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Abstract

Our model explains the observed gender-specific patterns of career and child care choices through endogenous social norms. We study how these norms interact with the gender wage gap. We show that via the social norm a couple's child care and career choices impose an externality on other couples, so that the *laissez-faire* is inefficient. We use our model to study the design and effectiveness of three commonly used policies. We find that child care subsidies and women quotas can be effective tools to mitigate or eliminate the externality. Parental leave, however, may even intensify the externality and decrease welfare.

***JEL*-Classification:** D13, H23, J16, J22

Keywords: Social norms, child care, women's career choices, child care subsidies, women quotas, parental leave

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1 Introduction

While the participation of women in the labor force has increased steadily over the last decades (Goldin, 2006), gender inequalities in the labor market remain substantial. Significant gender differences in wages, hours of work and occupational choices continue to exist in all OECD countries, where women with a median wage earn on average 15% percent less than their male counterpart. This differential cannot be explained solely by gender differences in schooling, experience and job characteristics (*e.g.*, O'Neill, 2003; Fortin, 2005; Blau and Kahn, 2006). Inequality is particularly striking when it comes to positions of leadership. In 2010, only one out of ten seats (around 12%) in the boardrooms of Europe's largest companies were held by a woman. The percentage dramatically decreases when we consider leadership positions, such as chairs and CEOs, where women hold only 3% of these roles.[1]

These career choices are mirrored by gender data on hours of work and child care provisions; the share of couples where both parents work full-time is well below 50% in most European countries.[2] It is predominantly the mothers who work part-time, while at the same time, are the main providers of child care within the family (*e.g.*, National Time Use Survey; Paull, 2008; Ciccia and Verloo, 2012).

Recent lines of research emphasize the role of social norms in shaping observed gender outcomes (see Betrand (2011) for an overview). Fortin (2005) finds that agreement to the statements: *"When jobs are scarce, men should have more right to a job than women"*, and *"Being a housewife is just as fulfilling as working for pay"*, are the most powerful explanatory factors in explaining cross-country differences in female employment rates and the gender wage gap. Additionally, there is evidence that the presence of social norms, such as men being the main breadwinners, may cause mothers who work full-time to feel guilty when they do not have the time to take care of their children.[3] Thus, social norms may provoke the differential sorting of men and women across occupations with women entering low pay occupations that allow for more flexible working hours (see, Albanesi and Olivetti, 2009; Goldin, 2014; Card, Cardoso and Kline, 2016).

In this paper, we present a simple model which explains the observed different gender patterns of career and child care decisions through (endogenously determined) social norms. Our model reveals how these norms interact with and are reinforced by a (predetermined) gender wage gap. We show that through social norms an individual couple's child care and career decisions may impose an externality on other couples so that the (female) labor market sorting observed in the *laissez-faire* equilibrium may be inefficient. Our model provides a theoretical underpinning

[1] See European Commission's report "More women in senior positions", 2010.

[2] Exceptions are some Eastern European countries (Slovenia, Lithuania, Latvia, Bulgaria) and Portugal; see the OECD Family Database.

[3] In the psychological literature this is called "mother's guilt". See, for instance, Guendouzi (2006).

for the afore-mentioned empirical results on gender-specific labor market outcomes, and brings together the various effects which have been documented, showing how they interact and explaining the persistence of gender differences in child care and career decisions. It also helps to understand the current labor market sorting we observe in different countries (see Section 7). At the same time, our model offers a framework which provides guidance for gender-oriented labor market and child care policies. In particular, we study the design and effectiveness of three commonly used policy instruments: child care subsidies, women quotas and parental leave.

Specifically, we consider a population of parents who choose their career path, child care arrangements and consumption. There are two career paths available; a full-time high-career path, and a more flexible low-career path. Individuals who take up the high-career path must work the entire day and have no time to provide child care. The low-career path offers flexible working hours and allows individuals to freely choose how much time to spend in the labor market and on child care. The wage rate in the low-career path is the same for all spouses in each couple. The high-career path, by contrast, comes with additional (future) earning possibilities which differ across couples and gender. They are perfectly correlated within couples, but the level that can be achieved by the mother is only a fraction of that available to the father, thus, reflecting the gender wage gap.

Couples are confronted with a social norm concerning child care activities. The norm derives from the previous generation's behavior. More precisely, it is determined by child care decisions made by the median couple of the preceding generation. Deviations from the social norm may impose a cost on the mother as well as on the father, but the determination of these costs is gender specific. The mother may feel guilt about taking up the high-career path and buying full-time child care on the private market if the majority of mothers in the previous generation personally took care of their children. The father, by contrast, may suffer from social stigma when he chooses the low-career path and looks after the children if the majority of men in the previous generation did not take care of their children.

With two career paths available to each spouse we have four scenarios to consider, but only two are relevant in equilibrium. The first is the "traditional couple", where the mother chooses the low-career path and provides some child care while the father opts for the high-career path. The second is a couple where both parents take up the high-career path, work full-time and rely entirely on market child care. We determine the couple who is indifferent between these two scenarios and show that those with lower future high-career earning opportunities opt for the traditional couple arrangement.

We concentrate on the steady state and characterize the *laissez-faire* solution when the norm is binding, that is, when the median couple is traditional. The model is rich enough to generate three types of first-best solution according to whether or not the norm optimally binds and depending on whether or not it is optimal to force some couples into a specific career path. First, we may have an unconstrained efficient solution, in which case we effectively have two potential steady states; an unconstrained no-norm allocation would be the efficient solution (without externality) but the economy is "stuck" in the wrong steady state where the norm binds (and where the share of traditional couples is too large). In the second case, the norm is binding both in the efficient solution and in *laissez-faire* equilibrium. The *laissez-faire* equilibrium then involves that mothers in traditional couples spend "too much" time in child care (because of the negative externality the norm imposes on high-career couples), and the share of traditional couples is "too large". Note that in the first case, a one period transitional policy may be sufficient to bring the economy to the efficient steady state, while in the second case, policies have to be permanent because of the externality. The constrained no-norm solution represents the third type of possible first-best solution. This differs from the unconstrained case in that a social planner forces some couples to become traditional even if their preference is for undertaking the high-career path. Here, a transitory policy is no longer effective, as we will explain.

We show that a uniform child care subsidy financed by a uniform lump-sum tax is welfare improving in all cases. It can always be designed as a transitional policy in order to achieve the efficient (no-norm) steady state in the first case. In the other cases, it cannot reestablish the first-best, but it is an efficiency enhancing second-best policy.

Women quotas, are also effective in achieving the efficient no-norm steady state. In the unconstrained case a transitory policy is sufficient, while the constrained solution calls for a permanent policy. However, a women quota is ineffective in the case where the norm binds at the efficient solution. While women quotas can affect the share of women in the high-career path, they have no leverage on the level of child care provided by the traditional couple. Consequently, they do not reduce the externality.

Finally, parental leave cannot eliminate the social norm when the norm is not binding in the efficient solution. With a binding norm it may or may not be welfare enhancing. It has the beneficial effect of letting the high-career couples who opt for parental leave to freely choose their child care. However, because it increases home child care it also exacerbates the externality and thus the norm cost for high-career couples who opt out of parental leave.

2 Related Literature

First, our paper contributes to the growing literature on an individual's identity and social norms. Akerlof and Kranton (2000; 2010) are the first to formally analyze how gender identity (that is, an individual's sense of self) can affect various economic outcomes. They propose a utility function in which identity is associated with different social categories. According to the theory, an individual may suffer disutility by deviating from their category's norms, which causes behavior to conform toward those norms.

More recent papers, mostly empirical, try to find explanations as to how social norms concerning the division of labor in the household evolve over time. The key result of these papers is that social norms of one generation are strongly affected by the behavior of former generations. Fernandez (2007) and Fernandez and Fogli (2009) show that the variation in work behavior of second-generation American women can be explained by the level of female labor force participation and attitudes towards women's work in their parent's country of origin. Concentrating on the family as a channel of norm transmission, Fernandez, Fogli and Olivetti (2004) and Olivetti, Patacchini and Zenou (2016) demonstrate that working mothers transmit different preferences to their children than non-working mothers. Working mothers not only make it more attractive for their daughter's to invest in labor market skills, but also for the wives of their sons, since these men more likely prefer a working wife themselves. Similarly, Farre and Vella (2013) show that a mother's attitudes have a statistically significant effect on the attitudes of her children. Alesina, Giuliano and Nunn (2013) argue that gender norms are very persistent and date back even to pre-industrial agricultural societies.[4]

Our paper builds on the evidence provided by that literature and analyzes how, with an endogenously evolving social norm, career choices and child care activities of one generation affect the behavior and welfare of future generations. In so doing, our paper complements studies that emphasize the role of gender-(in)equality and analyze policies that improve women's labor market outcomes. The most widely discussed policy in this respect are women quotas. Bertrand, Black and Lleras-Muney (2014) and Matsa and Miller (2013) analyze the effects on female labor market outcomes in Norway after the implementation of a women quota in 2006. They show that the gender-wage gap decreased for women with leadership positions on company boards. Another policy that has received much attention, especially in the empirical literature, is that of child care subsidies. Here, the evidence that child care subsidies increase the participation of women in the labor force is indisputable; see, for instance, Averett, Peters and Waldman (1997); Kimmel (1998); or Gelbach (2002). Our theoretical paper predicts that women quotas and child care subsidies not only improve outcomes for women in the labor market, but at the same time help to dissolve costly social norms. Finally, we analyze the effectiveness of parental leave (PL) programs. The empirical literature is as yet inconclusive on the overall effect of parental leave programs. Ruhm (1998), for instance, finds that PL increases the employment status of women but at the cost of a reduction in their relative wages for extended periods. Lalive and Zweimüller (2009) and Lalive *et al.* (2014) document the adverse short-run effects of parental

[4] A theoretical model on *optimal* transmission of social norms within and outside the family is provided by Bisin and Verdier (2000; 2001).

leave on both employment and wages, but do not find long-run effects. We identify another, formerly neglected, channel through which parental leave affects women's welfare; although parental leave increases the participation of women in the high-career path, it exacerbates the negative externality generated by the social norm.

3 Economic environment

Consider a population of couples with children, the size of which is normalized to one. Each couple consists of a mother 'm', a father 'f', and a given number of children. Couples choose their career path, the mode of child care, and their consumption.

Labor market. There exist two types of career paths (indexed by j). First, a full engaging high-career path, $j = h$, where individuals who take up this career path have to work an entire day which we normalize to one. Second, a less demanding low-career path, $j = \ell$, offering flexible working hours, where individuals can freely choose how much time to spend in the labor market. The time not spent at work can be used for child care c_i, where $i = f, m$. Both jobs pay the wage rate y, but the high-career path comes with additional future earning possibilities q_i.[5] We let $q_f \in [0, \overline{q}]$ and $q_m = \alpha q_f \in [0, \alpha\overline{q}]$, with $\alpha \in (0, 1]$. An $\alpha < 1$ simply reflects unequal opportunities for females and males as they are observed in nearly all developed countries. Future revenue q_f is distributed according to the density function $f(.)$, with the cumulative distribution being $F(.)$. The median q is such that $F(q^M) = 0.5$. Future earning opportunities are perfectly correlated in a couple. Consequently, there is a single level of q_m associated with each level of q_f.[6]

Child care. Care for children provided by the spouse(s) is denoted by c_i $(i = f, m)$, while that bought in the private market is denoted by c_p. The latter costs p per unit of time. We let $p = y$, meaning that the current salary of one member in the couple exactly covers the costs of buying full-time child care on the private market.[7] The children must be taken care of for the entire day, implying $c_f + c_m + c_p = 1$. Couples in which both parents choose the high-career path thus have to fully rely on private child care. When parents enter a flexible job their salary

[5] As a real world example, consider the low-career path as a job such that conciliating working-time and family duties is relatively easy but comes at costs of no career opportunities as, for instance, a school or nursery teacher. On the contrary, in the high-career path promotions are possible if the worker shows to be fully committed and dedicated to the job (also in terms of time physically spent in the company); for instance, a manager can later become chair or CEO of the company.

[6] Assortative mating is commonly observed and has been increasing over the last decades; see Schwartz and Mare (2005).

[7] This assumption is simply a normalization that has no relevance for our results. Since p and y are the same for all couples, without this assumption we would obtain a term proportional to $(p - y)$ in the first-order conditions with respect to child care. This would affect the equilibrium levels of child care but otherwise all other results are not affected.

decreases proportionally to the time devoted to care. Informal and private care constitute a family public good and its value to the parents is given by:

$$G(c_f, c_m, c_p) = v(c_f + c_m) + \beta v(c_p),$$

where $v' > 0, v'' < 0$ and $v(0) = 0$. Care provided by the father and mother are thus perfect substitutes while informal and private care are imperfect substitutes, with private care being (weakly) less welfare-enhancing than informal care, $\beta \in (0, 1]$.[8] Apart from child care, each parent derives utility from consumption of a numeraire commodity x.

Social norm. Couples are confronted with a social norm concerning child care activities. The norm derives from the previous generation's behavior. In particular, if in the previous generation the median father took up the high-career path while the median mother chose the low-career path and (partly) looked after the children, then those choices represent the social norm for the current parents.

Deviations from the social norm may thus concern mothers as well as fathers, and are costly. Mothers may feel guilt about taking up the high-career path and buying full-time child care on the private market if the majority of mothers in the previous generation personally took care of their children. Fathers, by contrast, may suffer from social stigma when they choose the low-career path and look after their children if the majority of fathers in the previous generation did not take care of their children.

Formally, we represent the social norm for mothers belonging to generation t as costs of the full-time job given by $\gamma_m(\max\{0; c_m^{M,t-1} - c_m^t\})$, where $c_m^{M,t-1}$ is time spent with children by the median mother in the previous generation. For fathers, the social norm is the cost of the flexible job given by $\gamma_f(\max\{0; c_f^t - c_f^{M,t-1}\})$, where $c_f^{M,t-1}$ is time spent with children by the median father in the previous generation. The parameter $\gamma_i \in [0, 1]$ reflects the costs of norm deviations.

In this paper, we concentrate on the case where the median mother in the previous generation entered the flexible job market and took care of the children, while the median father took up the high-career path.

Assumption 1 (Social norm active in period t) *In period $t-1$ a majority of couples were traditional, implying $c_m^{M,t-1} > 0$ and $c_f^{M,t-1} = 0$.*

We will focus on decisions made at the steady state. Thus, we omit the subscript t for all variables that differ from child care provided by the median mother and father in the previous generation, so that $c_m \equiv c_m^t$ and $c_f \equiv c_f^t$.

[8] See, for instance, Gregg *et al.* (2005), Bernal (2008), and Huerta *et al.* (2011).

Timing. The timing of couples' decisions is as follows: first, parents choose their career path and then, in the second stage, they choose consumption and the amount of child care (be it formal or informal). Parents act cooperatively and maximize the sum of their utilities:

$$W = x_m + x_f + G(c_f, c_m, c_p) - \gamma_m(\max\{0; c_m^{M,t-1} - c_m\}) - \gamma_f(\max\{0; c_f - c_f^{M,t-1}\}).$$

Since individual consumption levels play no role in our model, we define $x \equiv x_m + x_f$ for the subsequent analysis.

4 Couple's optimization

In this section, we first analyze the choice of child care activities for each given career path and then, by proceeding backward, we consider the choice of career path made by the couple. Observe, however, that the two-stage approach of the couple's decision making process is adopted for the sake of presentation. Because no new information is revealed between the two stages and nothing else changes, it yields the same outcome as a simultaneous choice.

4.1 Second Stage: Child care activities

At the second stage, we consider decisions made by four different types of couples: (*i*) only the father enters the high-career path while the mother enters the flexible job market; (*ii*) both parents take up the high-career path; (*iii*) only the mother enters the high-career path, while the father accepts the flexible job; and (*iv*) both enter the flexible job market. We will successively study each of the four scenarios.

4.1.1 Only the father enters the high-career path

This scenario exactly replicates the social norm so that neither the father nor the mother suffer from a deviation to the norm, that is $\gamma_f(\max\{0; 0 - c_f^{M,t-1}\}) = 0$ and $\gamma_m(\max\{0; c_m^{M,t-1} - c_m\}) = 0$. Since the father took up the high-career path he is not able to take care of the children, and $c_f^* = 0$. Welfare of this couple is denoted by $W_{h\ell}$, where the first subscript refers to the father's career choice and the second subscript refers to the mother's career choice. Noting that $c_m + c_p = 1$ the couple chooses c_m to maximize:

$$\max_{c_m} \quad W_{h\ell} = y + (1 - c_m)\, y + q - p(1 - c_m) + v(c_m) + \beta v(1 - c_m).$$

Given that $p = y$, the first order condition with respect to c_m can be written as:

$$c_{h\ell}^* \equiv c_m^* : \quad v'(c_{h\ell}^*) = \beta v'(1 - c_{h\ell}^*), \tag{1}$$

where $c_{h\ell}^*$ is the total amount of child care provided by couple $h\ell$. From (1), marginal utility from informal child care equals the marginal benefit from private care.

The traditional couple's welfare is given by:

$$W^*_{h\ell} = y + q + v(c^*_{h\ell}) + \beta v(1 - c^*_{h\ell}), \tag{2}$$

where its optimal consumption is given by $x^*_{h\ell} = y + q$.

4.1.2 Both parents enter the high-career path

When both enter the high-career path their common earnings amount to $2y+q_f+q_m = 2y+q(1+\alpha)$. Neither one of the couple is able to provide child care services so that $c^*_p = 1$. The mother suffers psychological costs equal to $\gamma_m(\max\{0; c_m^{M,t-1} - 0\}) = \gamma_m c_m^{M,t-1}$, while the father's costs are given by $\gamma_f(\max\{0; 0 - c_f^{M,t-1}\}) = 0$. A high-career couple simply consumes its income. Noting that $p = y$, their welfare can be written as:

$$W^*_{hh} = y + q(1 + \alpha) + \beta v(1) - \gamma_m c_m^{M,t-1}, \tag{3}$$

where the couple's optimal consumption is given by $x^*_{hh} = y + q(1 + \alpha)$.

4.1.3 Only the mother enters the high-career path

If the couple adopts the "anti-norm" in that the mother chooses the full-time job while the father enters the flexible job market both parents (may) suffer from norm deviations. The mother's psychological costs amount to $\gamma_m(\max\{0; c_m^{M,t-1} - 0\}) = \gamma_m c_m^{M,t-1}$, while the father's costs are given by $\gamma_f(\max\{0; c_f - c_f^{M,t-1}\}) = \gamma_f c_f$. Again, noting that $p = y$ and $c_f + c_p = 1$, the couple's optimization problem can be written as:

$$\max_{c_f} \quad W_{\ell h} = y + \alpha q + v(c_f) + \beta v(1 - c_f) - \gamma_m c_m^{M,t-1} - \gamma_f c_f. \tag{4}$$

The first order condition with respect to c_f is given by:

$$c^*_{\ell h} \equiv c^*_f : \quad v'(c^*_{\ell h}) - \gamma_f = \beta v'(1 - c^*_{\ell h}).$$

In words, the marginal utility from home child care net of the social stigma for the father equals the marginal benefit from private care. Inserting $c^*_{\ell h}$ back into (4) yields:

$$W^*_{\ell h} = y + \alpha q + \beta v(1 - c^*_{\ell h}) - \gamma_m c_m^{M,t-1} - \gamma_f c^*_{\ell h}, \tag{5}$$

where the couple's optimal consumption is $x^*_{\ell h} = y + \alpha q$.

4.1.4 Both parents enter the low-career path

If both parents choose the low-career path, the costs of the social norm are zero for the mother, while they are $\gamma_f(\max\{0; c_f - c_f^{M,t-1}\}) = \gamma_f c_f$ for the father. Again, noting that $c_p = 1 - c_f - c_m$ and $p = y$ the couple's optimization problem reads as:

$$\max_{c_f, c_m} \quad W_{\ell\ell} = y + v(c_m + c_f) + \beta v(1 - c_m - c_f) - \gamma_f c_f.$$

The father's and mother's optimal child care provisions are implicitly given by:

$$v'(c_m^* + c_f^*) - \beta v'(1 - c_m^* - c_f^*) - \gamma_f \leq 0, \tag{6}$$

$$v'(c_m^* + c_f^*) - \beta v'(1 - c_m^* - c_f^*) = 0. \tag{7}$$

These first order conditions show that if the father suffers from social stigma, *i.e.*, $\gamma_f > 0$, it is optimal that only the mother takes care of the children, implying $c_f^* = 0$ and $c_{\ell\ell}^* \equiv c_m^* > 0$. If, however, $\gamma_f = 0$ then from the couple's perspective it is of no importance who takes care of the children, and all combinations of c_m and c_f such that

$$c_{\ell\ell}^* \equiv c_m^* + c_f^* : \quad v'(c_{\ell\ell}^*) - \beta v'(1 - c_{\ell\ell}^*) = 0, \tag{8}$$

are optimal. The couple's optimal consumption is $x_{\ell\ell}^* = y$ and welfare is given by:

$$W_{\ell\ell}^* = y + v(c_{\ell\ell}^*) + \beta v(1 - c_{\ell\ell}^*). \tag{9}$$

Interestingly, the social stigma for the father is never relevant here because either $\gamma_f > 0$ and the father does not provide child care so that the social norm has no impact, or $\gamma_f = 0$ and the social stigma does not exist.

4.2 Comparing the different scenarios

The following lemma compares aggregate consumption levels and total child care provisions across the four second stage scenarios.

Lemma 1 (Consumption and child care) *In the laissez-faire,*

(i) consumption levels of the four different types of couples satisfy: $x_{\ell\ell}^* < x_{\ell h}^* \leq x_{h\ell}^* < x_{hh}^*$; *and*

(ii) levels of child care chosen by the four different types of couples satisfy: $0 = c_{hh}^* < c_{\ell h}^* \leq c_{h\ell}^* = c_{\ell\ell}^*$.

In words, in traditional couples and in couples where the low-career path is chosen by both parents, informal child care is relatively high, whereas in "anti-norm" couples the level of informal child care is relatively low because of the social stigma γ_f for the father. In general, high consumption of the numeraire good is associated with the low provision of informal child care and *vice versa*. This means that couples who exclusively rely on private child care are those with the highest consumption, while those who partly take care of their children are those with the lowest consumption levels.

4.3 First Stage: Job market decision

At the first stage, the couple compares its welfare levels and chooses its career path $jj \in \{hh, h\ell, \ell h, \ell\ell\}$, such that couple's welfare W_{jj} is maximized. Let us first compare welfare levels of traditional and "anti-norm" couples, that is:

$$W^*_{h\ell} = y + q + v(c^*_{h\ell}) + \beta v(1 - c^*_{h\ell}) \lesseqgtr$$
$$W^*_{\ell h} = y + \alpha q + v(c^*_{\ell h}) + \beta v(1 - c^*_{\ell h}) - \gamma_m c_m^{M,t-1} - \gamma_f c^*_{\ell h},$$

where $c_m^{M,t-1} = c^*_{h\ell}$. Recall that $c^*_{\ell h} \leq c^*_{h\ell}$ so that the benefit from child care is (weakly) higher in traditional couples. The couple in which both partners act against the social norm has lower welfare for three additional reasons. First, mothers in type-ℓh couples suffer from deviations of the social norm since they are not able to take care of their children. Second, fathers suffer from deviations of the social norm since they play an active role in child rearing. Finally, mothers in the "anti-norm" couple will earn less than fathers in the traditional couple as long as the job market suffers from unequal opportunities, which is why $x^*_{\ell h} \leq x^*_{h\ell}$. We thus have:

$$W^*_{h\ell} \geq W^*_{\ell h}.$$

Unless there are equal opportunities $\alpha = 1$ and no norm costs $\gamma_m = \gamma_f = 0$, a reversal of the social norm can thus never be optimal in the first stage.

Let us next compare the traditional couples' welfare with the welfare of couples in which both enter the low-career path, that is:

$$W^*_{h\ell} = y + q + v(c^*_{h\ell}) + \beta v(1 - c^*_{h\ell}) \lesseqgtr W^*_{\ell\ell} = y + v(c^*_{\ell\ell}) + \beta v(1 - c^*_{\ell\ell}).$$

Since $x^*_{\ell\ell} < x^*_{h\ell}$ and $c^*_{h\ell} = c^*_{\ell\ell}$, we clearly have:

$$W^*_{h\ell} > W^*_{\ell\ell}.$$

To summarize results so far, when the father enters the low-career instead of the high-career path, the couple forgoes the additional revenue q. For the father it is thus never optimal to take up a flexible job. Independent of his q he will always enter the high-career path. The final choice therefore concerns the mother's career and is a choice between being a high-career couple or remaining with the social norm as a traditional couple. Formally, we must compare the traditional couples' welfare with the welfare of couples in which both parents enter the high-career path:

$$W^*_{hh} = y + q(1 + \alpha) + \beta v(1) - \gamma_m c_m^{M,t-1} \lesseqgtr W^*_{h\ell} = y + q + v(c^*_{h\ell}) + \beta v(1 - c^*_{h\ell}).$$

As mentioned before, hh couples enjoy a larger utility from (future) consumption but a lower utility from child care than $h\ell$ couples. Whether or not they remain with the norm thus depends on the mothers' foregone labor market opportunities αq.

The marginal couple is the couple for which the father chooses the high-career path while the mother is indifferent between the high- and low-career path, or the couple for which $W^*_{hh} = W^*_{h\ell}$ holds. The marginal mother's "identity" denoted by $\alpha\hat{q}^*$ is thus in the interval $[0, \alpha\overline{q}]$ and depends on the parameters α, β, and γ_m. The following proposition summarizes the main characteristics of the marginal couple $\hat{q}^*$ in the *laissez-faire* steady state equilibrium. Note that the steady state equilibrium requires that the marginal couple lies to the right of the median couple, *i.e.*, $q^M < \hat{q}^*$ because the social norm is binding by Assumption 1. This, in turn, implies that the costs of the norm in equilibrium depend on child care provided by $h\ell$-couples, that is $c_m^{M,t-1} = c^*_{h\ell}$.

Proposition 1 (The marginal couple in the *laissez-faire* steady state) *In the laissez-faire, the marginal couple (that is, the couple where the mother is indifferent between the high- and the low-career path) is defined by the following value of future job market opportunities $\hat{q}^*$:*

$$\hat{q}^* = \frac{1}{\alpha}\left[v(c^*_{h\ell}) + \beta\left[v(1 - c^*_{h\ell}) - v(1)\right] + \gamma_m c^*_{h\ell}\right], \tag{10}$$

where $q^M < \hat{q}^*$ and $c^*_{h\ell}$ is determined by equation (1). The value of future job opportunities for the marginal couple, $\hat{q}^*$:

(i) decreases in the degree of equal opportunities, α;

(ii) decreases in the gains of private care, β;

(iii) increases with the costs for the mother of deviating from the social norm γ_m; and

(iv) increases with child care provided by the median mother, $c^*_{h\ell}$.

In couples with $q \geq \hat{q}^*$, the mother chooses the high-career path, implying $c^*_{hh} = 0$ and $c^*_p = 1$ and in couples with $q < \hat{q}^*$, the mother chooses the low-career path. Observe that here, and in the remainder of the paper, we impose the tie-breaking rule that when a couple is indifferent between the career paths the mother chooses the high-career one.[9] The time spent with their children for traditional couple is given by $c^*_{h\ell}$ and private market care amounts to $c^*_p = 1 - c^*_{h\ell}$.

Obviously, the larger $\hat{q}^*$, the higher the share of traditional couples and the lower the share of female participation in the high-career path. Hence, Proposition 1 states that female participation in the high-career path is negatively affected by the gender wage gap, α, and by child care provided by the median mother in the previous generation, $c^*_{h\ell}$. These two properties are fundamental when we study welfare-improving policies in Section 6. In particular, we show that with a women quota (which imposes a larger share of women in the high-career path) the policy-maker is able to impact the marginal couple via α. The other two policies (a subsidy on child

[9] This is a purely technical assumption which ensures that the optimization problems we consider below are well-behaved (the no-norm solution will emerge for a closed interval of critical q's).

care and parental leave) will instead be aimed at affecting the amount of child care provided by the median mother. Before proceeding with the policy analysis, we further characterize the *laissez-faire* and describe the first-best allocation(s) in our economy.

4.4 Characterization of the *laissez-faire* steady state

Job market outcome is given by the identity of the marginal couple and by the amount of child care provided by traditional couples. The following proposition characterizes the *laissez-faire* steady state.

Proposition 2 (Characterization of the *laissez-faire*) *When the job market suffers from unequal opportunities, $\alpha < 1$, and/or a social norm affecting those mothers who do not provide child care exists, $\gamma_m > 0$, then:*

(i) it is never optimal for the father to take up the low-career path;

(ii) couples where the mother has job opportunities higher or equal to the threshold $\alpha\hat{q}^*$ choose the high-career path for both parents;

(iii) the set of couples where both parents choose the high-career path is non-empty if $\alpha\hat{q}^* \leq \bar{q}$; and

(iv) in high-career couples $c^*_{hh} = 0$, whereas in traditional couples $c^*_{h\ell}$ satisfies equation (1).

Given that $\hat{q}^* > q^M$ (see Proposition 1), there will always be traditional couples in the economy and $\hat{q}^* > 0$. However, it is possible that the set of high-career couples is empty. In the following section, we determine the efficient share of female participation in the high-career path.

5 First-best allocation and inefficiency of *laissez-faire*

In this section, we characterize the first-best solutions in order to describe the inefficiencies created by the social norm in the *laissez-faire*. Recall that not only the cost of the social norm but also the norm itself is endogenous. It disappears if, in the previous generation, the majority of mothers entered the high-career path. Hence, we analyze two types of benchmark cases; the social norm is binding in the steady state; and where it is not binding.

We consider a utilitarian social welfare function which is given by the (unweighted) sum of steady state utilities of all households. Recall that a job market allocation specifies the amount of child care provided by traditional couples and the identity of the marginal couple, which, in turn, determines whether or not the social norm is binding in the steady state. Hence, we have to derive $c_{h\ell}$ and $\hat{q}$ that maximizes the following social welfare function:

$$\begin{aligned}\max_{c_{h\ell},\hat{q}} \quad SW = & \int_0^{\hat{q}} [y+q] f(q) \mathrm{d}q + F(\hat{q}) \left[v(c_{h\ell}) + \beta v(1-c_{h\ell}) \right] \\ & + \int_{\hat{q}}^{\bar{q}} [y + q(1+\alpha)] f(q) \mathrm{d}q + (1-F(\hat{q})) \left[\beta v(1) - \gamma_m c_m^M \right], \end{aligned} \tag{11}$$

where $c_m^M = c_{h\ell}$ if $\hat{q} > q^M$, that is, if the social norm is binding. If, instead $\hat{q} \leq q^M$, the social norm is not binding and $c_m^M = 0$. We denote the solution to the first scenario as $(c_{h\ell}^n, \hat{q}^n)$ and that without an active norm as $(c_{h\ell}^o, \hat{q}^o)$.

Let us first consider the case with a binding social norm. The solution to (11) is then characterized by the following two first order conditions:

$$v'(c_{h\ell}^n) = \beta v'(1-c_{h\ell}^n) + \gamma_m \frac{1-F(\hat{q}^n)}{F(\hat{q}^n)}, \tag{12}$$

$$\hat{q}^n = \frac{1}{\alpha} \left[v(c_{h\ell}^n) + \beta \left[v(1-c_{h\ell}^n) - v(1) \right] + \gamma_m c_{h\ell}^n \right]. \tag{13}$$

Since here the social norm is active in the steady state, we must have a higher share of traditional couples in the population so that $q^M < \hat{q}^n$.

Comparing the *laissez-faire* (Equation 1) with the first-best level of child care (Equation 12) shows that the marginal costs of informal care provision (the RHS of Equations 1 and 12) are higher in the first-best than in the *laissez-faire*. This implies that traditional couples provide less child care in the first-best than in the *laissez-faire*: $c_{h\ell}^n < c_{h\ell}^*$. Intuitively, child care provided by traditional couples imposes a negative externality, measured by the term $\gamma_m(1-F(\hat{q}^n))/F(\hat{q}^n)$, on all high-career couples. In the *laissez-faire*, however, traditional couples do not take into account that their informal care provision increases the costs of norm deviations by high-career mothers.

This difference in child care also has a bearing on the marginal couple. Equation (10) coincides, for a given $c_{h\ell}$, with the condition determining the marginal couple in the first-best. However, since:

$$c_{h\ell}^* = \arg\max\{v(c_{h\ell}) + \beta v(1-c_{h\ell})\}, \tag{14}$$

and v is concave, we necessarily have that the RHS of (13) is smaller than the RHS of (10) implying $\hat{q}^n < \hat{q}^*$.

When, on the other hand, the social norm is not active in the first-best steady state, then the solution to (11) is characterized by the following two first order conditions:

$$v'(c_{h\ell}^o) = \beta v'(1-c_{h\ell}^o), \tag{15}$$

$$\hat{q}^o = \frac{1}{\alpha} \left[v(c_{h\ell}^o) + \beta \left[v(1-c_{h\ell}^o) - v(1) \right] \right]. \tag{16}$$

Since here the social norm is non-binding, we must have $\hat{q}^o \leq q^M$ implying $F(\hat{q}^o) \leq F(q^M)$ so that a majority of couples indeed take up the high-career path.

Comparing $(c^o_{h\ell}, \hat{q}^o)$ with the *laissez-faire*, we see that without an active social norm in first-best, the marginal costs (and benefits) of informal child care coincide with those in *laissez-faire* (Equation 1). We thus have $c^n_{h\ell} < c^o_{h\ell} = c^*_{h\ell}$. This, however, does not imply that the marginal couples also coincide. Since in *laissez-faire* the norm is active, couples take, when choosing their career path, the costs of deviations from the norm into account. In first-best these costs are, however, not present so that the RHS of (16) is smaller than the RHS of (10), implying $\hat{q}^o < \hat{q}^*$.

The two scenarios, $(c^n_{h\ell}, \hat{q}^n)$ and $(c^o_{h\ell}, \hat{q}^o)$ describe interior solutions in the sense that $\partial SW/\partial c_{h\ell} = \partial SW/\partial \hat{q} = 0$ for a given level of c^M_m. Specifically, we have $c^M_m = c^n_{h\ell}$ in the binding norm case and $c^M_m = 0$ in the non-binding norm case. This implies that couple $\hat{q}^n$ is effectively indifferent between the two career paths when $c^M_m = c^n_{h\ell}$, while couple $\hat{q}^o$ is indifferent for $c^M_m = 0$.

However, we cannot rule out the case where the distribution of q's is such that $q^M < \hat{q}^o$ at $c^o_{h\ell}$ and $c^M_m = 0$. In other words, maximizing (11) with respect to $\hat{q}$ for $c^M_m = 0$ may yield a solution which is larger than q^M. This, in turn, is inconsistent with $c^M_m = 0$. To have consistency, we then have to consider a constrained solution where we impose $\hat{q} = q^M$.[10] This amounts to assigning all couples with $q \in [q^M, \hat{q}^o)$ to the high-career path so that the norm is indeed not binding in steady state.[11] Such a scenario is optimal when it yields a higher welfare than that achieved with a binding norm, that is with $(c^n_{h\ell}, \hat{q}^n)$. Observe that if $\hat{q}^o$ is only slightly larger than q^M forcing some couples to take the high-career path and thereby removing the social norm and its costs might dominate an equilibrium with a binding norm.[12] It can be easily verified that such a solution does not affect the optimal level of $c_{h\ell}$ which is given by $c^o_{h\ell}$ in the constrained no-norm solution as in the unconstrained no-norm solution.[13]

We summarize our results in the following proposition.

Proposition 3 (The efficient steady state allocation) *Depending on the parameters of the*

[10] Formally, this can be achieved by stating the optimization for $c^M_m = 0$ as a Kuhn-Tucker problem imposing the constraint that $q^M \geq \hat{q}$ associated with a multiplier $\lambda \geq 0$, so that the FOC of the Kuhn-Tucker expression with respect to $\hat{q}$ is given by $\partial SW/\partial \hat{q} = \lambda$. This yields the unconstrained solution with $\hat{q} = \hat{q}^o$ when $\lambda = 0$, while the constrained solution with $\hat{q} = q^M$ (and $\partial SW/\partial \hat{q} > 0$) obtains when $\lambda > 0$.

[11] Recall that couple $\hat{q}^o$ is by definition indifferent between the two career paths (given $c^M_m = 0$). Consequently, couples with $q \in [q^M, \hat{q}^o)$ would prefer the low-career path if they were free to choose. However, in a first-best world they can be assigned to a different path.

[12] The counterpart to this case with a constrained binding norm is when the maximization of (11) yields $q^M > \hat{q}^n$ for $c^M_m = c^n_{h\ell} > 0$ which is not possible. It would require setting $\hat{q} > q^M$, forcing some couples into their less-preferred career path in order to create a binding norm and thus a negative externality. This solution is clearly not optimal; it is necessarily dominated by the constrained no-norm allocation.

[13] Returning to the Kuhn-Tucker formulation presented in footnote 10, it is clear that the FOC of the Kuhn-Tucker expression with respect to $c_{h\ell}$ does not depend on λ.

utility function and on the distribution of q, the efficient steady state allocation $(c_{h\ell}, \hat{q})$ *is given by one of the following solutions of the social welfare program expressed in (11):*

(i) the unconstrained no-norm first-best, $(c^o_{h\ell}, \hat{q}^o)$*, defined by Equations (15) and (16) with* $\hat{q}^o < q^M$*; or*

(ii) the constrained no-norm first-best, $(c^o_{h\ell}, q^M)$*, defined by Equation (15) and with* $\hat{q}^o = q^M$*; or*

(iii) the binding norm first-best, $(c^n_{h\ell}, \hat{q}^n)$*, defined by Equations (12) and (13) with* $q^M < \hat{q}^n$*.*

Comparing the *laissez-faire* steady state described in Proposition 1 with the efficient allocations described in Proposition 3, yields the following proposition.

Proposition 4 (Welfare analysis of the *laissez-faire* with a binding norm) *Comparing the laissez-faire equilibrium with the first-best allocations described in Proposition 3:*

(i) when the norm is binding in first-best, informal child care in laissez-faire, $c^*_{h\ell}$*, is inefficiently high because of the negative externality it exerts on high-career mothers through the social norm. When instead the social norm is not binding in first-best (in both the constrained and unconstrained case), then neglecting the externality is efficient and the amount of informal child care is efficiently chosen in laissez-faire; and*

(ii) female participation in the high-career path is always inefficiently low in laissez-faire.

Let us first consider point *(i)* in the previous Proposition concerning child care provision. The fact that the negative externality is always ignored in *laissez-faire* translates into excessive informal child care provision by traditional couples in *laissez-faire* $(c^n_{h\ell} < c^*_{h\ell})$ when the norm is also binding in first-best. When, instead, the norm is not binding in first-best informal child care is efficient $(c^o_{h\ell} = c^*_{h\ell})$ because in this case no negative externality exists. This is true both for the unconstrained and the constrained case.

We now consider point *(ii)* in Proposition 4 concerning the share of women entering the high-career path. In *laissez-faire* female participation in the high-career path is always inefficiently low, both when the social norm is binding in first-best $\left(q^M < \hat{q}^n\right)$ and when it is not $\left(\hat{q}^o \leq q^M\right)$. In either case, the inefficiency is caused by the social norm, but the mechanism through which it is affecting the *laissez-faire* differs across the two scenarios. When the norm is not binding in first-best, then the social norm is taken into account by high-career mothers in *laissez-faire*, while it is absent in first-best and, as a consequence, $\hat{q}^o < \hat{q}^*$. When, instead, the social norm is binding in first-best, then informal child care provision by traditional mothers in *laissez-faire* is too high because they ignore the negative externality. As a consequence, the high-career path becomes less attractive, implying $\hat{q}^n < \hat{q}^*$.

The following lemma established in Appendix A.1 describes how the various parameters of our model affect the efficient solution. In particular, our comparative statics illustrate when the (unconstrained or constrained) first-best with a non-binding social norm is likely to ensure the highest social welfare.

Lemma 2 (No-norm vs binding norm in the steady state) *Ceteris paribus, a no-norm steady state is more likely to prevail than a binding norm steady state the larger (i) q^M, (ii) α, (iii) β, or (iv) γ_m is.*

When *ceteris paribus* q^M is large, then $\hat{q}^o \leq q^M$ will hold for a larger set of the other parameters (namely α and β) so that the non-binding norm solution becomes more likely. Additionally, the binding norm solution becomes more costly, and thus the no-norm solution becomes more appealing, when more mothers tend to choose the high-career path. This is also the case when α or β are large (see Proposition 1). Finally, social welfare decreases with a binding norm when the costs of the norm γ_m increase, which explains point (*iv*) in the above proposition.

Our model thus suggests that in economies with a low gender wage gap (α is large), a high cost of the norm (γ_m is large) and a high-quality child care system (β is large), the prevailing first-best tends to be a no-norm steady state; all these factors concur to increase social welfare when the norm disappears. The same factors result in more career women in *laissez-faire*. On the contrary, in economies where the gender wage gap is pronounced (α is small) and formal child care is relatively less structured (β is small), the social norm is not particularly costly and the first-best is more likely to imply a binding norm. At the same time, the share of career mothers in such an environment will be relatively low in *laissez-faire*.

The next section shows that the nature of the first-best affects the effectiveness of the considered child care and gender policies in a rather striking way. Generally speaking, the nature of the first-best determines the design of second-best policies. Consequently, Lemma 2 and the subsequent discussion are important in order to assess the practical policy implications of our model. In the Conclusion, we illustrate these predictions by showing how existing empirical results and stylized facts can be used to determine which type of first-best can be expected to be relevant in specific countries or types of countries.

So far, we have imposed Assumption 1 and have studied the inefficiencies characterizing the *laissez-faire* when the social norm is binding in period t. For the sake of completeness, suppose instead that the social norm is not binding in t, then:

Lemma 3 (Welfare analysis of *laissez-faire* when the norm is not binding) *If the norm is not binding in the laissez-faire steady state (that is, Assumption 1 does not hold), then $c^o_{h\ell} = c^*_{h\ell}$*

and $\hat{q}^* = \hat{q}^o$, so that the laissez-faire coincides with the first-best steady state.

6 Welfare improving policies

We now analyze how the government can improve efficiency by focusing on policy design. Specifically, we study the effects on mothers' career choices and child care provision of three policies currently used in the real world, namely, (i) uniform child care subsidies, (ii) women quotas and (iii) parental leave.

In analyzing these policies, we must differentiate between policy implementation when the target is the first-best without an active social norm, and when the policy target is instead the first-best allocation with a binding norm. When the social norm is not binding in first-best, the appropriate policy may be transitory. In this instance, the policy has to decrease the marginal couple $\hat{q}^*$ to the point where $\hat{q}^* = q^M$ for a single period. Once this objective is reached, the policy no longer has reason to be implemented because Lemma 3 holds in the subsequent period; the social norm disappears and efficiency is restored, that is, $\hat{q}^* = \hat{q}^o$ and $c^*_{h\ell} = c^o_{h\ell}$. In this case, we derive welfare of the transition generation. When, on the other hand, the social norm is binding in first-best the policy must be implemented permanently, and we concentrate on welfare in the new steady state.

6.1 Uniform subsidy on formal child care

We first consider a uniform subsidy s on market child care reducing its price to $p - s$.[14] Assume that the subsidy is financed by a uniform lump-sum tax T levied on all couples. The consumption level for high-career couples is then given by $x^U_{hh} = y + q(1+\alpha) + s - T$, while it is $x^U_{h\ell} = y + q + s(1 - c^U_{h\ell}) - T$ for low-career couples. With a subsidy on private care optimal informal child care, denoted by $c^U_{h\ell}$, by type-$h\ell$ couples is implicitly determined by:

$$v'(c^U_{h\ell}) = \beta v'(1 - c^U_{h\ell}) + s. \tag{17}$$

A subsidy on market care increases the marginal costs of informal care (RHS of Equation 17) and informal care will be lower than in *laissez-faire*: $c^U_{h\ell} < c^*_{h\ell}$.

6.1.1 Social norm is non-binding in the efficient steady state

Consider first the unconstrained case. As mentioned before, in order to implement the first-best steady state the social planner must determine s which makes q^M the marginal couple. Hence, s solves:

$$q^M = \frac{1}{\alpha}\left[v(c^U_{h\ell}) + \beta\left[v(1 - c^U_{h\ell}) - v(1)\right] + \gamma_m c^{M,t-1}_{h\ell} - s c^U_{h\ell}\right]. \tag{18}$$

[14] The case where $s = p$ can be interpreted as free (possibly public) provision of child care.

Budget balance requires:

$$T = s\left[1 - F(q^M)c_{h\ell}^U\right]. \tag{19}$$

Condition (18) ensures that given the costs of the social norm $\gamma_m c_{h\ell}^{M,t-1} = \gamma_m c_{h\ell}^*$, the marginal couple goes down to q^M. Consequently, in the next period $c_m^{M,t} = 0$, and we are in the first-best steady state described in Lemma 3, thus no further intervention is necessary.

Note, however, that child care provision $c_{h\ell}^U$ chosen in the transitory period is inefficiently low; with a non-binding norm in first-best, the *laissez-faire* level of informal child care (that is without a subsidy) is efficient because the negative externality is optimally ignored in that case.

It can be easily checked that welfare within the transition period is given by:

$$SW^U = \alpha \mathrm{E}_{hh}[q] + \mathrm{E}[q] + y + F(q^M)[\beta v(1) + v(c_{h\ell}^U) + \beta v(1 - c_{h\ell}^U) - \gamma_m c_{h\ell}^*], \tag{20}$$

where we have substituted $\mathrm{E}[q]$ and $\mathrm{E}_{hh}[q]$ respectively defined as:[15]

$$\mathrm{E}[q] \equiv \int_0^{\bar{q}} qf(q)\mathrm{d}q \quad \text{and} \quad \mathrm{E}_{hh}[q] \equiv \int_{q^M}^{\bar{q}} qf(q)\mathrm{d}q.$$

When the optimal solution is given by the constrained no-norm solution, the policy described continues to ensure $\hat{q} = q^M$ so that the norm disappears. But in this case, the policy needs to be implemented on a permanent basis. Consequently, with uniform subsidies, the constrained *first-best* cannot be achieved, as child care will remain at an inefficiently low level in the new steady state. In other words, removing the social norm now involves a permanent cost. As an alternative we must consider the policy applied in the binding norm case studied in the next subsection, which consists of mitigating the norm rather than eliminating it. Of course, this policy does not implement the first-best best either, but when the costs of eradicating the norm are sufficiently large, it may be the best policy. The second-best optimum is determined by comparing the levels of welfare achieved in each of the alternative policies.

6.1.2 Social norm is binding in the efficient steady state

At the steady state with a binding social norm, the social planner anticipates that $c_m^M = c_{h\ell}^M = c_{h\ell}^U$. Thus, the social planner maximizes the following welfare function:

$$\begin{aligned}\max_{s,T} \quad SW^U = &\int_0^{\hat{q}^U} [y + q + s(1 - c_{h\ell}^U) - T]f(q)\mathrm{d}q + F(\hat{q}^U)[v(c_{h\ell}^U) + \beta v(1 - c_{h\ell}^U)] \\ &+ \int_{\hat{q}^U}^{\bar{q}} [y + q(1+\alpha) + s - T]f(q)\mathrm{d}q + \left(1 - F(\hat{q}^U)\right)\left[\beta v(1) - \gamma_m c_{h\ell}^U\right],\end{aligned} \tag{21}$$

[15] We show in Appendix A.2 that a uniform subsidy *on full-time care only* can achieve the same steady state but yields a higher level of transition utility.

subject to the same budget constraint as given in (19). Optimal child care continues to be given by (17) and $\hat{q}^U$ is defined by:

$$\hat{q}^U = \frac{1}{\alpha}\left[v(c_{h\ell}^U) + \beta\left[v(1-c_{h\ell}^U) - v(1)\right] + (\gamma_m - s)\, c_{h\ell}^U\right]. \tag{22}$$

Substituting (19) into the welfare function, the first-order condition of (21) with respect to s can be written as:

$$s(\hat{q}^U) = \gamma_m \frac{1 - F(\hat{q}^U)}{F(\hat{q}^U) + f(\hat{q}^U) c_{h\ell}^U \frac{\partial \hat{q}^U/\partial s}{\partial c_{h\ell}^U/\partial s}}. \tag{23}$$

Since $\partial \hat{q}^U/\partial s = -c_{h\ell}^U/\alpha < 0$ and $\partial c_{h\ell}^U/\partial s < 0$ Equation (23) implies:

$$s(\hat{q}^U) < s^P(\hat{q}^U) \equiv \gamma_m \frac{1 - F(\hat{q}^U)}{F(\hat{q}^U)}. \tag{24}$$

In words, the optimal s is smaller than the Pigouvian subsidy s^P that restores efficiency of informal child care for a given level of $\hat{q}^U$. The Pigouvian tax rule, $s^P(\hat{q})$, is obtained by equating (12) and (17), and it depends on $\hat{q}$ since the costs of the externality depend on the number of high-career couples. From (24) we see that, given $\hat{q}^U$, the subsidy on market care is set at a lower level than the Pigouvian subsidy. This is because a uniform subsidy benefits high-career couples more than traditional ones. For high-career couples, market care is given and equal to one so that the subsidy represents a windfall gain. Consequently, the policy will distort $\hat{q}$ downwards which was otherwise optimally chosen in *laissez-faire* for any given level of the traditional couples' child care. Observe that this comparison is based on tax *rules* (that is, given q^U), the first- and second-best *levels* of the subsidy, $s(\hat{q}^U)$ and $s^P(\hat{q}^n)$, cannot be compared since $\hat{q}^U$ and $\hat{q}^n$ differ.

Proposition 5 (Uniform subsidy on formal child care) *Consider a uniform subsidy on child care financed by a uniform lump-sum tax:*

(i) when the efficient steady state is given by the unconstrained no-norm solution, it can be achieved by a uniform subsidy which is implemented for one period only and is set to make the marginal couple coincide with the median one. In the transition period in which the subsidy is imposed, informal child care is inefficiently low. In the subsequent periods, efficiency is fully restored;

(ii) when the social norm is binding in the efficient steady state, the uniform subsidy is implemented indefinitely. It mitigates the norm costs by reducing the median couple's informal child care provision. Efficiency is only partially restored: informal child care is lower than in the laissez-faire but (given $\hat{q}^U$) it is larger than efficient; and

(iii) when the efficient steady state is given by the constrained no-norm solution, the optimal policy is either the one described in (i) but implemented on a permanent basis, or the one explained in (ii), whichever of these gives the highest level of welfare.

6.2 Women quotas

A women quota (WQ) requires that the number of women in the high-career path, $1 - F(\hat{q}^*)$, in the total number of high-career employees, $1 + 1 - F(\hat{q}^*)$, is not lower than r, that is:

$$r \leq \frac{1 - F(\hat{q}^*)}{2 - F(\hat{q}^*)}. \tag{25}$$

We argue that employers who are confronted with a WQ reduce the gender wage gap to make it more attractive for women to enter the high-career path. Specifically, they increase the premium to their female high-career employees by s_m financed by a reduction in the salary of their high-career males by t_f so that their profits remain unchanged.[16] Hence, implementing a WQ in practice translates into imposing firms to reduce the gender wage gap.

6.2.1 Social norm is non-binding in the efficient steady state

Again, we start with the case where the unconstrained solution is such that the social norm is not binding in the first-best steady state. In that case, a transitory policy (implemented during a single period) is sufficient and it must be designed to make q^M the marginal couple. That way the norm disappears in subsequent periods and Lemma 3 applies.

Evaluating expression (25) at $\hat{q}^* = q^M$ shows that this requires a WQ of $r = 1/3 = (1 - 1/2)/(2 - 1/2)$. In words, at least 1/3 of workers in the high-career path must be women. To achieve this, s_m and t_f have to be chosen so that the median couple is indifferent between the high- and low-career for the female spouse, that is:

$$\begin{aligned} &y + q^M[1 - t_f + \alpha(1 + s_m)] + \beta v(1) - \gamma_m c_{h\ell}^{M,t-1} = \\ &y + q^M[1 - t_f] + v(c_{h\ell}^*) + \beta v(1 - c_{h\ell}^*), \end{aligned} \tag{26}$$

where $c_{h\ell}^{M,t-1} = c_{h\ell}^*$ and $c_{h\ell}^*$ is implicitly determined by Equation (1). Profit neutrality for the firms require:

$$t_f \mathrm{E}[q] = s_m \alpha \mathrm{E}_{hh}[q] \quad \Rightarrow \quad s_m \alpha = \frac{\mathrm{E}[q]}{\mathrm{E}_{hh}[q]} t_f \equiv A t_f, \tag{27}$$

[16] This modeling strategy of WQ appears the most coherent with our setting where firms have no active role, and it is also justified by the literature mentioned in Section 2. In particular, Matsa and Miller (2013) and Bertrand *et al.* (2014) show that, after the implementation of a WQ in Norway, the gender-wage gap decreased for those women on boards.

where $A \lesseqgtr 1$, depending on the distribution of q.[17] Observe that this policy reduces the gender wage gap, and when s_m and t_f are sufficiently large it could even be reversed with $q_f = q(1-t_f) < q_m = \alpha q(1+s_m)$. The policy remains effective even in that case as long as it does not reverse the ranking of career choices within couples, that is, when the norm cost for fathers is sufficiently large to prevent them from choosing the low-career path.

Welfare within the transition period when WQs are in place is given by:

$$SW^Q = \alpha \mathrm{E}_{hh}[q] + \mathrm{E}[q] + y + F(q^M)[\beta v(1) + v(c^*_{h\ell}) + \beta v(1 - c^*_{h\ell}) - \gamma_m c^*_{h\ell}]. \qquad (28)$$

By comparing (20) and (28) we observe that $SW^Q > SW^U$. Unlike the uniform subsidy, which distorts $c_{h\ell}$, the WQ policy achieves $\hat{q}^* = q^M$ together with an efficient child care provision, that is $c^*_{h\ell} = c^o_{h\ell}$. Consequently, welfare in the transition generation is larger under a WQ than with a uniform subsidy on market child care. Since both policies yield the same steady state (the efficient first-best equilibrium) this pleads in favor of a WQ.

When the first-best is given by the constrained no-norm solution, the policy just described remains effective, but it must now be permanent; if it were abandoned, the economy would return to a steady state with a binding norm. In this case the WQ dominates the uniform subsidy policy not just in the transition period but also in steady state.

6.2.2 Social norm is binding in the efficient steady state

If the social norm is binding in the efficient steady state, then $c^M_m = c^M_{h\ell} = c^*_{h\ell}$ and the government chooses the WQ (or the transfers t_f and s_m necessary to reduce the gender wage gap) so as to maximize the following welfare function:

$$\begin{aligned}\max_{t_f, s_m, \hat{q}^Q} \quad SW^Q = & \int_0^{\hat{q}^Q} [y + q[1 - t_f] + v(c^*_{h\ell}) + \beta v(1 - c^*_{h\ell})] f(q) \mathrm{d}q \\ & + \int_{\hat{q}^Q}^{\bar{q}} [y + q[1 - t_f + \alpha(1 + s_m)] + \beta v(1) - \gamma_m c^*_m] f(q) \mathrm{d}q, \end{aligned} \qquad (29)$$

subject to the profit neutrality constraint given in (27). Optimal informal child care continues to be given by Equation (1) while the marginal couple $\hat{q}^Q$ is implicitly determined by (26) with $\hat{q}^Q$ instead of q^M, that is

$$\hat{q}^Q = \frac{1}{\alpha(1 + s_m)} \left[v(c^*_{h\ell}) + \beta \left[v(1 - c^*_{h\ell}) - v(1) \right] + \gamma_m c^*_{h\ell} \right]. \qquad (30)$$

[17] With a uniform distribution, for instance, we have $E[q] = q^M = \bar{q}/2$ so that:

$$\mathrm{E}_{hh}[q] = \frac{1}{\bar{q}} \left(\frac{\bar{q}^2}{2} - \frac{(q^M)^2}{2} \right) = \frac{\bar{q} - q^M}{\bar{q}} \frac{(\bar{q} + q^M)}{2} = \frac{(\bar{q} + q^M)}{4} = \frac{2q^M + q^M}{4} = \frac{3}{4} q^M,$$

implying $A = 4/3$.

Observe that (30) defines $\hat{q}^Q$ as a decreasing function of s_m. As s_m increases, the effective level of α increases and, the participation of women in the high-career path rises; see also Proposition 1 *(i).* However, recall that when the social norm is binding in the efficient steady state, the marginal couple was (for any given level of informal child care) optimally chosen in *laissez-faire.* Hence, the policy is not effective in improving efficiency.

To see this formally, differentiate the Lagrangian expression of the above optimization problem, denoted by $\mathcal{L}^Q$, with respect to t_f:

$$\frac{\partial \mathcal{L}^Q}{\partial t_f} = -\mathrm{E}[q] + \mu \mathrm{E}[q] = 0.$$

Thus, μ (the Lagrange multiplier of Equation (27)) is equal to one. Because all fathers are in a high-career path, t_f is effectively a lump sum tax. Consequently, the marginal social benefit is equal to the marginal social cost; there is no deadweight loss.

The derivative of $\mathcal{L}^Q$ with respect to s_m is given by:

$$\frac{\partial \mathcal{L}^Q}{\partial s_m} = \alpha \mathrm{E}_{hh}[q] - \mu \alpha \mathrm{E}_{hh}[q] + \mu s_m \alpha \hat{q}^Q f(\hat{q}^Q) \frac{\partial \hat{q}^Q}{\partial s_m} \leq 0. \tag{31}$$

Since $\mu = 1$ and $\partial \hat{q}^Q / \partial s_m < 0$, the above equation is negative for $s_m > 0$. Consequently, the optimal policy implies $s_m = 0$, and with (27), also $t_f = 0$. In other words, no WQ should be imposed. This result may seem surprising, given that setting a WQ translates into imposing a reduction of the gender wage gap. Intuitively, the policy is not welfare improving because s_m is not a lump-sum subsidy. Equation (31) simply rediscovers a classical result in tax theory, namely, that a distortionary subsidy financed by a lump-sum tax reduces welfare. The third term on the RHS is effectively the deadweight loss of the subsidy. It arises because an increase in s_m reduces $\hat{q}^Q$ (which was otherwise, without the WQ, efficient) and thus increases the number of high-career couples who benefit from the subsidy. This argument shows that a WQ is costly, though it could still be desirable if it also had benefits. Surprisingly, when the norm is binding in steady state, the WQ has no benefits. In order to be beneficial, it would have to reduce the costs of the norm by decreasing traditional couples' informal child care provision. This was achieved by the uniform subsidy in the previous subsection, but the WQ (or t_f and s_m) has no impact on $c^*_{h\ell}$. The WQ affects the marginal couple but this couples is already efficient in *laissez-faire* (for a given $c_{h\ell}$).

Proposition 6 (A women quota) *Consider a WQ requiring a minimum share of women in the high-career path and being implemented by a premium s_m to female high-career employees, that is financed by a reduction t_f in the salary of high-career males so that profits are unchanged, then:*

(i) when the social norm is non-binding in the efficient steady state, a WQ set to make the marginal couple coincide with the median one implements the efficient solution. In the

unconstrained case a transitional (one period) policy is sufficient, while in the constrained case the policy must be permanent. In both situations the efficient steady state is attained after a single transition period. Informal child care by traditional couples is not affected by the policy. Consequently, a WQ policy dominates the uniform subsidy. In the unconstrained case it yields a larger welfare in the transition period but the same in steady state. In the constrained case it also yields a larger steady state welfare; and

(ii) when the social norm is binding in the efficient steady state, the policy is ineffective and reduces welfare.

6.3 Parental leave

Parental leave (PL) entitles a parent (mother or father) to receive the salary y during a given period while taking a break from work to care for the (newborn) child. In the case of high-career workers, PL implies that they obtain the same flexibility as low-career workers and are free to decide how to split their time between working and child care activities. However, PL comes at a cost in terms of future earning opportunities. Being on leave for one period implies lower opportunities for future promotions; an employer may perceive a worker's request for leave as a signal of a lower level of commitment to the job, or a worker may miss the opportunity to increase their professional knowledge by not taking part in projects relevant to the firm. We denote qk (or αqk for career mothers) with $k \in (0, 1)$ the share of future earning opportunities that are maintained by workers in the high-career path when they request PL. We assume that PL is financed by a lump sum tax T imposed on all couples.

Differing from the policies already presented, PL is an option, and thus couples must decide whether or not to benefit from it and which parent will opt in to PL. So, in analyzing welfare implications of PL we must return to the second stage of a couple'a decision and verify under which conditions they are willing to take PL. For the sake of presentation, we consider the following timing of choices: first, parents make their career choice; then, they decide about opting in or out of PL; and finally, they choose the amount of informal child care provision.

When the hh couple opts in to PL, they choose child care to maximize:

$$\max_{c_m} \quad W_{hh}^L = 2y + q(1 + \alpha k) - T - p(1 - c_m) + v(c_m) + \beta v(1 - c_m) - \gamma_m(\max\{0; c_m^{M,t-1} - c_m\}).$$

Note that PL does not affect the ranking of incomes within a couple. Consequently, it will still be the mother (if any parent) who will opt in PL. Recalling that $p = y$, the FOC with respect to c_m is given by:

$$c_{hh}^L \equiv c_m^L : \quad y + v'(c_{hh}^L) - \beta v'(1 - c_{hh}^L) = 0. \tag{32}$$

With PL hh couples are able to enjoy the larger benefit of informal child care. Since informal care does not imply any opportunity costs in terms of lower salary y, we have $c_{hh}^L > c_m^{M,t-1} = c_{h\ell}^*$, so that the costs of deviating from the social norm will disappear.

A type-hh couple will opt in PL if it is welfare improving to do so, that is if:

$$2y + q(1+\alpha k) - T - p(1-c_{hh}^L) + v(c_{hh}^L) + \beta v(1-c_{hh}^L) > y + q(1+\alpha) - T + \beta v(1) - \gamma_m c_{h\ell}^*, \quad (33)$$

where the RHS denotes welfare of hh couples when opting out of PL. So, there exists a critical value of future job market opportunities defined by

$$\tilde{q}^L = \frac{1}{\alpha(1-k)} \left[y c_{hh}^L + v(c_{hh}^L) + \beta[v(1-c_{hh}^L) - v(1)] + \gamma_m c_{h\ell}^* \right] \quad (34)$$

below which the hh couple accepts PL. Couples with $q \geq \tilde{q}^L$ will instead opt out of PL. For them the opportunity costs of PL given by $(1-k)\alpha q$ are too high.

We now consider type-$h\ell$ couples. If they take PL, their optimal child care maximizes:

$$\max_{c_m} \quad W_{h\ell}^L = 2y + q - T - p(1-c_m) + v(c_m) + \beta v(1-c_m).$$

The FOC is again given by Equation (32) so that $c_{h\ell}^L = c_{hh}^L > c_{h\ell}^*$. Notice that traditional couples will always opt for PL; for them the PL option comes at no cost, rather the contrary is true. As the mother continues to receive her whole salary, informal care provision does not imply any opportunity cost in terms of lower y (see Appendix A.3 for a formal proof).

Next, we analyze the career choice of each couple. We must consider two scenarios. First, hh couples opt in to PL and, second they opt out of PL. First, consider an hh couple with $q < \tilde{q}^L$ (that is, a couple who opts in to PL if they took up the high-career path). Such a couple initially enters the high-career path if $W_{hh}^L > W_{h\ell}^L$. Recalling that $c_{h\ell}^L = c_{hh}^L$ this inequality is always true so that all couples with $q < \tilde{q}^L$ will enter the high-career path and take up PL. Let us confirm that all couples with $q \geq \tilde{q}^L$ will enter the high-career path but will not accept PL. For this to be true, it must be that:

$$y + q(1+\alpha) - T + \beta v(1) - \gamma_m c_{h\ell}^* \geq 2y + q - T - p(1-c_{h\ell}^L) + v(c_{h\ell}^L) + \beta v(1-c_{h\ell}^L), \quad (35)$$

where the LHS is welfare of hh couples opting out of PL, and the RHS is welfare of $h\ell$ couples opting in PL. Notice that if (35) holds for $q = \tilde{q}^L$, then it necessarily holds for all $q > \tilde{q}^L$. Substituting $\tilde{q}^L$ defined by (34) for q, inequality (35) reduces to:

$$\gamma_m c_{h\ell}^* \geq \beta v(1) - [y c_{h\ell}^L + v(c_{h\ell}^L) + \beta v(1-c_{h\ell}^L)],$$

which always holds since the RHS is negative while the LHS is positive. The following lemma summarizes these results and shows that $\tilde{q}^L$ is always larger than the median level q^M.

Lemma 4 (Parental leave) *When PL is an option:*

(i) all couples decide to enter the high-career path;

(ii) couples with $q < \tilde{q}^L$ will opt in PL while couples with $q \geq \tilde{q}^L$ will opt out from PL, where $\tilde{q}^L$ is defined in (34); and

(iii) the share of couples where both parents work full time is lower than in laissez-faire: $q^M < \hat{q}^* < \tilde{q}^L$.

Parts *(i)* and *(ii)* directly result from the previous discussion. The proof of part *(iii)* can be found in Appendix A.3. Note that the PL policy also makes the high-career path valuable to women with low future labor market opportunities, so that full female participation in the high-career path is obtained.

We are now in a position to study the effectiveness of the PL policy. Strictly speaking, the first-best allocations described in Section 5 are not the appropriate benchmark here. PL allows couples in the high-career path to be flexible and to provide some child care whereas this option does not exist in our efficient steady states. While keeping this in mind, for the sake of symmetry between sections, we will nevertheless continue to refer to the earlier benchmarks in order to present our results.[18]

From Lemma 4 *(ii)* we know that $\tilde{q}^L > \hat{q}^* > q^M$. Consequently, the policy cannot be used to achieve a steady state with $c_m^M = 0$, where the norm is not binding. In other words, PL is not effective as a transitory policy to achieve a steady state where the norm is not binding, nor as a permanent policy to eliminate the norm in the constrained case. Since $\tilde{q}^L > q^M$, the norm spills over to the next period and deviations from the norm become even more costly since the PL induces a higher informal child care provision.

To asses the effectiveness of PL as a second-best policy, we compare the outcome produced by the PL in steady state with the *laissez-faire*. Here we observe a benefit and a cost of the policy. The former is the benefit from future earning opportunities $\alpha k \int_0^{\hat{q}^*} q f(q) \mathrm{d}q$ accruing to couples who, under *laissez-faire*, were choosing the low-career path. The costs are the additional costs of the social norm. Indeed, one period after the policy is implemented, the median couple is choosing the amount of care $c_{hh}^L > c_{h\ell}^*$ and thus couples opting out of PL (that is, couples with $q \in [\tilde{q}^L, \bar{q}]$), are paying the additional costs of the social norm $\gamma_m \left[1 - F\left(\tilde{q}^L\right)\right] (c_{hh}^L - c_{h\ell}^*)$. Consequently, PL is welfare improving if the benefit from future earning opportunities accruing to new couples entering the high-career path (those with $q < \hat{q}^*$) more than compensates for the additional costs of the social norm affecting hh couples opting out of PL. Formally, if:

$$\alpha k \int_0^{\hat{q}^*} q f(q) \mathrm{d}q - \gamma_m \left[1 - F\left(\tilde{q}^L\right)\right] (c_{hh}^L - c_{h\ell}^*) > 0. \tag{36}$$

[18] In other words, we continue to use the term efficient steady state for the solution presented in Section 5.

Proposition 7 (Parental leave) *Consider a PL financed by a lump sum tax T imposed on all couples which entitles one of the parents to receive the salary y while taking care of the children. With PL, high-career workers are free to provide child care, but they lose the fraction k of their future job opportunities. With such a policy, all couples enter the high-career path, however, informal child care is inefficiently high. Moreover:*

(i) the policy cannot be used to achieve a steady-state with a non-binding norm; and

(ii) the policy is welfare improving if condition (36) is satisfied. In words, the benefits from future earning opportunities accruing to new couples entering the high-career path must outweigh the additional costs of the social norm affecting couples who do not take PL.

7 Conclusion

This paper has presented a simple model to explain observed gender patterns of labor market and child care decisions through (endogenously determined) social norms. It reveals how these norms interact with and are reinforced by an exogenous gender wage gap. Couples cooperatively decide on both of the spouses' career paths and on child care arrangements. The low-career path offers the flexibility to provide child care, while the high-career path requires full-time commitment but also generates additional (future) earning possibilities. The latter differs across couples.

Career and child care choices are affected by a social norm which is determined by the median couple's child care decisions of the preceding generation. In equilibrium, two types of couples prevail: first, the "traditional couple", where the mother chooses the low-career path and provides some child care while the father opts for the high-career path; second, the couple where both parents take up the high-career path, work full-time and must rely entirely on market child care.

We have concentrated on the steady state and have characterized the *laissez-faire* solution when the norm is binding, that is, when the median couple is traditional. Compared to the first-best, the share of traditional couples is always too large. When the norm is binding in the first-best, the informal child care provision of traditional couples imposes a negative externality (via the norm cost) on high-career couples, and thus it will be too extensive. When, on the other hand, the efficient steady state involves a non-binding norm, informal child care coincides with its first-best level.

The effectiveness of the considered second-best policy depends on the nature of the first-best steady state. A linear subsidy on market child care is always welfare-improving, albeit to a differing degree depending on the efficient steady state. When this is of the unconstrained no-norm type, a transitional (one period) policy implements the efficient steady state, otherwise, we have a second-best solution since the externality will only partly be mitigated.

Women quotas are effective in achieving a first-best no-norm steady state. In the unconstrained case, a transitional policy is sufficient, while it must be permanent in the constrained case. In these situations, a WQ welfare dominates child care subsidies since it does not distort child care provision. When, however, the efficient steady state implies a binding norm, then the policy is ineffective; it has no impact on the traditional couples' child care and thus cannot mitigate the externality.

A parental leave policy can never bring about a no-norm steady state. However, it can be second-best efficient when the benefit from future earning opportunities accruing to new couples entering the high-career path outweigh the additional costs of the social norm affecting the couples who do not take up PL.

Our model shows that a given policy is likely to have a different impact, according to the type of first-best steady state (with or without a binding norm), that is relevant in the considered country. This, in turn, depends on the country's cultural and historical tradition and on its economic fundamentals. In particular, it is possible that a social norm is so pervasive and widespread that it optimally persists in the efficient steady state. This is more likely to be the case in countries with a significant gender-wage gap. On the contrary, if a society is relatively closer to gender equality of opportunity then overcoming the norm might be beneficial.

As an example, take Mediterranean (Spain, Italy and Greece) and Nordic countries (Denmark, Sweden and Finland). In Mediterranean countries, the gender wage gap is more pronounced (α is low), and we can expect the costs of the social norm to be relatively low. In Nordic countries, by contrast, the gender wage gap is weak (α is high) and child care structures are very efficient (which suggests a larger β).[19] These stylized observations are confirmed by the facts that these two types of countries currently show a large disparity in the time that mothers and fathers devote to informal child care (with the greatest inequality in child care provisions appearing in Spain and the smallest in Denmark), and that the share of career mothers is currently already much higher in Nordic countries (see, Garcia *et al.*, 2009).[20] Finally, Nordic countries are typically characterized by a larger GDP per-capita. A higher GDP is likely to translate into larger support for future earning opportunities, implying a relatively higher $\overline{q}$ and q^M which, in turn, pushes towards a no-norm efficient allocation.

Our model thus suggests that women quotas might be effective in Nordic countries, but be

[19] This is in line with Garcia *et al.* (2009, page 7), who argue that "... the cluster of Mediterranean countries (Spain, Italy and Greece) seems to delegate all the management of child care to the family. These countries are characterized by a high index of informal care, with formal childcare arrangements being quite underdeveloped. At the other extreme, is the cluster of the Nordic countries (Denmark, Sweden and Finland), which follow a universalist approach, with extensive formal childcare resources. The role of the family in providing care is substituted almost entirely by the state." See also O'Neill (2003) and Blau and Kahn (2016).

[20] Recall that Proposition 1 and Lemma 2 have shown that larger levels of α and β increase both the *laissez faire* share of high-career women and the likelihood of a no-norm first-best.

an inappropriate policy in Mediterranean ones. A uniform subsidy on child care, on the other hand, still represents a second-best policy in Mediterranean countries. Even though it cannot be expected to achieve a first-best solution, it is the only policy amongst the three considered ones that can be welfare-improving when social norms are active.

Throughout the paper we have concentrated on efficiency issues. With quasi-linear preferences and a utilitarian welfare function, redistribution and equity considerations are of no relevance.[21] This is important to keep in mind, because the uniform subsidy we have considered is clearly regressive; it provides larger benefits to high-career couples who also have a higher income than traditional couples. When the policy is transitory, the regressive effect will be relevant but only within a single period. However, it will linger when the policy is permanent. Consequently, one can expect the optimal second-best subsidy to be lower when redistribution is accounted for, either because individual preferences are concave or because social welfare applies a concave transformation to individual utilities. The redistributive impact of WQ, on the other hand, is more complicated to assess. Because redistribution occurs across high-career couples only, it is certainly not as obviously regressive as the subsidy.

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Appendix

A.1 Proof of Lemma 2

The following table provides the six possible rankings of the threshold values $\hat{q}^n$ and $\hat{q}^o$ (which are given by the solutions to equations (13) and (16) respectively) and the median couple q^M. Since the rankings of $\hat{q}^n$ and $\hat{q}^o$ are ambiguous and do not depend on the distribution, while q^M solely depends on the distribution, none of the cases can be ruled out *a priori*.

We call CNN the constrained no-norm solution, BN the binding norm solution, and UNN the unconstrained no-norm solution. For each ranking, we indicate below the potential first-best solution(s).

(1)	$q^M < \hat{q}^o < \hat{q}^n$	CNN or BN
(2)	$q^M < \hat{q}^n < \hat{q}^o$	CNN or BN
(3)	$\hat{q}^o < q^M < \hat{q}^n$	UNN
(4)	$\hat{q}^o < \hat{q}^n < q^M$	UNN
(5)	$\hat{q}^n < q^M < \hat{q}^o$	CNN
(6)	$\hat{q}^n < \hat{q}^o < q^M$	UNN

In cases from (4) to (6) the (constrained or unconstrained) no-norm first best always prevails because, as mentioned in Footnote 12, the constrained binding norm solution is always dominated by the no-norm solution. In case (3), BN and UNN are both "consistent" but UNN yields the higher level of welfare. To see this formally, one has to derive the social welfare function (11) with respect to informal child care and apply the envelope theorem. Finally, in cases (1) and (2), we cannot *a priori* say which solution prevails, and the relevant first-best will be the allocation assuring the highest social welfare between CNN and BN.

We are now in a position to proceed with the comparative statics. Simple inspection of the above table shows that a binding norm is never optimal if $q^M > \min[\hat{q}^o, \hat{q}^n]$ or in cases (3)–(6). This condition is more likely to be satisfied the larger q^M is and the smaller $\hat{q}^o$ and $\hat{q}^n$ are, and these two benchmarks are decreasing functions of α, γ_m, and β (see Equations 13 and 16).

To complete the proof we must also address cases (1) and (2) arising when $q^M < \min[\hat{q}^o, \hat{q}^n]$. In cases (1) and (2), we have either CNN or BN depending on which of these solutions yields the highest welfare. As mentioned in Section 5, CNN is more likely to prevail the closer q^M and $\hat{q}^o$ are because, when q^M and $\hat{q}^o$ are close to each other, few couples need to be forced into the less-preferred career path. As a consequence, a constrained no-norm solution will dominate the larger q^M is and the lower $\hat{q}^o$ is. As before, a lower $\hat{q}^o$ is more likely the higher α is and the higher β is. Finally, CNN is more likely to succeed the lower the social welfare is associated with BN, and welfare in BN is decreasing in γ_m.

To conclude, taking into account all six possible cases in the previous table, a no-norm solution is more likely to prevail the larger q^M, α, γ_m and β are.

A.2 Subsidy on full-time care when the norm is not binding

Alternatively, the social planner could impose a one period subsidy σ on *full time* care only. To make q^M, the marginal couple the subsidy σ must satisfy:

$$q^M = \frac{1}{\alpha}\left[v(c^*_{h\ell}) + \beta\left[v(1-c^*_{h\ell}) - v\left(1\right)\right] + \gamma_m c^*_{h\ell} - \sigma\right],$$

where T is again a uniform lump-sum tax and is given by $T = (1 - F(q^M))\sigma$ to yield a balanced budget. Note that, since the subsidy is on full-time care only, $c^*_{h\ell}$ is not affected in the transition period which increases social welfare because, as previously mentioned, $c^*_{h\ell}$ is efficient when the social norm is not binding in first-best. With a subsidy on full time care welfare amounts to:

$$SW^F = \alpha \mathrm{E}_{hh}[q] + \mathrm{E}[q] + y + F(q^M)[\beta v(1) + v(c^*_{h\ell}) + \beta v(1-c^*_{h\ell}) - \gamma_m c^*_{h\ell}].$$

Because $c^*_{h\ell}$ maximizes $v(c_{h\ell}) + \beta v(1 - c_{h\ell})$ we have $SW^F > SW^U$. Intuitively, the subsidy on full-time care is a lump-sum payment financed by a lump-sum tax, while the uniform subsidy is distortionary and affects the traditional couple's level of care. Both policies yield the same marginal couple, but the uniform subsidy implies a distortion on $c_{h\ell}$ and is thus welfare inferior.

Note that a subsidy on full-time care also implements the constrained first-best solution with a non-binding norm. To ensure that $\hat{q} = q^M$ the policy needs to be implemented again on a permanent basis.

A.3 Parental leave

With PL all couples chose high-career path

Formally, traditional couples opt in PL if it is welfare maximizing, that is, if:

$$2y + q - T - p(1 - c^L_{h\ell}) + v(c^L_{h\ell}) + \beta v(1 - c^L_{h\ell}) > y + q - T + v(c^*_{h\ell}) + \beta v(1 - c^*_{h\ell}).$$

where the RHS is welfare of type-$h\ell$ couples when they opt out of PL. The above inequality reduces to:

$$yc_{h\ell}^{L} + v(c_{h\ell}^{L}) + \beta v(1 - c_{h\ell}^{L}) > v(c_{h\ell}^{*}) + \beta v(1 - c_{h\ell}^{*}),$$

which is always true since:

$$\begin{aligned} & yc_{h\ell}^{L} + v(c_{h\ell}^{L}) + \beta v(1 - c_{h\ell}^{L}) = \max_{c_m} \left[y - p\left(1 - c_m\right) + v\left(c_m\right) + \beta v\left(1 - c_m\right) \right] \\ & > v(c_{h\ell}^{*}) + \beta v(1 - c_{h\ell}^{*}) = \max_{c_m} \left[y\left(1 - c_m\right) - p\left(1 - c_m\right) + v\left(c_m\right) + \beta v\left(1 - c_m\right) \right]. \end{aligned} \tag{A.1}$$

Proof Lemma 4 ***(ii)***

Let us consider (34) and (10) and notice that, in the equations below, the last two terms are the same:

$$\tilde{q}^{L} = \frac{1}{\alpha(1-k)} \left[yc_{hh}^{L} + v(c_{hh}^{L}) + \beta v(1 - c_{hh}^{L}) - \beta v(1) + \gamma_m c_{h\ell}^{*} \right] \tag{A.2}$$

$$\hat{q}^{*} = \frac{1}{\alpha} \left[v(c_{h\ell}^{*}) + \beta v(1 - c_{h\ell}^{*}) - \beta v(1) + \gamma_m c_{h\ell}^{*} \right]. \tag{A.3}$$

Recalling that $c_{hh}^{L} = c_{h\ell}^{L} > c_{h\ell}^{*}$ and $k \in (0, 1)$, and noticing the inequality in (A.1), the RHS of (A.2) is larger than the RHS of (A.3), which implies that $\hat{q}^{*} < \tilde{q}^{L}$. Finally, the inequality $q^{M} < \hat{q}^{*}$ follows by Assumption 1.

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