these three measures. In the main sample, almost two-thirds of women are in a paid job. Among those in employment, we observe nearly 27 hours of market work per week on average, but a great deal of variation with a minimum of 2 and a maximum of 70 hours per week and a standard deviation of 10 hours. In couples with a working partner, women contribute one-quarter of the total

[12]To gain more statistical power, we have also performed the entire analysis selecting women with the same characteristics as in the main sample but with at least one child aged between 0 and 11 years. With this new selection, which gives us 4,457 focal mothers, we find results that are very similar to those reported below. For the sake of brevity, they are not shown. Interestingly, this evidence suggests that the implications we draw from mothers of very young children are relevant also for those whose children are in primary school.

[13]Women on maternity leave are excluded because, although formally in paid employment, they have zero hours of market work by definition.

hours worked every week on average.

As discussed in the previous section, our key explanatory variables are measures of each focal woman's gender role attitudes (g_i, following the notation used earlier), the gender identity norms across the woman's peers ($\overline{g}_{-i}$), and the labor supply outcomes of the woman's peers ($\overline{y}_{-i}$).

All respondents in the UKHLS's waves 2 and 4 are asked a battery of questions designed to elicit their gender role attitudes. More specifically, they are asked their level of agreement with the following statements: (i) "Pre-school child suffers if mother works "; (ii) "Family suffers if mother works full time"; (iii) "Husband and wife should contribute to household income"; (iv) "Husband should earn, wife should stay at home"; and (v) "Employers should help mothers combine jobs and childcare". The agreement of respondents with each of these statements is rated according to the scale "1=strongly agree", "2=agree", "3=neither agree nor disagree", "4=disagree" and "5=strongly disagree". We define each woman's gender role index by summing her responses across the five questions after inverting the scale for questions (iii) and (v).[14] The index therefore varies between 5 and 25, with higher values indicating more egalitarian attitudes between the sexes and lower values capturing more traditional gender role attitudes.

Peers' gender norms are measured with the gender role attitude index averaged across all peers, where peers are defined as other women born in the same country and cohort and with the same level of education as the focal woman.[15] Education is stratified into four categories (no education, vocational/technical/O-level, A-level, and university degree or higher).[16] Birth cohorts are divided into five groups (women born in 1970 or earlier, 1971–1975, 1976–1980, 1981–1985, and 1986 or later). Of the several birth countries represented in the UKHLS, we end up with 26, distinguishing also England, Wales, Scotland, North Ireland as separate countries of origin. Individuals with fewer than 4 peers (by country of birth, cohort, or education) are excluded.[17] This leads us to 263 peer groups and an average size of the peer group of 56 women. The same definition of peers is used when

[14] In a sensitivity analysis, we summarize the responses with the first component obtained from a principal component analysis. The results are identical to those shown below and are therefore not presented. They can be obtained from the authors.

[15] An alternative to country of origin is ethnicity. Using a definition of peers based on ethnicity, rather than country of origin, recognizes that many British-born women are from ethnic minorities and they might identify with other women of their own ethnic background regardless of where they were born. For completeness, the next section will mention the results found with this alternative definition.

[16] Some may see a definition of peers based on educational homophily problematic, since education is a choice. For this reason, we repeat the whole analysis excluding education from our definition of peers and from $\mathbf{x}$. Using this alternative specification leads to the same results as those presented below. They will be briefly discussed in the next section.

[17] About 65% of the women in the sample were born in England and another 15% in Scotland, Wales, and Northern Ireland. Approximately 12% were born in India, Pakistan and Bangladesh, with the remaining 8% being split among the rest of the countries, which include France, Germany, Poland, Ireland, Nigeria, South Africa, China, the US, Australia and New Zealand.

computing the peers' employment rate.

The summary statistics of these variables for the main sample of women are reported in the top panel of Table 2. The measure of a focal woman's gender role attitudes, g_i, has a mean of about 18 points and a standard deviation of 3.38 points. The distribution of her peers' gender role values, $\overline{g}_{-i}$, has a similar mean, but a smaller standard deviation of 1.12 points. The peers' employment rate, $\overline{y}_{-i}$, is close to 72% on average, almost 8 percentage points higher than the rate observed for focal women.

In estimation, we also control for the focal woman's age (and age squared), the number of dependent children by age (for which we distinguish three groups, i.e., those aged 0–2, 3–4, and 5–15 years), and indicator variables for her education and birth cohort (which are defined in the same way as those used for peers), her ethnicity (which takes value 1 if she is white, and 0 otherwise), urban residence, and her constituent country of residence (i.e., England, Wales, Scotland, and North Ireland). Summary statistics for all these $\mathbf{x}_i$ variables are in the middle panel of Table 2.[18]

Finally, to take account of the potential endogeneity issues discussed in Section 2, we use the proportion of peers whose mother worked when they were 14 years old, $\overline{e}^m_{-i}$, as an instrument for peers' gender role norms in model (1). Approximately 63% of peers' mothers' worked. In the same model, we also include the focal woman's mother's employment status, e^m_i, as an individual instrument to better isolate the influence of peers' social norms. About 62% of the focal woman's mothers were in paid work when their daughter (i.e., the focal woman in our sample) was 14 years old. In model (2), the focal woman's partner's gender identity values, g^p_i, is an instrument for the woman's gender norms.[19] The bottom panel of Table 2) shows an average score of 17.6 points for g^p_i, slightly lower than the mean value of g_i.

3.2 Descriptives of Peers' Gender Role Norms

In what follows, we provide a picture of how peers' gender role norms, our focus in model (1), look like in the main sample. We start with the mean, 25th, 50th and 75th percentile values of $\overline{g}_{-i}$ by constituent country, cohort, education, and ethnicity, which are presented in Table 3. There is evidence of a geographical gradient, with peers' gender

[18]The table also shows nonlabor income, a standard predictor used in labor supply models. In our benchmark regressions, however, we do not include this variable, as it is unlikely to be orthogonal to the same unobservables that give rise to women's labor supply and earnings. But its inclusion does not alter any of our main results. We show this in the robustness analysis presented in subsection 4.2.

[19]On average, 80% of the focal women have a partner born in the same country of origin. There is however a great deal of variation across focal women. For instance, the share of country-of-birth homogamy is about 90% among Sri Lankans, 87% among individuals born in England, and 85% for Nigerian, Indian, and Bangladeshi women. The figures are lower among women born in Scotland (72%), China (70%), South Africa (67%), Wales (51%), and Germany (6%).

norms of mothers in Wales, Scotland, and Northern Ireland being on average more gender egalitarian than those of English women. The mean value of $\overline{g}_{-i}$ is 18.3–18.4 for Northern Irish, Welsh, and Scottish women, and only 17.9 for English women. The gap is about 35–45% of a standard deviation.

Perhaps unsurprisingly, gender identity values have become substantially less traditional (and more gender equal) among more recent cohorts of mothers. Education is strongly correlated with peers' gender norms: the higher the woman's education, the more gender-equal her peers' norms. For example, the most progressive peers of women with no educational qualification are less gender-equal than the most traditional peers of college educated mothers. Finally, white women's peers have more gender equal norms. The racial gap in attitudes is more than one standard deviation at the mean, with the differences being larger at the bottom of the distribution.

There is a great deal of variation in $\overline{g}_{-i}$ within each birth country and across countries.[20] For example, among women born in England, $\overline{g}_{-i}$ varies from 17.7 at the 25th percentile to 18.7 at the 75th percentile. The gap of 1 point is large and close to 90% of a standard deviation. The differences are larger among women born in some other countries — such as Germany (nearly 1.5 points), Bangladesh (1.8 points) and South Africa (2.7 points) — but more compressed in others, as in the case of Scotland and Wales (with a gap of about 0.6 points). The between-country variation in $\overline{g}_{-i}$ is even starker, with for instance women born in Pakistan having an average peers' gender role norms score of 15.1 points at the bottom end of the distribution, and US, Canadian and French women reporting a score of 20.5 points at the top end.[21] In sum, both sources of variation play a relevant role for identification.

It might also be important to check whether the country-specific distribution of $\overline{g}_{-i}$ is representative of the 26 countries in which the women in our sample were born. Because of data unavailability, we cannot perform this check for $\overline{g}_{-i}$ directly. We instead look at country-specific female employment rates using external data from the World Bank,[22] and assess the extent to which the distribution of $\overline{y}_{-i}$ in our sample is comparable to the corresponding distribution of women in the home countries. In interpreting these comparisons, we should keep in mind that, for all foreign-born women, there might be large cross-country differences in labor demand and labor market institutions, and there is a

[20] Due to space limitations, these breakdowns are not shown but are available upon request.

[21] Interestingly, we find similar features of the within- and between-country variation in g_i, the focal woman's gender role attitudes.

[22] The data can be found at <https://ourworldindata.org/female-labor-supply#labor-force-participation>. For peers (and focal women), we peg our statistics around 2012, which is the year in between our two survey wave. For peers' mothers (and focal women's mothers), the comparison uses employment rates observed in 1992, which is the year in which the median focal woman in our sample was 14 years old. Using different reference years does not change our results.

potential selection of migrants based on the propensity to work. Despite these caveats, we detect extremely high degrees of similarity in the distributions of labor force participation rates for the women in our sample and the corresponding rates reported in the World Bank data, with correlation coefficients of the order of 0.6 for peers and focal women and 0.75 for peers' mothers and focal women's mothers. These estimates are compelling and suggest that the labor market information for the women in our sample provides an accurate reflection of that for their counterparts in their home countries.

We next consider how our three outcome variables are correlated with $\overline{g}_{-i}$. Figure 2 shows the way in which women's paid employment, e_i, varies across the distribution of peers' gender role attitudes. The figure also reports the mean of $\overline{g}_{-i}$ by ventile. Overall, maternal employment is positively correlated with peers' social norms: mothers whose peers have more egalitarian norms are more likely to be in paid employment.

Figure 3 repeats the same exercise for the average number of weekly hours worked, h_i, using the sample of working women. In this case, h_i and $\overline{g}_{-i}$ do not display any strong correlation. Conditional on being at work, mothers whose peers hold gender-equal beliefs work a number of hours comparable to that supplied by women whose peers have more traditional values.

The results for s_i, the share of market hours worked by mothers within the couple are computed on the sample of women with a working partner and depicted in Figure 4. As in the case of the probability of working, women whose peers have more egalitarian gender identities contribute to a larger share of the total market hours worked by the couple. Given that the sample of women with a working partner contains women who are not at work (as it is the case in the main sample), these patterns suggest that the positive relationship between $\overline{g}_{-i}$ and y_i be driven by the extensive rather than the intensive margin of labor supply.

Plotting the distribution of s_i shows a substantial spike at 0.5, where both working partners spend the same number of market hours in their paid job per week (see Appendix Figure A.1). This point mass at 0.5 (which comprises about 7% of all couples) echoes the finding by Bertrand, Kamenica, and Pan (2015) for relative earnings. Owing to our sample selection, this result cannot be driven by self-employment, although we cannot exclude the possibility that partners work together in the same firm (Zinovyeva and Tverdostup, 2020). It is worth stressing that the mean gender role attitude index for women and their male partners at 0.5 is greater than that of their counterparts below and above the equal hours split. Such differences however are never statistically significant, except when couples at 0.5 are compared to all the couples in which the wife works fewer hours. This emphasizes the importance of gender role identities to intrahousehold allocations of market hours, even if alternative interpretations unrelated to gender identity norms are more likely to explain the spike at 0.5 (e.g., Binder and Lam, 2020; Zinovyeva and Tverdostup, 2020).

4 Results

4.1 Peers' Gender Role Norms and Employment Outcomes

Table 4 shows the estimates for model (1) on each of our three outcomes, y_i. The first two columns are linear probability estimates for e_i, the labor force participation indicator, obtained from the main sample. The two middle columns report the estimates on weekly hours of paid work, h_i, from the sample of working women, while the last two columns refer to the female share of hours worked, s_i, from the sample of women with a working partner. For each outcome, column (a) presents ordinary least squares (OLS) estimates, and column (b) shows the results found from two-stage least squares (2SLS) estimation.

Looking at the first two columns, we find that having peers with more progressive norms in terms of gender equality leads to greater labor market participation. If the focal woman's peers' gender role norms increase by one standard deviation (which corresponds to 1.12 units), the woman's probability of working goes up by about 4 and 9 percentage points in columns (a) and (b), respectively. These effects are sizeable, corresponding respectively to increases of 6 and 13% in the average female employment rate in the main sample, and are both statistically significant at the 1% level. The instrument used for $\overline{g}_{-i}$ is $\overline{e}^{m}_{-i}$, the peers' mothers' employment rate when the peers were aged 14. As shown in the bottom panel of Table 4, the first stage F-test strongly rejects the null hypothesis of a zero effect of this instrument; there is no issue of weak identification from the Kleibergen-Paap rank test statistic; and the exogeneity of $\overline{g}_{-i}$ is rejected.

To give an idea of the magnitudes, we use the statistics reported in Tables 2 and 3. An increase by one standard deviation in peers' gender role values is equivalent to a 1.12 point increase in the main sample. This in turn is almost twice as large as the increase caused by changing peers from women born before the 1970s to women born after 1985, roughly moving from "baby boomers" to "millennials". Alternatively, the one point increase in $\overline{g}_{-i}$ corresponds to about 80% of the effect of switching from nonwhite to white peers, or from women with no educational qualification to women with A level or equivalent qualifications. Moving from the bottom end to the top end of the interquartile range of the distribution among all women is also equivalent to one standard deviation increase in gender identity norms. Cross-sectional variation in $\overline{g}_{-i}$ as well as exposure to younger peers, peers with greater educational attainment, or peers of white ethnicity (all traits that are associated with more gender egalitarian norms) have therefore a substantial positive impact on young mothers' probability of working.

The two middle columns of Table 4 show that having peers with more gender equal norms leads to a reduction of 0.3 and 2 hours worked per week from the OLS and 2SLS models, respectively. The former estimate is statistically indistinguishable from zero, while the latter is significant at the 10% level (t-stat=1.91), although the exogeneity of $\overline{g}_{-i}$ cannot be rejected at conventional levels (p-value=0.068). We checked if this result is driven by the lack of statistical power, since the sample of working women is smaller than the main sample. We thus extended the analysis to all women, assigning zero hours to those on maternity leave as well as to those out of the labor market. The new estimates reported in columns (i) and (ii) of Appendix Table A1 indicate that power is not an issue. Such estimates are now positive, quantitatively small, and statistically insignificant. This suggests that the hours reduction shown in Table 4, albeit at the threshold of statistical significance in the 2SLS case, operates through women in paid jobs and is unlikely to reflect changes in the extensive margin.

Finally, the last two columns of Table 4 document that peers' gender values do affect the female share of market hours, with an increase of 1.9 and 2.5 percentage points for one unit increase in peers' gender role attitudes. Both estimates are statistically significant at conventional levels, and correspond respectively to increases of 7.5 and 9.9% in the average female share of market hours. Our attention should be on the least squares estimate in column (a), since we cannot reject the hypothesis that peers' gender identity norms be exogenous. These estimates are obtained using the sample of women with a working partner (i.e., the focal woman may have a paid job or not, but her partner must work). Appendix Table A1 confirms that the same OLS result emerges when we extend the sample to the case in which at least one of the two partners works, and not just the man (column (iii)). If instead we restrict the sample to dual earner couples in which both partners work a positive number of hours, neither OLS nor 2SLS estimate is statistically significant and economically meaningful (columns (v) and (vi)).

In sum, social interactions with peers who have more progressive, gender-egalitarian attitudes induce mothers of dependent children to increase their attachment to the labor market and to increase the share of total market hours worked at the household level. Despite these positive effects, however, those who are in employment see no change (or possibly even a reduction) in hours worked. Taken together, these results suggest that on average women with gender-equal peers are more likely to be in a paid job and to strike a work-life balance. Progressive mothers, therefore, seem to be able to combine careers with domestic responsibilities more effectively than their more traditional counterparts.

As mentioned in the Introduction and Section 2, peers' gender role values may influence young mothers' labor market behavior through two main channels, conformism and information. In the absence of a clean (experimental) design, one cannot credibly discriminate between these two mechanisms. We however offer some suggestive evidence, which could enhance the interpretation of our results. If education beyond mandatory schooling provides (extra) information about how labor market involvement might affect women when they become mothers or simply how young mothers could navigate through the system, then the need to look at peers for information may be less pressing for better educated women.[23] Likewise, highly educated mothers may not have the pressure to comply with a given group norm, to the extent that higher education confers more autonomy and more influence in the family and in society (Kessler-Harris, 2003; Jayachandran, 2020). Conversely, low-education women may weigh up their peers' attitudes to emulate their labor market behaviors, or look at them to receive more information, or both.

We therefore perform the same analysis we just presented, after stratifying the sample into two educational groups (i.e., women with educational qualifications above mandatory schooling, and women at or below mandatory schooling qualifications) and interacting the higher education indicator, d_i^H, with $\overline{g}_{-i}$. The results of this exercise are summarized in Table 5. They show that the impact of peers' gender identity values found on the whole sample is primarily driven by less educated women. Low-education women are more likely to be in a paid job, work fewer hours, and have a higher share of total household hours worked in the market if they have progressive peers compared to their low-education counterparts whose peers have more traditional gender role norms. These differences by education are statistically significant at 5% level except for the differential effect on hours.

The employment gap between low- and high-education women in the main sample is about 21.6 percentage points (51.1% and 72.7%, respectively). The estimates in Table 5 suggest that an increase of gender role attitudes by one unit would reduce the employment gap by about 25% (from 21.6 to 16.2 percentage points).[24] Low-education women may thus rely on their network of progressive peers to extract salient labor market information, or conform to expectations, or both. Better educated mothers' labor market behavior is also shaped by their peers' social values, but to a lower degree. They can probably rely on other sources of information and be less influenced by social pressure.

The information mechanism is likely to be stronger when women are more uncertain

[23] This greater awareness may not be the direct effect of education, but just a mechanical result of the fact that, on average, more educated women enter the labor market and give births at a later age than their less educated counterparts. This does not matter for our argument to hold.

[24] A unit increase in gender role attitudes of peers leads to an increase in the employment rate of low educated mothers by 10.9 percentage points (from 51.1% to 61.9%) and of high educated mother by 5.4 percentage points (from 72.7% to 78.1%), hence the reduction of the gap to 16.2 (=78.1-61.9) percentage points.

about the effects of labor market involvement on their career and family life. This type of uncertainty is perhaps more acute for first-time mothers. We thus check if there is heterogeneity in the effect of peers' gender role attitudes on the outcomes of mothers with just one child (who by definition in our sample will be aged between 0 and 4 years) as opposed to the rest of the mothers in the sample. This latter group of women might have already accumulated enough information to make decisions without looking at peers, although they might always feel the pressure to conform to their peers' norms if occupational identity and rational cognitive dissonance reduction continue to play a role. The results obtained on this subsample (not shown) are virtually identical to those reported in Table 4, suggesting that women who might need more information do not seem to be influenced more by their peers' gender identity values. This result does not provide support for an information mechanism.

We repeated the analysis using the alternative definitions of peers mentioned in subsection 3.1, one in which we substitute country of origin with ethnicity, and the other in which we do not consider education to identify peers. The estimates from these two alternative definitions are reported in Appendix Table A2 (panels A and B, respectively) and fully confirm the results shown in Table 4.

Finally, Appendix Table A3 repeats the analysis by education for the subsample of mothers with only one child aged 0–4 years. A one unit increase in peers' gender role attitudes leads low-educated first-time mothers to raise their employment probability by 13 percentage points (column (ii)), work 10 fewer hours per week (column (iv)), and increase their intrahousehold share of market work by 4 percentage points (column (v)). While giving some support to the idea that peers provide relevant labor market information, these results do not exclude the possibility of social pressure. Determining the relative influence of all the channels that affect female labor market outcomes through peer effects is important and this is what we turn to next.

4.2 Explaining the Effect of Norms on Maternal Employment

Here we focus more explicitly on the three main channels through which peers' social norms are expected to influence the focal woman's employment probability. These are described in Figure 1 and are given by the direct effect of $\overline{g}_{-i}$, η, and the two mediated effects operating through the focal woman's gender role attitudes, $\lambda\phi$, and through the peers' labor participation rate, $\psi\theta$. To estimate these effects, we consider models (2) and (3). For conciseness, we concentrate our attention only on one outcome, the focal woman's employment decision, for which we find large and significant peers' effects.

The linear probability model estimates are reported in Table 6. In the first two columns, we show the results from (2) while assuming that there is no direct effect of peers' gender identity norms, $\overline{g}_{-i}$ on y_i, i.e., imposing that $\eta = 0$. In the last two columns, instead, we relax this assumption.

Column (i) shows the 2SLS estimates in which we instrument the focal woman's gender role values, g_i, and her peers' labor market outcome, $\overline{y}_{-i}$, with the woman's partner's gender role norms, g_i^p, and her peers' mothers' employment rate, $\overline{e}_{-i}^m$, respectively. An increase of one unit in g_i, which corresponds to a rise of about one-third of a standard deviation in gender attitudes, leads to a significant increase of 10 percentage points in the focal woman's likelihood of working, a jump of approximately 16% at the mean. A growth of 10 percentage points in the woman's peers' employment rate, instead, implies a 2.3 percentage points increase in her employment probability, but this effect is not statistically significantly different from zero.

It is informative to consider the statistical performance of this specification, summarized in the bottom panel of Table 6. The first stage F-test statistics reject the null that the two IVs are individually not relevant. The results from the Kleibergen-Paap rank test statistics reveal also there are no issues with weak instruments. Moreover, from the two first stage regressions, we find that each of the instruments is relevant but only for one of the two endogenous variables. Specifically, g_i^p predicts g_i but not $\overline{y}_{-i}$, and vice versa, $\overline{e}_{-i}^m$ predicts $\overline{y}_{-i}$ but not g_i.[25] Finally, and importantly, although we reject the null that both g_i and $\overline{y}_{-i}$ are jointly exogenous, we cannot reject the null that the peers' employment rate be exogenous.

For this reason, therefore, we re-estimate equation (2) using a 2SLS design, in which we only instrument the focal woman's gender role values with her partner's norms, but treat $\overline{y}_{-i}$ as exogenous. The results of this new specification are displayed in column (ii) of Table 6. As in the previous specification, a one unit increase in the focal woman's gender role attitudes implies a significant 10 percentage point rise in her own likelihood of being in a paid job. A 10 percentage point increase in the fraction of peers working raises the focal woman's participation by 3 percentage points, and now — differently from before — this impact is statistically significant at the 1% level. Notice that our θ estimate falls in between the 0.6 effect reported in Maurin and Moschion (2009), who use women in the same close neighbourhood as peers, and the 0.01 effect found by Olivetti, Patacchini, and Zenou (2020), who use high school mates' mothers as peers. Our result is also comparable with the endogenous peers' effect on work hours shown in Nicoletti, Salvanes, and Tominey (2018), who use family members (sisters and cousins) as peers and find estimates of θ ranging between 0.3 and 0.45.

[25] These results are not shown due to space concerns, but are available from the authors.

We test whether the assumption of no direct effect ($\eta = 0$) is born out by the data and re-estimate (2) including $\overline{g}_{-i}$ as one of the determinants of e_i. The 2SLS results for this extended model are reported in column (iii) of Table 6, in which we instrument for $\overline{g}_{-i}$ with $\overline{e}^m_{-i}$ and for g_i with g^p_i. The estimated direct effect of peers' gender identity values is small, –0.024, and statistically indistinguishable from zero (t-stat=–0.40). The estimates of ϕ and θ are quantitatively very similar to those shown in column (ii), although the impact of $\overline{y}_{-i}$ is now statistically significant only at 10% level, possibly a result of lower statistical power. Because we cannot reject the exogeneity of $\overline{g}_{-i}$, we repeat the exercise by re-estimating (2) but instrumenting only for g_i. These new results are reported in column (iv) and show similar effects of $\overline{y}_{-i}$ and g_i, but the η estimate is still not statistically significant at 5% level. We thus cannot reject the assumption that the direct effect of $\overline{g}_{-i}$ on the probability of working be zero, while we detect strongly significant influences of both $\overline{y}_{-i}$ and g_i. Our preferred results therefore are those reported in column (2), in which we impose $\eta = 0$.

As in the previous subsection, we next check if there are heterogeneous effects by education. We re-estimate the specification shown in column (ii) of Table 6 after interacting the higher education dummy, d^H_i, separately with g_i and with $\overline{y}_{-i}$. The results in column (ii) of Table 7 reveal that the focal woman's gender role attitudes and her peers' employment rates have slightly larger impact on her labor market participation if she is from the low-education group. In both cases, however, the differential effects by education are statistically insignificant and quantitatively negligible.

Appendix Table A4 reports the estimates of λ from equation (3). Not only is the 2SLS estimate, which is found using $\overline{e}^m_{-i}$ as instrument for $\overline{g}_{-i}$, statistically insignificant, but we also cannot reject the hypothesis that our measure of peers' gender role norms be exogenous to the focal woman's gender role attitudes. We thus rely on the OLS estimate in column (i), which implies a value of 0.361 (s.e.=0.120).

We now have all the ingredients that are needed to compute the total effect of peers' gender identity values on the focal woman's probability of working. As discussed in subsection 2.2 and illustrated in Figure 1, this total effect is given by the sum of the mediated effects through the focal woman's gender role attitudes, $\lambda\phi$, and through her peers' employment rate, $\psi\theta$. The direct effect, measured by η, has been shown to be zero and is therefore excluded from our computation. Taking the estimates in column (ii) of Table 6 as our benchmark, the values of ϕ and θ are 0.101 and 0.304, respectively. These lead to $\psi = \phi(1 - \theta)^{-1} = 0.145$. Thus, the mediated effect through g_i, $\lambda\phi$, is 0.036 (=0.361 $\times$ 0.101), while the mediated effect through $\overline{y}_{-i}$, $\psi\theta$, is 0.044 (=.145 $\times$ 0.304). Their sum of 0.080 represents the total effect of peers' gender norms on the focal mother's probability of working under the assumption of a direct effect of zero.

It is worth stressing that the figure 0.080 is very close to the total effect ρ of 0.076 found with model (1) and reported column (ii) of Table 4. It turns out, therefore, that approximately 45% of the total effect of peers' gender norms operates through changes in the focal woman's gender role attitudes and about 55% through the spillover effect of peers' labor force participation decisions. While the former effect is likely to be explained primarily by social pressure, the latter can be driven by both social conformity and social learning. The fact that the two mediated effects have comparable magnitudes suggests that the social pressure mechanism is at least as strong as the informational channel.

The partner's gender role values, g_i^P, which we use as instrument for the focal woman's gender identity norms, could be endogenous as a result of assortative mating. We thus perform three robustness checks, which have some bearing on the role played by marital sorting. In one, we use an alternative instrumental variable; in another, we include partner's characteristics as additional controls; and in the last, we account for the focal woman's nonlabor income.

The alternative IV is the gender role attitudes of the husband's (or male partner's) peers' spouses. Let g_j^P denote this variable, where j denotes the peers' wives or partners in group $\mathcal{J}$. For each focal woman i, we construct the instrument averaging this variable over all partner's peers while excluding the focal woman's partner, $\overline{g}_{-i}^P = \frac{1}{J}\sum_{j\in\mathcal{J}} g_j^P$. As for the case of the focal woman's peers, we define her partner's peers, which determines $\mathcal{J}$, as the group of men born in the same country, belonging to the same birth cohort and with the same level of education as the male partner. It is highly unlikely that the spouses of the partner's peers have direct interactions with the focal woman in our setup. This means that they should not have a direct impact on her employment status but only an indirect effect through her gender identity norms. The results when $\overline{g}_{-i}^P$ is used as IV are shown in Appendix Table A5 column (i). They are very similar to the benchmark results reported in column (ii) of Table 6. Using the computation procedure illustrated above, we obtain a slightly smaller total effect of peers' gender values on the focal mother's probability of working of 0.055 (rather than 0.080), with a mediated effect through g_i, $\lambda\phi$, of 0.030, and a mediated effect through $\overline{y}_{-i}$, $\psi\theta$, of 0.025. This means the first effect explains about 54% of the total impact of peers' gender norms on women's employment decision, and the second effect about 46%.

The second exercise is to include additional partner's and mother-in-law's characteristics in the estimation of (2) and (3). These are partner's education, age, and his mother's employment status when he was 14 years old. The results are summarized in Appendix Table A5 column (ii). The 2SLS estimates for ϕ and θ, which are both statistically significant, imply a value for ψ of 0.124, while the relevant estimate of λ is the OLS one with a value of 0.361 (s.e.=0.120). Thus, $\lambda\phi = 0.035$ and $\psi\theta = 0.028$, suggesting that the two mediated effects are, as before, quantitatively comparable. Summing up these two terms leads to a total effect of 0.063, which is comparable to — albeit smaller than — the benchmark total effect of 0.080 and the total effect estimated with model (1) of 0.076. These new estimates imply that the fraction of the total impact of peers' gender role attitudes on female employment attributable directly to social pressure is about 55%, with the remaining 45% being explained by both social learning and social conformity. This again emphasizes the important role played by social pressure.[26] Controlling for the household's total monthly nonlabor income, as in column (iii), leads to virtually identical results.[27]

5 Conclusion

The gender convergence in social and economic roles, occurred since the end of World War II across most advanced societies, has been impressive (Goldin, 2014), despite growing evidence of a slowdown in recent years, especially among mothers (e.g., Blau and Kahn, 2017; Juhn and McCue, 2017). This paper shows that social interactions with peers may play an important role in this process. In particular, we find that a mother whose peers have gender-egalitarian attitudes is more likely to be in a paid job and contributes a greater share of total market hours worked jointly by her and her partner than her counterparts with more traditional peers. A one standard deviation growth in peers' gender role norms leads to average increases of 13% and 9% in the probability of working and the female share of total paid hours, respectively.

Such effects are primarily driven by less educated mothers. Women with lower levels of education generally exhibit a weaker attachment to the labor market and lower employment rates than their better educated counterparts (Blundell et al., 2016; Blundell et al., 2018). But they can offset about one-quarter of this employment gap if their peers have progressive gender identities.

Our decomposition analysis shows that about one-half of the total effect of peers'

[26]Notice also that the probability that the focal woman works is positively and significantly related to whether her partner's mother worked when he was 14. This result in line with the estimates found by Fernández, Fogli, and Olivetti (2004), Johnston, Schurer, and Shields (2014), and Bredtmann, Höckel, and Otten (2020).

[27]An increase in nonlabor income comparable to the observed median (approximately £230 per month) is associated with a decline in the focal woman's probability of working of about 3 percentage points. The same results are found if we replace household's total nonlabor income with only the nonlabor income of the focal woman. For simplicity, the results from this alternative specification are not shown, but are available upon request.

gender role attitudes operates through changes in the focal woman's gender norms and the other half through the spillover effect of peers' labor force participation decisions. The former mediated effect may be largely attributable to conformity, while the latter may be driven by both conformity and social learning. This indicates that the role played by social pressure is at least as important quantitatively as that played by information.

These findings, which emphasize the importance of both slow- and fast-moving components of culture, are relevant to policy. Disseminating detailed up-to-date statistics on female labor market outcomes and work attitudes (by fine age, education, and ethnicity groups) may be a cost effective way to promote labor market participation, especially among low education mothers. Such a dissemination could speed up social learning and social conformity processes, accelerating both the current trends in female labor market participation (Blundell et al., 2018) and the convergence to more egalitarian gender role attitudes (Berridge, Penn, and Ganjali, 2009; Perales, Lersch, and Baxter, 2019). Part of this dissemination is carried out already by government-run statistical agencies worldwide and could be included in the curriculum for personal, social, health and economic education across all primary and secondary schools. The part that is not routinely performed refers to statistics on gender role attitudes, which nonetheless could be readily computed from existing representative surveys. Advances in data analytics can only make this information diffusion easier and cheaper. Publicizing group behaviors avoids personal data disclosure, which is known potentially to impede the adaptation of standards to changes in norms (Ali and Bénabou, 2020), and may increase prosocial compliance.

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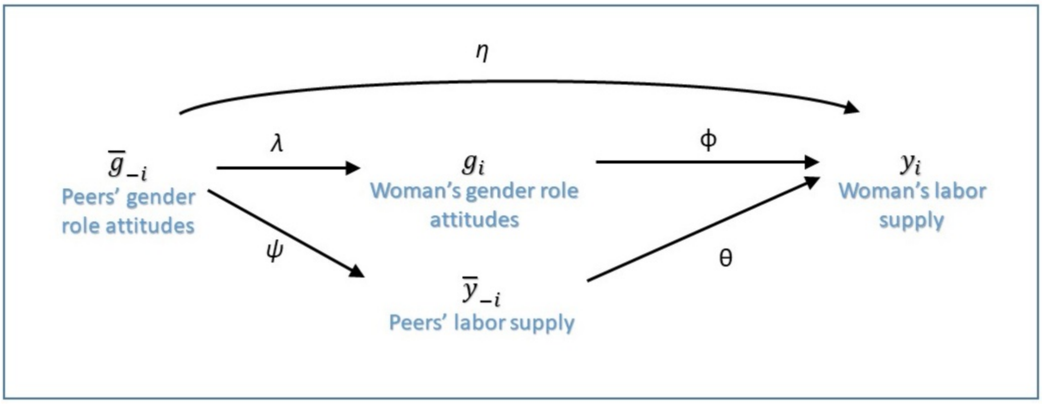
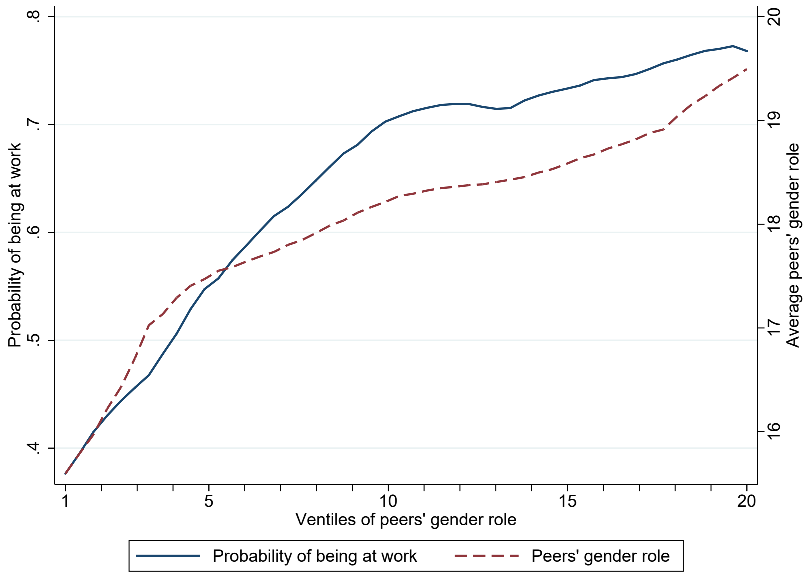
Figure 1: A Representation of the Total Effect of Peers' Gender Role Attitudes on Female Labor Market Outcomes



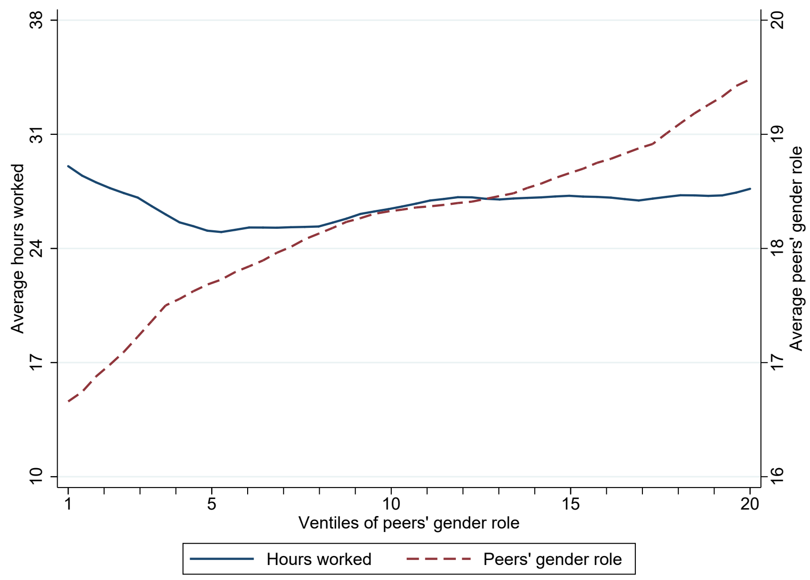
Note: See the text for an explanation of the notation.

Figure 2: Probability of Working across the Peers' Gender Role Distribution



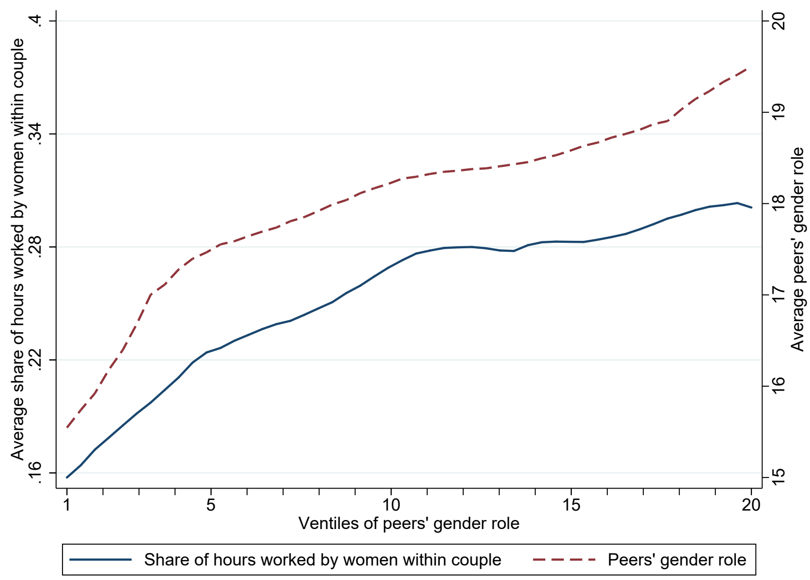
Note: Both the probability of working and the peers' gender role attitudes are averages by ventile of the peers' gender role attitudes index and are obtained with local polynomial smoothing.

Figure 3: Number of Hours Worked across the Peers' Gender Role Distribution



Note: See the note to Figure 2 for details.

Figure 4: Share of Women's Hours of Paid Work within the Household across the Peers' Gender Role Distribution



Note: See the note to Figure 2 for details.

Table 1: Summary Statistics: Labor Market Outcomes

Variable	Obs.	Mean	S.D.
Main sample			
Work status	2,656	0.643	
Sample of working women			
Hours worked	1,456	26.873	10.269
Sample of women with working partner			
Woman's share of hours worked	2,144	0.252	0.209

Source: UKHLS, waves 2 and 4 (2010/11 and 2012/13, respectively).
Notes: "Work status" is a variable taking value 1 for women who are in paid work, and zero otherwise; "Hours worked" is the number of weekly hours spent in paid work; "Share of hours worked" is the weekly hours worked in a paid job by the woman divided by the total number of hours worked by the woman and her partner. "Obs." refers to the total number of person-wave observations.

Table 2: Summary statistics: Main Explanatory, Control and Instrumental Variables

Variable	Mean	Std. dev.
Main explanatory variables		
Peers' gender role attitudes ($\overline{g}_{-i}$)	18.002	1.117
Own gender role attitudes (g_i)	17.899	3.378
Peers' employment rate ($\overline{y}_{-i}$)	0.718	0.170
Control variables ($\mathbf{x}_i$)		
Age (years)	33.528	4.840
Birth cohort:		
1970 or earlier (baseline)		
1971–1975	0.246	
1976–1980	0.352	
1981–1985	0.266	
1986 or later	0.035	
Country of residence:		
England (baseline)		
Wales	0.052	
Scotland	0.073	
Northern Ireland	0.034	
Living in urban area (yes=1)	0.815	
White ethnicity (yes=1)	0.759	
Number of children by age:		
0–2	0.753	0.576
3–4	0.532	0.552
5–15	0.727	0.885
Education:		
No education	0.108	
Vocational/technical, GCSE, O-level (or equivalent)	0.280	
A-level (or equivalent)	0.219	
University degree or more (baseline)		
Woman's mother worked when woman aged 14 (yes=1)	0.618	
Instrumental variables		
Woman's peers' mothers employment rate ($\overline{e}^{m}_{-i}$)	0.626	0.221
Woman's partner's gender role attitudes (g^{p}_{i})	17.572	3.294

Notes: Peer groups are defined by women in the same birth cohort, same level of education, and same country of birth as the focal woman. All values are computed on the main sample (2,656 person-wave observations), except for woman's partner's gender role attitudes and peers' employment rate, which are computed on the sample of 1,878 person-wave observations used to estimate (2).

Table 3: Peers' Gender Role Attitudes Index Distribution by Country of Residence, Birth Cohort, Ethnicity, and Education — Mean and Selected Percentiles

Variable	Mean	Percentile		
		25	50	75
Country of residence:				
England	17.930	17.500	18.266	18.647
Wales	18.298	17.743	18.372	18.841
Scotland	18.441	18.175	18.353	18.667
Northern Ireland	18.397	17.733	18.429	19.000
Birth cohort:				
1970 or earlier	17.769	17.611	17.903	18.434
1971–1975	17.872	17.419	17.979	18.391
1976–1980	17.926	17.714	18.259	18.838
1981–1985	18.259	18.196	18.363	18.739
1986 or later	18.408	18.222	18.757	19.289
Ethnicity:				
Non-white	17.039	15.900	17.222	18.372
White	18.308	17.738	18.359	18.746
Education:				
None	16.725	15.231	17.425	17.637
GCSE/O-level (or equivalent)	17.779	17.422	17.735	18.354
A-level (or equivalent)	18.008	17.958	18.261	18.643
University degree	18.509	18.388	18.571	18.851
Overall	18.002	17.613	18.305	18.650

Note: All statistics are computed on the main sample (2,656 observations).

Table 4: The Effect of Peers' Gender Role Attitudes on Mothers' Labor Market Outcomes

	Dependent variable					
	Employment		Hours Worked		Woman's Share of Hours	
	(a) OLS	(b) 2SLS	(a) OLS	(b) 2SLS	(a) OLS	(b) 2SLS
Peers' gender role attitudes ($\overline{g}_{-i}$)	0.038***	0.076***	-0.334	-2.052*	0.019***	0.025**
	(0.013)	(0.023)	(0.503)	(1.086)	(0.007)	(0.012)
First stage statistics on IV ($\overline{e}^{m}_{-i}$):						
F-test		382.760		98.261		281.176
		[0.000]		[0.000]		[0.000]
Kleibergen-Paap rk LM		208.700		65.017		162.068
		[0.000]		[0.000]		[0.000]
Exogeneity test for $\overline{g}_{-i}$		4.397		3.214		0.309
		[0.036]		[0.073]		[0.578]
Observations	2,656	2,656	1,456	1,456	2,144	2,144

Sources: Main sample (first two columns); sample of working women (middle two columns); sample of women with working partner (last two columns).

Notes: Robust standard errors in parentheses allow for within-panel serial correlation. The estimates of ρ are obtained using model (1) with the control variables listed in Table 2. The 2SLS specification in column (b) uses the peers' mothers' employment rate, $\overline{e}^{m}_{-i}$, as instrument for $\overline{g}_{-i}$, the peers' gender role attitudes. The p-values of the first stage and exogeneity tests are reported in square brackets.

* p-value < 0.1, ** p-value < 0.05, *** p-value < 0.01.

Table 5: The Effect of Peers' Gender Role Attitudes on Mothers' Labor Market Outcomes, by Education

	Dependent variable					
	Employment		Hours Worked		Woman's Share of Hours	
	(a) OLS	(b) 2SLS	(a) OLS	(b) 2SLS	(a) OLS	(b) 2SLS
Peers' gender role attitudes ($\overline{g}_{-i}$)	0.065***	0.109***	-0.445	-5.897*	0.041***	0.046***
	(0.017)	(0.024)	(1.048)	(3.338)	(0.009)	(0.012)
$d_i^H \times \overline{g}_{-i}$	-0.043**	-0.055*	0.123	4.242	-0.033***	-0.037**
	(0.020)	(0.030)	(1.117)	(3.434)	(0.010)	(0.015)
First stage statistics on IVs:						
F-test (for $\overline{e}^m_{-i}$)		196.812		48.566		143.775
		[0.000]		[0.000]		[0.000]
F-test (for $d_i^H \times \overline{e}^m_{-i}$)		194.550		46.600		152.944
		[0.000]		[0.000]		[0.000]
Kleibergen-Paap rk LM		140.199		6.111		114.112
		[0.000]		[0.013]		[0.000]
Joint exogeneity test		6.142		6.297		0.420
		[0.046]		[0.043]		[0.811]
Observations	2,656	2,656	1,456	1,456	2,144	2,144

Notes: Robust standard errors in parentheses allow for within-panel serial correlation. The estimates are produced using model (1) with the control variables listed in Table 2. The term d_i^H is an indicator variable taking value 1 for women with an A-level or higher educational level, and 0 otherwise. In the 2SLS specification in column (b), the peers' gender role attitudes, $\overline{g}_{-i}$, and its interaction with d_i^H, $d_i^H \times \overline{g}_{-i}$, are instrumented using the peers' mothers' employment rate, $\overline{e}^m_{-i}$, and the interaction of $\overline{e}^m_{-i}$ with d_i^H, $d_i^H \times \overline{e}^m_{-i}$, respectively. The p-values of the first stage and exogeneity tests are reported in square brackets. For other details, see the notes to Table 4.
* p-value < 0.1, ** p-value < 0.05, *** p-value < 0.01.

Table 6: The Effect of Own Gender Role Attitudes and Peers' Employment Rate on Mothers' Paid Employment Decision

	(i)	(ii)	(iii)	(iv)
Own gender role attitudes (g_i)	0.101***	0.101***	0.101***	0.101***
	(0.008)	(0.008)	(0.008)	(0.008)
Peers' employment rate ($\overline{y}_{-i}$)	0.226	0.304***	0.385*	0.426***
	(0.212)	(0.106)	(0.232)	(0.117)
Peers' gender role attitudes ($\overline{g}_{-i}$)			-0.024	-0.037*
			(0.060)	(0.019)
First stage statistics on IVs:				
F-test (for g_i^p)	161.319	317.683	158.781	314.935
	[0.000]	[0.000]	[0.000]	[0.000]
F-test (for $\overline{e}_{-i}^m$)	76.702			
	[0.000]			
F-test (for $\overline{e}_{-i}^m$)			31.222	
			[0.000]	
Kleibergen-Paap rk LM	186.851	187.755	41.520	186.512
	[0.000]	[0.000]	[0.000]	[0.000]
Exogeneity test for g_i	68.136	67.952	68.309	68.513
	[0.000]	[0.000]	[0.000]	[0.000]
Exogeneity test for $\overline{y}_{-i}$	0.165			
	[0.685]			
Exogeneity test for $\overline{g}_{-i}$			0.050	
			[0.823]	
Joint exogeneity test for g_i and $\overline{y}_{-i}$	68.214			
	[0.000]			
Joint exogeneity test for g_i and $\overline{g}_{-i}$			68.545	
			[0.000]	
Observations	1,878	1,878	1,878	1,878

Notes: 2SLS estimates of ϕ (first row), θ (second row), and η (third row) obtained from the main sample. Robust standard errors in parentheses allow for within-panel serial correlation. The set of control variables includes the focal women's characteristics listed in Table 2. Columns (i) and (ii) estimate (2), while columns (iii) and (iv) estimate (2) with the inclusion of peers' gender role attitudes. In column (i), both g_i and $\overline{y}_{-i}$ are endogenous and their instruments are g_i^p and $\overline{e}_{-i}^m$, respectively. In column (ii), only g_i is endogenous (and instrumented with g_i^p), while $\overline{y}_{-i}$ is assumed exogenous. In column (iii), both g_i and $\overline{g}_{-i}$ are endogenous and their instruments are g_i^p and $\overline{e}_{-i}^m$, respectively, while $\overline{y}_{-i}$ is assumed exogenous as in column (ii). In column (iv), only g_i is endogenous (and instrumented with g_i^p), while both $\overline{g}_{-i}$ and $\overline{y}_{-i}$ are assumed exogenous. The p-values of the first stage and exogeneity tests are reported in square brackets.
* p-value < 0.1, ** p-value < 0.05, *** p-value < 0.01.

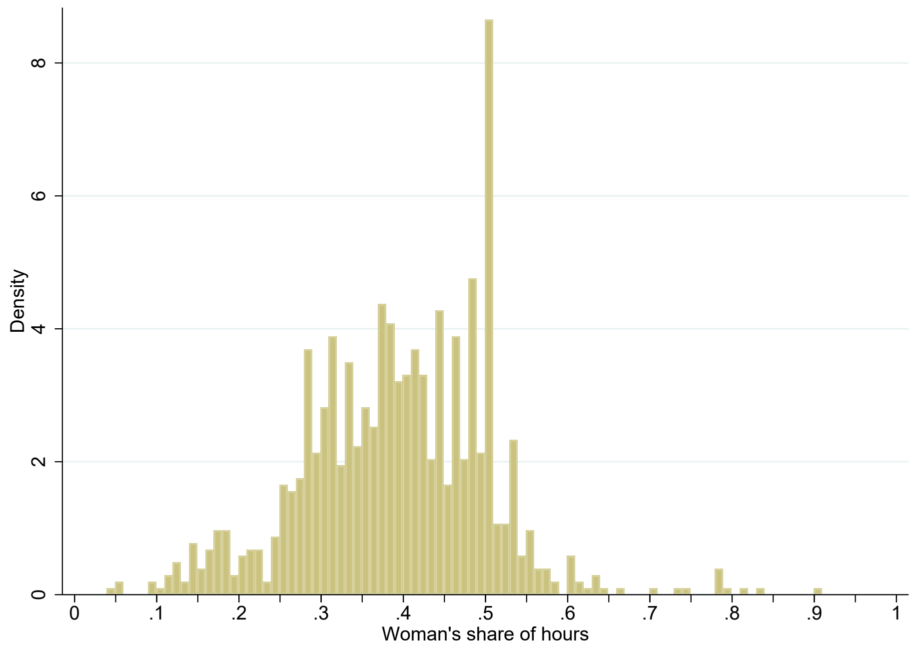
Table 7: The Effect of Own Gender Role Attitudes and Peers' Employment Rate on Mothers' Paid Employment Decision, by Education.

	(i)	(ii)
Own gender role attitudes (g_i)	0.101***	0.110***
	(0.008)	(0.013)
$d_i^H \times g_i$		-0.015
		(0.015)
Peers' employment rate ($\overline{y}_{-i}$)	0.304***	0.317**
	(0.106)	(0.124)
$d_i^H \times \overline{y}_{-i}$		-0.039
		(0.182)
First stage statistics on IVs:		
F-test (for g_i^p)	317.683	159.669
	[0.000]	[0.000]
F-test (for $d_i^H \times g_i^p$)		119.659
		[0.000]
Kleibergen-Paap rk LM	187.755	175.867
	[0.000]	[0.000]
Exogeneity test for g_i	67.952	
	[0.000]	
Joint exogeneity test for g_i and $d_i^H \times g_i$		67.957
		[0.000]
Observations	1,878	1,878

Notes: 2SLS estimates obtained from the main sample. Robust standard errors in parentheses allow for within-panel serial correlation. The set of control variables includes the focal women's characteristics listed in Table 2. Columns (i) reports the benchmark estimates found for model (2) and reported in column (ii) of Table 6. Column (ii) estimates the same model but allows the effects of own gender role attitudes and peers' employment rate to differ by education. The term d_i^H is an indicator variable taking value 1 for women with an A-level or higher educational level, and 0 otherwise. The interaction $d_i^H \times g_i$ is instrumented with the interaction $d_i^H \times g_i^p$, where g_i^p, the woman's partner's gender role attitudes, is the instrument. The p-values of the first stage and exogeneity tests are reported in square brackets. For other details, see the notes to Table 6. * p-value < 0.1, ** p-value < 0.05, *** p-value < 0.01.

Appendix: Additional Results

Figure A.1: Distribution of Relative Weekly Hours Worked by the Female Partner



Source: Sample of women with working partner.
Note: The figure shows the distribution of s_i (see text for its construction). Each bin indicates the fraction of couples in 1% relative hours share group.

Table A1: The Effect of Peers' Gender Role Attitudes on h_i and s_i Using Different Definitions of Hours and Share

	Dependent variable					
	Hours Worked (including zeros)		Share of Hours (at least one partner works)		Share of Hours (both partners) work)	
	OLS	2SLS	OLS	2SLS	OLS	2SLS
	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Peers' gender role attitudes ($\overline{g}_{-i}$)	0.698*	0.844	0.015**	0.014	0.001	-0.018
	(0.406)	(0.736)	(0.007)	(0.013)	(0.006)	(0.013)
First stage statistics on IV ($\overline{e}^{m}_{-i}$):						
F-test		380.335		330.232		92.698
		0.000		0.000		0.000
Kleibergen-Paap rk LM		207.384		185.687		60.848
		0.000		0.000		0.000
Exogeneity test for $\overline{g}_{-i}$		0.052		0.002		2.934
		0.819		0.963		0.087
Observations	2,630	2,630	2,447	2,447	1,376	1,376

Notes: For details on samples and estimation, see the notes to Table 4.
* p-value < 0.1, ** p-value < 0.05, *** p-value < 0.01.

Table A2: The Effect of Peers' Gender Role Attitudes on Mothers' Labor Market Outcomes — Alternative Definitions of Peers

	Dependent variable					
	Employment		Hours Worked		Woman's Share of Hours	
	(a) OLS	(b) 2SLS	(a) OLS	(b) 2SLS	(a) OLS	(b) 2SLS
A. PEERS DEFINED ON ETHNIC ORIGIN (NOT COUNTRY OF BIRTH)						
Peers' gender role attitudes ($\overline{g}_{-i}$)	0.065***	0.097***	0.894	0.944	0.036***	0.045***
	(0.013)	(0.031)	(0.613)	(1.383)	(0.007)	(0.016)
First stage statistics on IV ($\overline{e}^{m}_{-i}$):						
F-test		163.958		41.878		119.550
		[0.000]		[0.000]		[0.000]
Kleibergen-Paap rk LM		130.731		37.759		103.523
		[0.000]		[0.000]		[0.000]
Exogeneity test for $\overline{g}_{-i}$		1.419		0.001		0.427
		[0.234]		[0.971]		[0.514]
Observations	2,880	2,880	1,559	1,559	2,312	2,312
B. PEERS NOT DEFINED ON EDUCATION						
Peers' gender role attitudes ($\overline{g}_{-i}$)	0.068***	0.097***	0.270	-1.276	0.029***	0.039***
	(0.013)	(0.018)	(0.492)	(0.937)	(0.006)	(0.009)
First stage statistics on IV ($\overline{e}^{m}_{-i}$):						
F-test		950.473		188.157		727.040
		[0.000]		[0.000]		[0.000]
Kleibergen-Paap rk LM		302.471		84.189		236.453
		[0.000]		[0.000]		[0.000]
Exogeneity test for $\overline{g}_{-i}$		5.082		4.124		2.498
		[0.024]		[0.042]		[0.114]
Observations	3,116	3,116	1,712	1,712	2,514	2,514

Notes: Robust standard errors in parentheses allow for within-panel serial correlation. In panel A, peers are defined as other women born in the same cohort, with the same level of education and of the same ethnic group (16 mutually exclusive categories) as the focal woman. In panel B, peers are defined as other women born in the same country and cohort as the focal woman. For other details, see the notes in Table 4.
* p-value < 0.1, ** p-value < 0.05, *** p-value < 0.01.

Table A3: The Effect of Peers' Gender Role Attitudes on Labor Market Outcomes for Mothers with One Child Aged 0–4 Years, by Mother's Education

	Dependent variable					
	Employment		Hours Worked		Woman's Share of Hours	
	(a) OLS	(b) 2SLS	(a) OLS	(b) 2SLS	(a) OLS	(b) 2SLS
Peers' gender role attitudes ($\overline{g}_{-i}$)	0.070***	0.128***	-0.817	-10.297*	0.042***	0.055***
	(0.019)	(0.027)	(1.043)	(5.597)	(0.011)	(0.014)
$d_i^H \times \overline{g}_{-i}$	-0.048**	-0.066*	0.456	7.795	-0.030**	-0.035*
	(0.023)	(0.035)	(1.128)	(5.637)	(0.012)	(0.018)
First stage statistics on IVs:						
F-test (for $\overline{e}_{-i}^m$)		142.172		35.076		104.475
		[0.000]		[0.000]		[0.000]
F-test (for $d_i^H \times \overline{e}_{-i}^m$)		156.734		34.787		120.278
		[0.000]		[0.000]		[0.000]
Kleibergen-Paap rk LM		115.163		2.575		94.096
		[0.000]		[0.109]		[0.000]
Joint exogeneity test		7.493		10.124		1.244
		[0.024]		[0.006]		[0.537]
Observations	1,956	1,956	1,151	1,151	1,604	1,604

Notes: This table replicates the analysis reported in Table 5 on the subsample of mothers with only one child aged 0–4 years in the main sample. See the notes to Table 5 for all details.
* p-value < 0.1, ** p-value < 0.05, *** p-value < 0.01.

Table A4: The Effect of Peers' Gender Role Attitudes on Mothers' Gender Role Attitudes

	(i) OLS	(ii) 2SLS
Peers' gender role attitudes ($\overline{g}_{-i}$)	0.361***	0.334
	(0.120)	(0.229)
First stage statistics on IV ($\overline{e}^{m}_{-i}$):		
F-test		185.183
		0.000
Kleibergen-Paap rk LM		114.056
		0.000
Exogeneity test for $\overline{g}_{-i}$		0.021
		0.885
Observations	1,878	1,878

Source: Main sample of women.
Notes: Robust standard errors in parentheses allow for within-panel serial correlation. The estimates of λ are obtained using model (3) with the control variables listed in Table 2. The 2SLS specification in column (b) uses the peers' mothers' employment rate, $\overline{e}^{m}_{-i}$, as instrument for $\overline{g}_{-i}$, the peers' gender role attitudes. The p-values of the first stage and exogeneity tests are reported in square brackets.
* p-value < 0.1, ** p-value < 0.05, *** p-value < 0.01.

Table A5: The Effect of Own Gender Role Attitudes and Peers' Employment Rate on Mothers' Paid Employment Decision: Robustness Checks

	Alternative IV (i)	With partner's characteristics (ii)	With nonlabor income (iii)
Own gender role attitudes (g_i)	0.083*	0.096***	0.100***
	(0.042)	(0.008)	(0.008)
Peers' employment rate ($\overline{y}_{-i}$)	0.233*	0.228**	0.314***
	(0.129)	(0.109)	(0.104)
Mother-in-law's employment rate when partner aged 14		0.078***	
		(0.026)	
Household's total monthly nonlabor income/100			-0.014***
			(0.002)
First stage statistics on IV:			
F-test	9.015	322.658	317.379
	[0.003]	[0.000]	[0.000]
Kleibergen-Paap rk LM	8.525	188.618	187.701
	[0.004]	[0.000]	[0.000]
Exogeneity test for g_i	0.745	58.090	71.196
	[0.388]	[0.000]	[0.000]
Observations	1,734	1,787	1,878

Notes: All columns show 2SLS estimates for model (2). See column (ii) of Table 6 for a comparator. In column (i), we instrument g_i with $\overline{g}_{-i}^{P}$ rather than g_i^p. In column (ii), we estimate the same specification shown in Table 6, but additionally control for partner's education, age, and his mother's employment status when he was 14 years old. In column (iii), we estimate the same specification shown in Table 6, but additionally control for the household's total nonlabor income. In all columns, $\overline{y}_{-i}$ is assumed to be exogenous. For all other details, see the note to Table 6.
* p-value < 0.1, ** p-value < 0.05, *** p-value < 0.01.