Does Information Matter for Women Decisions? Experimental Evidence from Childcare*

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Abstract

Gender stereotypes are well eradicated also among women. Yet, a recent literature suggests that learning from other women experience about the effects of maternal employment on children outcomes may increase female labor force participation. In this paper, we design a survey experiment to provide a direct analysis of how direct information on the positive consequences of formal childcare on children outcomes affects decisions about the use of formal child care and female labor market participation. Our theoretical model suggests that heterogenous effects may emerge due to the different incentives faced by women with different working ability or wage. Our survey experiment, carried out on a sample of 1500 Italian women, shows in fact that high educated women (non-mothers) are convinced by our positive message to send their (future) children to formal child care, and to pay more for it, while low educated (non-mothers) do not increase their use of formal child care, but wish to take more on themselves the care of their (future) children, and thus reduce their willingness to work in the market. These results have a strong policy implication. Information – about the future benefits on the children of attending child care – is only effective (to increase child care attendance) when combined with a certain degree of education of the recipient, perhaps due to the difference in career opportunities.

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1 Introduction

Gender stereotypes are as eradicated among men as among women. The most pervasive gender stereotypes relate to maternal employment and child care. Women tend to see themselves as the better provider of care for their children, and thus refrain from delegating child care. At the same time, they may be skeptical about their chances of being contemporaneously successful both as mothers and in their working career. Obviously, this scenario is particularly salient in countries with low female labor force participation, such as Italy.

Are women right in holding these beliefs? Is it nature to make a mother the best providers of care for her children? Or are these perceptions largely driven by cultural elements? And, if so, do they change over time or across societies? And, perhaps more importantly, could they be modified by appropriate policies?

Recent studies by Fernandez (2007) and Fogli and Veldkamp (2011) suggest that cultural elements may indeed be dominant. Fogli and Veldkamp show that, as information about the effects of maternal employment on children development is revealed, female labor force participation begins to increase. Learning resolves the uncertainty on the effects of maternal employment on children and increase participation.

In this paper we provide a direct analysis of the role of information in sustaining or reverting these beliefs in Italy, a country where gender stereotypes are strongly eradicated . We present a simple model that analyzes the effect of information on women labor supply and child care decisions, and then develop a survey experiment on a large sample of Italian women. Our goal is to study whether direct information and knowledge on the positive consequences of formal child care on children outcomes helps to remove gender stereotypes among Italian women, by inducing them to use more formal child care, to seek a better division of care within the couple and to increase their (female) participation to

the labor market.

Data from the European Values Study (2008) show that gender stereotypes indeed dominate women perceptions of their roles, especially in countries with low female labor force participation. For instance, in Italy, 71% of men, but also 63% of women, agree with the statement "A job is alright but what women really want is a home and children". The corresponding percentages in Spain are 45% for women and 53% for men, and are much lower in Denmark (11% for women and 12% for men) and Sweden (27% for women and 35% for men). The key driver of gender stereotypes is the role of women as care givers for their children. Again, this is far from being an exclusive male perception: in Italy, only 18% of men and of women strongly agree with the statement "In general, fathers are as well suited to look after their children as mothers". The corresponding percentages for women raise up to 38% in Spain, 49% in Denmark and 54% in Sweden, against a lower, and more homogenous, 38-39% among males. Finally, only a small percentage of both men (14%) and women (23%) in Italy strongly agree with the statement "A working mother can establish just as warm and secure a relationship with her children as a mother who does not work", while the percentage increases respectively to 36% and 41% in Spain, to 40% and 63% in Sweden and to 54% and 64% in Denmark. A similar pattern emerges with the statement "A pre-school child is likely to suffer if his or her mother works".

Knowledge and information may play an important role in the formation and transmission of gender roles and gender culture[1] (Fernandez, 2007). Recent contributions have indeed shown that gender stereotypes may depend on

[1] Gender culture captures the view on women's and men's roles in society, on their responsibilities in the family context, on their position in the labor market and the social evaluation attached to these positions (Pfau-Effinger, 2000). Children and the provision of child care represent major issues in gender culture. Whether culture depends on "nature" or "nurture" is a crucial issue. Several recent studies argue that well-defined individual traits differentiate women and men, such as for instance the degree of competitiveness and the propensity of women to self-select into less rewarding positions, with consequences on their economic outcomes (see Gneezy et al, 2004). Institutional design or specific policies (the introduction of gender quotas, for instance) may also affect the outcomes.

women lacking information on the consequences of their participation in the labor market on their children psychological and educational outcomes[2]. Fogli and Veldkamp (2011) find that the local information transmission largely explains the changes in female labor force participation over the past century. Women learn about the effects of maternal employment on children by observing nearby employed women of the previous generation. When only few women participate in the labor force, participation rises slowly. As information accumulates in some regions, the effects of maternal employment become less uncertain, and more women in that region participate. Differences across regions enlarge as long as the information transmission differs. When information is complete, beliefs converge to the truth and differences across regions disappear.

Hence, providing positive, reassuring information on the impact of maternal employment on children outcomes may largely modify women's perception about their role and, therefore, also decisions such as female labor market participation and division of care within the couple. This information effect should be particularly strong in countries where female labor force participation is low, and thus learning from other women's experience is limited.

Formal child care represents a natural support to parental care when children are younger than three years old. Yet, the use of child care differs widely across countries, and also within countries among parents with different characteristics (such as income, education, etc.). In fact, while some parents may believe that professional child care helps their children to develop cognitive abilities, others may think that children suffer when separated from their mothers, and thus that child care is detrimental to their children cognitive or emotional development. Previous contributions of the empirical literature have indeed shown

[2] The relation between maternal employment and outcomes such as the stability of marriage and children outcomes has been analyzed by a large literature (see Poortman, 2005 and Kalmijn and Poortman, 2006 and Cuhna et al., 2010). However, less is known about the perception of women themselves on their economic role and the consequences of this perception on the above outcomes, which may in turn depend on the information they have.

that substituting maternal time with other child care providers may deliver negative results for children skills, thus inducing a negative relationship between maternal employment and child development (Baker et al, 2008, Baum, 2003, Ruhm, 2004). However, when maternal time is substituted with formal child-care the adverse effect of maternal employment on children cognitive outcomes disappears (Bernal, 2008, Bernal and Keane, 2010 and 2011). Moreover, formal child-care for small children has recently been recognized to play a positive role on children outcomes, especially for children coming from disadvantaged families (Carneiro and Heckman, 2003). Some recent studies have in fact shown that day-care attendance has positive effects on children' educational outcomes (Felfe and Lalive, 2010; Havnes and Mogstad, 2011, Brilli et al., 2011). Interestingly, the same beneficial effect is not obtained by increasing maternal time: a recent study by Dustmann and Schonberg (2012) shows that the expansion in mother's leave coverage does not improve the welfare of the children in terms of educational and labor market outcomes.

The provision of positive information on the role of child care may reduce possible parental skepticism about sending children to child care, and thus to promote its adoption. A more extensive use of child care would also allow mothers, who represent – in Italy, but also elsewhere – the main provider of parental care, to have more time to dedicate to market activity. Several studies have indeed shown that public kindergarden may have a positive impact on maternal employment: Gelbach (2002) analyses the impact of public kindergarten in the US on a sample of single mothers to find that access to freely provided kindergarten increases their probability of employment.[3] Using a natural experiment, Lefebvre and Merrigan (2008) show that a policy which increased the generos-

[3]Heterogeneous effects may however emerge. Studying the introduction of kindergartens into american public schools, Cascio (2009) finds that maternal labour supply increasse with the availability of kindergartens only for single women with five year olds but no younger children.

ity of child-care subsidies and the availability of free full-time kindergarten in Canada had a substantial positive effect on the labor supply of mothers with young children. Interestingly, the results are stronger for the more educated mothers.[4]

Thus, to the extent that female participation to the labor force is constrained by parental duty, the use of child care could lead to an increase in their labor supply, both on the extensive and intensive margin, and perhaps induce a more balanced division of care within the couple. Positive information on child care should also reduce the working mothers' perceived emotional cost of having additional children.

In this paper, we try to directly address the role of information in modifying women perceptions on their roles. Does the release of information on the benefits of child care affect women's perception on gender culture and gender stereotypes? And would this newly acquired knowledge modify their decisions? Are the effects similar across women?

To address these issues, we first introduce a stylized model to analyze how women decisions on using formal child care and on the amount of time spent with their children or at work depend on female individual characteristics (such as their wage) and on their knowledge of the importance of pre-school years and formal child care on children outcomes. Our model suggests that strong heterogenous effects may exist. High ability mothers are more willing to use formal child care in order to pursue their working career, while low ability women specialize more in child care activities, and refuse formal child care. Information on the importance of pre-school years, and child care is shown to polarize these decisions.

[4] These results are in line with the analysis by Schone (2004) for Norway and Piketty (2005) for France, who find that family policies, respectively a cash-for-care subsidy for not using daycare and the extension of a parental home care allowance have a disincentive effect on mothers' labour supply.

We then carry out a survey experiment on Italian women. As already mentioned, Italy features a conservative gender culture, somewhat hostile to mothers' participation in the labor market, and is characterized by the lowest female employment rate in Europe after Malta, and by low child care attendance (see Casarico and Profeta, 2010 and Del Boca et al., 2012 for a complete overview of the Italian situation). In our experiment, a sample of 1,500 Italian women between 20 and 40 years old is randomly assigned to three groups. The first groups is "treated" with a text message, i.e., women in this group saw an on screen text message, which states the benefits of day-care attendance; the second group is "treated" with a video-message, i.e., women were shown a video featuring six months-to- three years old children doing activities at a day-care center, while a background voice read the same message on the benefits of day-care attendance, as shown to the first group; the third group was not treated, as it did not receive any information. Before the treatment, background individual characteristics, such as age, gender, marital status, number and age of children, nationality, education, level and work activity were asked. After the treatment, we asked all women several questions, related to different topics, which represent our outcomes of interest. The questions include: (i) their opinion on the use of formal child care as well as their willingness to pay for it; (ii) their intention to participate in the labor market; and (iii) their most preferred division of child care between parents.

Our results suggest that information on the educational advantages obtained by children who attended child care modify women's opinion on the use of formal child care, on their role as the main care givers, on the use of grandparents as care-givers, and on their work intensions. Strong heterogenous effects emerge. High educated women (especially non-mothers) were convinced by our information to send their (future) children to formal child care, and increased their willingness to pay for this service. Low educated women instead did not modify

their (negative) view on formal child care, and were induced to increase maternal time, and to reduce working hours.

Our study confirms that exposure to information may change individual choices and socioeconomic outcomes. Consequences of these changes may be large. If women themselves tend to self-select into more conservative gender roles, changing the information set on a relevant policy may produce an outcome with less gender gaps and less gender stereotypes, and have positive repercussions on female labor force participation. This represents a key target for economic growth and individuals' well-being, especially in countries, such as Italy, where it is still very low. Our results suggest also that the timing of the information release may be crucial, as women may make irreversible career decisions, which cannot be modified by the arrival of late information.

The paper is organized as follows: the next section introduces a stylized model of women decisions, section 3 and 4 describe respectively the experimental design and the empirical analysis, section 5 analyzes the main results of the experiment and section 6 concludes. Proofs of the two propositions are in the appendix.

2 The Model

We introduce a simple theoretical framework to address two crucial issues for perspective mothers: their labor market participation and the use of child care facility for their (future) child. Models of female labour supply decisions and child care are numerous (see Apps and Rees, 2009). Earlier contributions such as Blau and Robbins (1988), Blau (1991) and Michalopoulos et al.(1992), Ribar (1995), have been recently enriched in dynamic models, which include also children skills' formation (Bernal, 2008). The purpose of this section is to sketch a static thoretical framework, which relates female childcare and labor decisions

to their individual characteristics (i.e., their wage), and to the productivity of formal childcare and maternal time in producing child quality.

We consider women[5] who differ in their labor ability, and hence wage, w. All women care about current consumption, c, and about the quality of their child, q, according to a logarithmic utility function:

$$U(c, q) = \ln c + \beta \ln q \tag{1}$$

where β represents the relative importance of child quality versus consumption. Women are allocated one unit of time, to be divided between labor supply, n, and time spend with the child (maternal time), m. We assume a minimum level of maternal time, so that $m \geq \overline{m}$. By supplying labor on the market, an individual obtains a wage, w. Wages depend on working ability, and are distributed across women according to a cumulative function $G(w)$ over the support $[w_L, w_U]$. Additionally, women can count on an additional income, x, provided by their spouse. Mother's time spent with the child, rather than working, increases child quality. In fact, we consider a linear production function in child quality, which depends on maternal time, m, and on time spend at formal child care, k, as follows:

$$q = Q(m, k) = \theta + A(\gamma m + \delta k) \tag{2}$$

where θ is a constant measuring the contribution to child quality of investments made later in life (after age three) by the parents and by public policies (such as maternal time after age three, schooling, etc.), γ and δ represent respectively the productivity of maternal time before age three and the time at formal child care, and A is the total productivity of both maternal time before age three and child care time relative to later investments, as measured by θ.

Besides maternal and formal child care time, children can be allocated to alternative informal care, a, such as grandparents or baby-sitters. We assume

[5] Like in Federico Fellini's movie "the city of women," no male populates our model.

this alternative care to be less productive for child quality, and for simplicity we set its productivity to 0. The complete set of constraints faced by women in their labor and child care decisions is thus as follows:

$$1 = n + m \tag{3}$$

$$1 = k + a + m \tag{4}$$

$$nw + x = c + pa + (F + kh)\, I \tag{5}$$

where the first equation represents the mother's time constraint, the second one is the child's time constraint, since young children have to be looked after at all time, and the last equation is the budget constraint. Notice that the total amount of resources is given by the female labor income, nw, and by the spouse additional income, x, and has to be divided between consumption, c, and resources spent on raising the child. These consist of the alternative care, a, which has a unitary cost, p, and of formal child care, which has a fixed cost, F, and a unitary cost, h, depending on the usage of the child care facilities, k. Finally, we assume that $w_L > p$, that is, the unitary cost of the alternative care is always less than the mother's wage.

To analyze women's labor supply decision, n, consider first the case of no formal child care ($I = 0$, $k = 0$). Women can only choose how much time to work or to stay with the child, who will spend the remaining time in alternative care. With a logarithmic utility, it is easy to see that the maternal time will be the following:

$$m = \frac{\beta}{1+\beta}\left(1 + \frac{x}{w-p}\right) - \frac{\theta}{(1+\beta)\, A\gamma} \tag{6}$$

Thus, maternal time is decreasing in female wage, but increasing in the income of the spouse. Moreover, it is decreasing in the importance of later stage (after age three) contribution to child quality, but increasing in early years productivity.

Consider now the case of formal child care. Women maximize their utility at eq.1, with respect to their decisions on formal child care, k, and labor supply, n,

given the constraints at equations 3, 4, and 5, and the child quality production function at eq.2. The optimization problem gives raise to the following two first order conditions, respectively for the maternal time and for the formal child care decisions:

$$-\frac{w-p}{c}+\frac{\beta\gamma A}{q} \leq 0 \tag{7}$$

$$-\frac{h-p}{c}+\frac{\beta\delta A}{q} \leq 0 \tag{8}$$

By combining equations 7 and 8, we have that formal child care may only be used by those women whose wage is sufficiently large:

$$w > \frac{\gamma}{\delta}h + p\left(1-\frac{\gamma}{\delta}\right) = \overline{w}, \tag{9}$$

In other words, formal child care may be convenient if the unitary extracost (over the cost of the alternative care) of providing quality to the child is lower with formal child care than with maternal time. However, since formal child care entails an initial fixed cost, F, the condition at eq.9 is only necessary. If a woman chooses to send her child to formal child care, she provides the minimum level of maternal time, $m = \overline{m}$, and uses formal child care as follows:

$$k = \frac{\beta}{1+\beta}\frac{(w-p)(1-\overline{m})+(x-F)-(h-p)\gamma\overline{m}}{h-p} - \frac{\theta+A\gamma\overline{m}}{A\delta(1+\beta)} \tag{10}$$

The next proposition summarizes women's decisions, according to their wage.

Proposition 1 *There exists a threshold wage, $\widehat{w} \geq \overline{w}$, such that (i) women with low wage, $w \leq \widehat{w}$, do not use formal child care, $k = 0$, dedicate an amount $m = \frac{\beta}{1+\beta}\left(1+\frac{x}{w-p}\right) - \frac{\theta}{(1+\beta)A\gamma}$ to maternal time and $1-m$ to labor market activities, with m being decreasing in w and increasing in x; and (ii) women with high wage, $w > \widehat{w}$, send their child to formal child care, $k = \frac{\beta}{1+\beta}\frac{(w-p)(1-\overline{m})+(x-F)-(h-p)\gamma\overline{m}}{h-p} - \frac{\theta+A\gamma\overline{m}}{A\delta(1+\beta)}$, dedicate a minimum amount $m = \overline{m}$ to maternal time and $1-m$ to labor market activities, with k being increasing in w and x.*

The above proposition suggests that women's behavior towards formal child care crucially depends on their wage, i.e., their outside option in the labor market, even when maternal time increases child quality, provided that also formal child care has a positive effect on child quality. Mothers with low wages prefer to spend more time at home with their child, and refrain from using formal child care. As their wage increase, they will spend progressively more time on the labor market. Only for a sufficiently high wage, $\widehat{w}$, mothers will turn to formal child care.

2.1 The Effects of Information

How does the release of information on the importance of the early life education (before age three) for the future cognitive ability of a child, and in particular on the positive role played by formal child care affect female labor and child care decisions? Our theoretical model allows to study the effect of (i) an increase in the relevance of early life education in the production of child quality, corresponding to an increase in A, and (ii) an increase in the perceived productivity of formal child care in producing child quality, corresponding to an increase in δ. The next proposition summarizes the results.

Proposition 2 *An increase in the relevance of early life education in the production of child quality (higher A) reduces labor supply and increases maternal time among low wage females (with $w < \widehat{w}$), increases the use of formal child care among high wage females (with $w > \widehat{w}$), and, for a sufficiently large β, reduces the threshold $\widehat{w}$ such that more women send their child to formal child care. An increase in the productivity of formal child care in enhancing child quality (higher δ) has no effect on low wage women (with $w < \widehat{w}$) decisions, increases the use of formal child care among high wage women (with $w > \widehat{w}$), and, for a sufficiently large β, reduces the threshold $\widehat{w}$ such that more women send their child to formal child care.*

The above proposition suggests that women's response to the release of information on the importance of early life education and of formal child care differs according to their ability or wage level. The low-wage women's response is to reduce their labor supply, and to spend more quality time with their child, while high wage women prefer to take larger use of child care facilities. Medium wage women, with initial wage slightly below $\widehat{w}$, instead largely modify their behavior: they respond to the information released by sending their child to formal child care, by reducing the number of hours spent with their children, and by increasing their labor supply. Our experimental design will test the existence of these heterogenous effects.

3 Experimental design

Our theoretical model studied how women decisions on the use of formal child care and labor supply are affected by their individual characteristics (i.e., their wage), and by the productivity of formal child care and maternal time in enhancing child quality. Our experiment is meant to provide a direct empirical direct of Proposition 2 on how exposure to new information on the positive effect of attending child care on children later cognitive ability modifies women's perception about the use of formal child care, their willingness to pay for it, and their labor market participation.

The information that we choose to release is about the advantage in the future educational obtainments of children attending formal child care. More specifically, women in the treatment group receive the following three pieces of information, as a text or from a background voice in a video:

Information I A study conducted on ten years old Germans shows that children who attended formal child care are more independent, socialize more with other children, and use a more appropriate language, when compared to children

who stayed at home.

Information II A research on thirty years old Norwegians shows that those who attended formal child care have a higher probability of going to college, earn more, and have a lower probability to be on welfare.

Information III Also in Italy, thanks to data collected by the National Institute for the Evaluation of the Educational System, a positive effect of attending formal child care emerges. In second grade, children who attended formal child care have better results in Italian tests than others.

Our online sample consists of 1,503 Italian women aged between 20 and 40 years. All women answered to an online survey on child care. A survey agency was contacted to run the online survey. They used different technics (such as exploiting their existing online panel, or producing new contact using the phone book, etc.) to construct an initial panel of women, who had internet access from home. The women contacted were asked to answer a survey on child care. The women who initially agreed to be interviewed were immediately selected and randomly assigned to the different groups. The survey took place on November 2011.

In an initial part of the survey, women were asked questions about their individual characteristics (age, location, education, fertility history, marital status, occupation). Their average age is 31.7 years, 67% of the interviewed is in a stable relation, and almost 13% are housewives[6]. The average household monthly income of a women in a couple is Euro 2,725, of which she earns around 40%. The sample was stratified so that around 25% of the interviewed women have their youngest child of age 0 to 3, 25% have their youngest child of age 4 to 6, the remaining 50% have either no children or children older than 6.

[6] See table A1 in the Appendix for a summary of their characteristics.

In the second part of the survey, the interviewed women were randomly assigned to three different groups. These three groups are balanced in the individual observable characteristics[7]. Women in the first group were treated with a text message, which showed in three subsequent pages the three pieces of information reported above. Women in the second group were exposed to a 60 seconds video showing a group of children doing various activities, such as playing, painting, dancing and having lunch, at a child care facility, while a (professional) background voice read the three pieces of information reported above[8]. Women in the third group (the control group) instead did not receive any information. Women in the treatment groups were then asked whether they already knew the information released, whether they agreed with it, and how much they liked it.

In the third part of the survey, all women were asked questions on the potential use of formal child care and their willingness to pay for it, on their labor supply intentions (both for the extensive and intensive margin), as well as on their preferences for different family arrangements. As detailed at table 1, responses were in different forms: in categories, such as: Strongly agree, Agree, Nor agree nor disagree, Disagree, Strongly disagree (Do you agree with the message?), binary (Desired work status, 1: Work; 0: No work) or a scale, such as from 1 to 9 (How much did you like the text/video) or from 0 to 99 (Desired hours of work). Responses that allowed for categories were rearranged to be binary (see table 1), while binary response or on a scale were not transformed.

Although we exposed our sample to a controlled experiment, it is still interesting to compare the average characteristics of the women in our sample with the average characteristics of women between 20 and 40 years old in the Italian part of the European Survey on Living and Income conditions, a representative

[7] Average characteristics of the women in the three samples are reported at table A2 in the Appendix.

[8] The video is available upon request.

Italian household survey[9]. Women in the two samples are of similar age and contribution to the disposable household income. A difference emerges in their average level of education, since 39% of women in our sample have tertiary education versus only 25% in the Italian representative data. Along these lines, the women in our sample tend to work more (62% versus 57%) and are less likely to be housewives (13% versus 19%)[10]. These differences are largely explained by the on-line nature of our sample, as online panels typically feature more educated respondents.

4 Empirical Analysis

Our theoretical model provides empirical predictions in terms of differences in working ability or (potential) wage. However, wages can only be observed for women, who are actually active in the labor market. Moreover, even for those who work, reported wages (or income) in surveys are known to suffer from large measurement errors. To overcome these problems, we proxy wages with education levels. The underlying assumption is that highly educated women have a distribution of potential wages that stochastically dominates the wage distribution of the low educated ones. Hence, on average, high educated women will behave as high wage individuals, whereas low educated women will act as low wages ones. We hence consider the sample of women with tertiary education as high educated, while women with no tertiary education constitute our sample of low educated women.

Our theoretical model mainly emphasizes the choice between formal child

[9] Table A1 in the Appendix provides a comparison of our sample, with the corresponding European Survey on Living and Income conditions for the year 2008. Although data are also available for the year 2010, we use the 2008 wave, where the variables describing the activity status (work, unemployment, student, housewife) are more in line with ours. Average values have been calculated using survey weights.

[10] Although household monthly income is difficult to compare, being measured as gross labor income in the European Survey on Living and Income conditions, and as total net income in our sample, a rough comparison, based on a 30% average tax rate, suggests that women have a slightly higher net income in our sample.

care and maternal time. Clearly, this decision is no longer salient for mothers with children older than three, while may potentially become relevant for women who have not yet had a child. Since almost all non-mothers in our sample (91%) expressed their desire to have at least one child during their life (and 68% in the next three years), we divide our sample in mothers and non-mothers. Almost all of the former have not yet had any direct experience the child care versus maternal time trade-off, but will face it in the future, and may thus be more responsive to the information that we provide. The already mothers, on the other hand, may no longer be involved in the trade-off, which they however already faced – thereby being, at least marginally, informed.

To summarize, we will consider four different sub-samples of women, who differ in their information set, as well as in the salience of the trade-off between formal child care and maternal time: (i) high educated non-mothers; (ii) low educated non-mothers; (iii) high educated mothers; and (iv) low educated mothers. Table 2 displays the average observed characteristics of our four sub-samples. Women without children are younger than mothers: 29 years old for the low educated, 30 for the high educated versus 34 years old for the mothers. Around a third of the non-mothers cohabits with their partner, as opposed to almost 95% among the mothers. High educated mothers have on average younger children than low educated mothers. High educated women are more likely to be employed than lower educated women, and mothers are more likely to be employed than non-mothers, due to the fact that a large proportion of non-mothers is still in college (or high school).

As discussed in the previous section, all responses to our survey questions are arranged to be binary or on a scale from 0 to 9. Due to our experimental design, we then simply compare the average value of the outcome in the treated group with the average value of the outcome in the untreated group through a t-test. As a robustness check, we run respectively logistic and OLS regressions

to control for observable characteristics that may have different averages across groups (such as employment).

5 Results

Proposition 1 analyzes women's child care and labor market decisions according to their individual characteristics. To provide an empirical test of this proposition for our four sub-samples, we consider how women in the control group, who have thus not been exposed to any message, respond to our questions about formal child care, labor market intentions, and family arrangements (see table 3). Consistently with our model, among the non-mothers, who are yet to face the child care-maternal time trade-off, high educated women are significantly more likely to send their children to child care (50% versus 39%), and slightly more willing to pay for it (€345 versus €313), than low educated ones. Moreover, controlling for maternal status, high educated women tend to work (slightly) longer hours than low educated.

Other interesting differences also emerge. Non-mothers are more attached than mothers to the labor market. Around 90% of women without children express their desire to have a job outside of the household as opposed to around 75% among mothers; moreover, on average they want to work longer hours. Maternal status largely explains also the within family desired division of child care. In fact, 65% of the mothers prefer to be the main care giver for their children, whereas only 35% of non-mothers wish, at least prospectively, to take on this main role (this increases to 42% if we consider the non-mothers who desire a child in the next 3 years).

Before analyzing the differential impact of our experiment on these four subsamples of women, it is crucial to assess their informational background about the message proposed in the treatment and how they perceive it. Table 4 shows

that low educated women without children are less aware of the information released in the text or in the video, as opposed to all other types of women. Moreover, low educated non-mothers, who were exposed to the video, find the message less credible and like it less than high educated mothers, but also – to a lesser extent – than low educated mothers and high educated non-mothers. These simple summary statistics thus suggest that besides being less aware of the information, low educated non-mothers are also less willing or prepared to receive and acquire it. Being educated or having a children (or, even better, both) increases women's awareness as well as the credibility of the message.

Table 5 shows the main results of our experiment, which was designed to test the predictions at Proposition 2. Average values of the outcomes are reported for the two treatment groups (text and video) and for the control group (no treatment), together with symbols signaling the statistical differences of "text" and "video" with respect to "no treatment". Among non-mothers, who were shown to be less informed about the effects of formal child care, the treatments had a strong differential effect depending on their educational level. In fact, high educated non-mothers were convinced by our positive message to send their (future) children to professional child care. Our treatment strongly increased the proportion of non-mothers willing to use child care: from 50% to 72% with the text, and to 61% with the video. Moreover, their willingness to pay for child care also increased – by € 50 with the text. Coherently, they were less likely to rely on grandparents' help, and less willing to be the main care giver (from 36% to 23% with the video treatment) .

Among low educated non mothers, we do not find any impact of our treatment on the potential use of child care, nor on the willingness to pay for it. In line with the theoretical predictions at Proposition 2, after the treatment, fewer low educated non-mothers reported to be willingness to work outside of the household (from 88% to 76%) and also the desired number of hours dropped

substantially, from almost 22 hours to slightly above 17.

As expected, mothers reacted less than non-mothers to our treatment (see table 5). In fact, they already faced the main trade-off about formal child care and maternal time, and may thus be more informed. Nevertheless, a positive effect of the video treatment on the willingness to pay emerges for high educated mothers (from €330 to €380), and a negative effect (both with the text and the video) on the desire to be the main care giver for low educated mothers (from 65% to 56%). We also find a puzzling reduction of desired hours of work for high educated mothers treated with the video, which – however - disappears in the robustness checks provided below.

Due to the experimental design of our analysis, we need not to control for individual observable characteristics, since women are randomly assigned to the three groups, which should thus be balanced in the individual characteristics. This is indeed the case for all variables[11], with the exception of the employment status, which happens to be lower in the group of women treated by the video compared to the group of non-treated women (58% versus 65%). As a robustness check, we thus replicate our analyses, by using OLS and logistic regressions and including "observed work status" as a control variable. All previous results are robust to the inclusion of this control variable[12], with the exception of the reduction of desired hours of work for high educated mothers treated with the video, which loses its significance.

6 Conclusions

A recent literature has emphasized the role of information on the effects of maternal employment in influencing female labor force participation. The main argument is that, as women have become increasingly aware of the fact that

[11] See table A2 in the Appendix.
[12] See table A3 in Appendix.

working outside the household has no negative effects on the children future outcomes, their attachment to the labor market has increased. To address this issue more thoroughly, we introduced a stylized theoretical model that uncovers important heterogenous effects between low and high wage women. We then provide a direct test of our empirical predictions by designing a survey experiment that exposed a group of women to a text or video message on the future educational benefits for children who attended child care.

We consider four groups of women, according to their education level (college graduate or not) and maternal status (mother or not). These four groups of women differ in their individual characteristics, such as average age, income, marital status. But also in their (self-reported) level of information about the future educational benefits for children attending child care. In particular, high educated mothers report to be more informed than non-mother or non-college graduate. The least informed are the low educated non-mothers, who also find the information released in the message to be less credible. Hence, being a mother or high educated (or both) increases their knowledge about child care.

The responses to the two treatments (text and video message) confirm the predictions of our theoretical model. High educated non-mothers are convinced by our positive message to send their (future) children to formal child care, and to pay more for it (€50). For low educated non-mothers, instead, child care facilities remain a less preferred option. They are indeed moved by the treatment to take on themselves the care of their (future) children, their willingness to work is reduced, and so are their desired weekly working hours. This result is in line with Lefebvre and Merrigan (2008) argument that, when mothers are out of the labor market (i.e., they stay at home) because they strongly value spending time in rearing their children, any type of subsidy would have limited effect.

These results have a strong policy implication. Information – about the future benefits on the children of attending child care – is only effective (to

increase child care attendance) when addressed to a high educated recipient. In less educated persons, this information led to a completely different desired behavioral change. Not only less educated women self-report to be less aware of the information that we released – and thus potentially they have more to learn – but they are also more critical towards our message, which they find less credible and which they like less than the educated women. This critical approach towards the message received, and their intended behavior, is consistent with a structural difference in the maternal role of low and high educated women. College graduate women, who have thus invested in their education, may be more responsive to exploit institutions that reduce the opportunity cost (for instance in terms of their children ability) of having a working career. On the other hand, low educated women may be less eager to use these alternative institutions, as they might have already committed to a predominately maternal role, perhaps by giving up career opportunities.

7 References

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8 Appendix

8.1 Proof of Proposition 1

It is useful to consider first the female optimal decisions when (i) no formal child care is used ($I = 0$), and (ii) when formal child care is used ($I = 1$).

(i) For $I = 0$ and $k = 0$, women maximize utility at eq.1, with respect to maternal time, m, given the constraints at equations 3, 4, and 5, and the child quality production function at eq.2. Simple algebra shows that the optimal value of m is described at eq.6. Moreover, it is straightforward to see that $\partial m/\partial w < 0$, and $\partial m/\partial x > 0$.

(ii) For $I = 1$, women maximize utility at eq.1, with respect to their child care, k, and labor supply, n, decisions, given the constraints at equations 3, 4, and 5, and the child quality production function at eq.2. The optimization problem gives raises to the two first order conditions at equations 7 and 8. If the condition at eq.9 is not satisfied, then $k = 0$, and we are back to case (i). Otherwise, it is easy to see that the optimal k is at eq.10, and maternal time is at its minimum level, $m = \overline{m}$. Moreover, it is straightforward to see that $\partial k/\partial w > 0$, and $\partial k/\partial x > 0$.

Hence, women with wages $w \leq \overline{w}$ are in case I and prefer no child care. But does a woman with a wage $w > \overline{w}$ prefer no child care, $I = 0$ (case i), or child care, $I = 1$ (case ii)? To answer this question, we need to compare the respective utilities: $U(I = 0)$ and $U(I = 1)$. It is useful at this junture to introduce two definitions:

$$\begin{aligned}\Psi &= w - p + x + \frac{\theta(w-p)}{A\gamma} \\ \Lambda &= (w-p)(1-\overline{m}) + x - F + \frac{(\theta + A\gamma\overline{m})(h-p)}{A\delta}\end{aligned}$$

These two utilities can be written as

$$\begin{aligned}U(I=0) &= \ln\frac{\Psi}{1+\beta} + \beta\ln\frac{\beta}{1+\beta}\frac{A\gamma\Psi}{h-p} \\ U(I=1) &= \ln\frac{\Lambda}{1+\beta} + \beta\ln\frac{\beta}{1+\beta}\frac{A\delta\Lambda}{h-p}\end{aligned}$$

Clearly, a woman with wage $w > \overline{w}$ will prefer $I = 1$ if $U(I = 1) > U(I = 0)$, which, after simple algebra, can be rewritten as

$$\frac{\Lambda}{\Psi} > \left(\frac{h-p}{w-p}\frac{\gamma}{\delta}\right)^{\frac{\beta}{1+\beta}}. \tag{11}$$

It is easy to see that the rhs of the inequality at eq. 11 is decreasing in w, that it goes to $+\infty$ for $w \to p$ and that it goes to 0 for $w \to +\infty$. An analysis of the lhs of the inequality at eq. 11 show that, for $w = p$ $\frac{\Lambda}{\Psi} = \frac{x-F+(\theta+A\gamma\overline{m})(h-p)/A\delta}{x}$ and for $w \to +\infty$ $\frac{\Lambda}{\Psi} = \frac{1-\overline{m}}{1+(\theta/A\gamma)}$. Moreover, Λ/Ψ can either be decreasing (figure A1) or increasing (figure A2) in w, since

$sign\left(\frac{\partial(\Lambda/\Psi)}{\partial w}\right) = sign\left\{x(1-\overline{m}) - \left(1+\frac{\theta}{A\gamma}\right)\left[(x-F) + \frac{(\theta+A\gamma\overline{m})(h-p)}{A\delta}\right]\right\}$. As shown at figure 1 and 2, in both cases, there exists a $\widehat{w}$ s.t. for $w \leq \widehat{w}$ we have $U(I = 1) \leq U(I = 0)$, and thus women chose not to use child care, and for $w > \widehat{w}$ we have $U(I = 1) > U(I = 0)$, and thus women use child care. ***qed.***

FIGURE 1: Case I

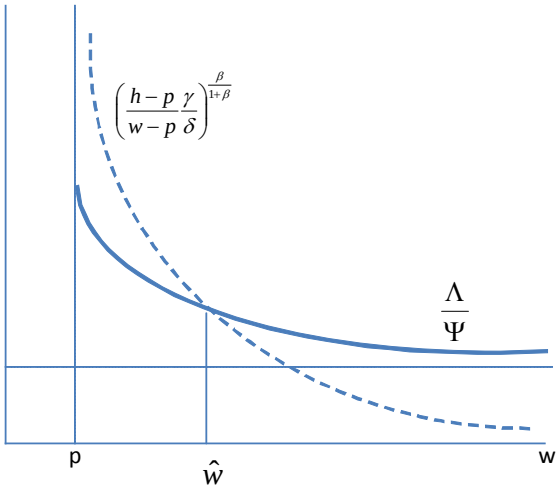

Figure 1:

Figure 2:

FIGURE 2: Case II

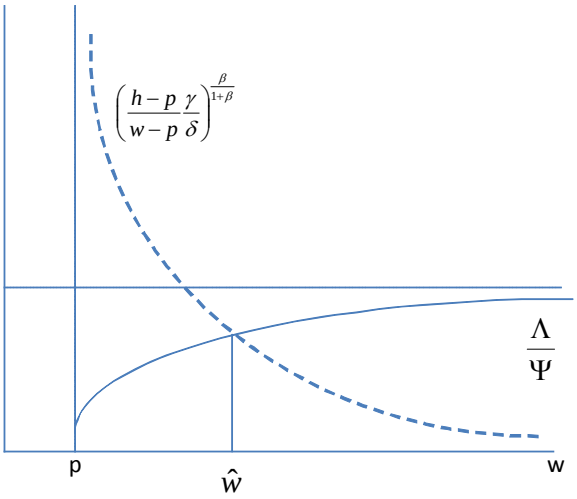

Figure 3:

8.2 Proof of Proposition 2

To prove proposition 2, It is convenient to consider first the case of no formal child care ($I = 0$) when $w \leq \widehat{w}$. Given the optimal parental time, m, at eq.6, it is easy to see that $\partial m/\partial \delta = 0$ and $\partial m/\partial A > 0$. In the case of child care ($I = 1$) when $w > \widehat{w}$, given the optimal use of child care, k, at eq.10, it is easy to see that $\partial k/\partial \delta > 0$ and $\partial k/\partial A > 0$.

To analyze the effect of A and δ on the threshold level $\widehat{w}$, notice that $\widehat{w}$ s.t. $\Delta = \ln \frac{\Lambda}{\Psi} + \beta \ln \frac{w-p}{h-p}\frac{\delta}{\gamma} = 0$. Taking the total differential of this expression, we have $\frac{d\widehat{w}}{dA} = -\frac{\partial \Delta/\partial A}{\partial \Delta/\partial \widehat{w}}$ and $\frac{d\widehat{w}}{d\delta} = -\frac{\partial \Delta/\partial \delta}{\partial \Delta/\partial \widehat{w}}$. After some tedious algebra, we have that $\frac{\partial \Delta}{\partial A} = \left(\frac{h-p}{w-p}\frac{\gamma}{\delta}\right)^{-\frac{\beta}{1+\beta}} > 0$, $\frac{\partial \Delta}{\partial \delta} = -\frac{(\theta+A\gamma\overline{m})(h-p)(1+\beta)}{A\delta\Lambda} + \frac{\beta}{\delta} > 0$ for $w > \widehat{w}$, and $\frac{\partial \Delta}{\partial \widehat{w}} = \frac{(1-\overline{m})(1+\beta)}{\Lambda} - \frac{(1+\beta)}{\Psi}\left(1+\frac{\theta}{A\gamma}\right) + \frac{\beta}{w-p}$. Hence, $\frac{\partial \Delta}{\partial \widehat{w}} > 0$ for $\beta > \overline{\beta} = \frac{(w-p)\left(1+\frac{\theta}{A\gamma}\right)\left[x-F+\frac{(\theta+A\gamma\overline{m})(h-p)}{A\delta}\left(1+\frac{\theta}{A\gamma}\right)\right]-(1-\overline{m})(w-p)x}{(1-\overline{m})(w-p)\Psi+x\Lambda}$. It follows that, for $\beta > \overline{\beta}$, $\frac{d\widehat{w}}{dA} < 0$ and $\frac{d\widehat{w}}{d\delta} > 0$. ***qed***