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The impact of child care costs and availability on mothers' labour supply

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Abstract

In this paper we review recent literature on the link between child care and women's labor supply. The growing labor market participation of women has raised many concerns since it implies less time spent with the children and greater reliance on external forms of care. The studies on child care have focused on three important aspects which are likely to impact labor supply decisions: availability, costs and quality. Focusing on studies examining US, Canada and several European countries, we compare and discuss their methodologies and empirical results as well as their implications for child care policies.

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1. Introduction

The number of children enrolled in child care has grown significantly in most countries as a consequence of the growing participation of women in the labor market. However, while women participation has increased worldwide, child care enrolment is still quite differently across countries. Formal child care for children has increased more in the Northern European countries, especially child care for children aged 0-3. While enrollment in formal (public and private) preschool is over 60 percent in almost all EU countries, enrollment in child care for children aged 0-3 is much lower and heterogeneous across countries (Figure 1). In Northern Europe, the majority of children younger than 3 attend a formal facility, while in other countries (e.g., Southern Europe, the UK and the U.S.) fewer than 30% attend. In the US and Canada child care is privately provided and subsidized programs are often directed only to children from low income households, while most European countries child care is universal and highly subsidized. Publicly-financed systems can provide more equitable access to high quality childcare.

Both the quantity and the quality of child care correspond to levels of government spending for pre-primary education. Northern-European countries invest much more than Southern European countries in pre-primary education.

Because of parents' growing reliance on formal and informal child care to help with child-rearing, researchers and policy-makers are focusing new attention on the importance of child-care arrangements and mothers' labor market participation. In this paper, we review several studies examining the relationship between child care and mothers' labor supply. We review and compare the empirical results regarding the impact of child care costs and availability and discuss the different impacts across different groups.

The empirical results reviewed show that child care availability appears to be more important than costs while child-care quality does not seem to have a large effect on households' decisions. Moreover most of the results suggest that the impact of child care availability and costs are stronger for mothers' labor supply among more disadvantaged backgrounds. Childcare programs aimed at lower income and less educated families are more effective than programs benefiting households with higher incomes

Section 2 compares the different methodologies of the literature. Section 3 discusses the empirical results of child care costs and availability. Section 4 shows the heterogeneity of the effects reported when different income and education groups are considered. Section 5 reports concluding results.

2. A comparison of different approaches and methodologies

Policy makers and scholars with an interest in child care have focused on two main issues. The first is the impact of child care costs on the labor market decisions of mothers of young children. The cost of child

care services is a critical factor in parents' decisions and can be viewed as a sort of tax on the mother's salary: the higher the cost of childcare for families, the lower the value of mothers' time in the market. Child care subsidies and publicly provided child care are both important policies to support mothers' employment. The second issue is related to the availability of child care and is strongly linked with costs. Affordable and conveniently located child care is an important form of support for working mothers of young children, providing incentives to work especially for mothers in low-income households¹.

In recent years, a growing proportion of young children of non-employed mothers spend time in external child-care centers. This means that in addition to using child care to look after their children physically during working hours, mothers are relying on external child care for other reasons as well. As recent empirical evidence reports, the use of external child-care centers may positively affect child development, especially for children in low-income households. Anderson and Levine (2000) and Kalb (2009) provide reviews of the research literature related to childcare and labor supply. The literature can be broadly classified according to the assumptions made regarding parental demand for childcare and the aspects of child care considered. We consider mostly mothers' labor supply, since fathers' labor supply has not been found responsive to changes in costs or availability of child care.²

A first stream focuses primarily on mothers' labor supply. It considers childcare as a way to make time for parents to engage in market work, but does not consider child care as one option among many. In this framework, childcare is considered mainly as part of the costs of working, and the demand for care is completely determined by the parental labor-supply decision. The advantage of this type of modeling is that it simplifies a more complicated decision-making problem. The limitation of this approach regards the exogeneity issue, since child care is a choice and child-care characteristics may differ significantly across different types of child care. Child-care costs are in fact likely to be endogenous, since households choose among options with different levels of quality and other attributes (usually unobserved), as well as differing costs. Most household surveys rarely include measures of quality or other attributes of the childcare service. The pioneering study in this field is that of Heckman (1974) which starts with the recognition that most working women with young children have access to informal methods of child care, often by family members or relatives, at little or no direct cost. The decision to purchase market care involves the

¹ For a more detailed review of the literature on child care see Del Boca D. "Child care and Mothers' labour supply" IADB 2013.

² Blundell et al. (2000) and Doiron and Kalb (2005) are among the few studies to look at married men. Their results suggest that men are hardly affected at all by childcare costs.

comparison of the cost and quality of market care with the cost and quality of informal care. Therefore, an analysis of the effects of child-care costs clearly requires a labor supply approach in which the labor supply decisions of the mother is modelled jointly with the decision to purchase market child care. In this approach, households make their employment and childcare decisions simultaneously. Blau and Robins (1988), Connelly (1992), Del Boca and Vuri (2007), among others, consider joint labor supply and child-care decisions. In these papers, the endogeneity of child-care costs is addressed by using variables capturing regional variations as instruments for price variations or by merging information from other sources.

Most existing studies do not take into account that the largest proportion of child-care expenditures is paid by actors other than the household. Local governments intervene directly in the regulation or the provision of public child care. In Brilli, Del Boca and Pronzato (2015), the local government's decisions regarding the number of places in childcare depend on the local budget constraint and its own preferences. Local governments may have different objectives: on the one hand, they may wish to encourage women's work (which would also increase the tax base that can be used to pay for local services, including childcare); on the other, they may wish to increase children's educational outcomes, which is especially important for lower income families. A local government may use "rationing" as a means of maximizing its objective function. For example, to increase maternal employment, local government could limit access and make maternal employment one of the criteria for acquiring a place in child care. In this view, rationing and selective access are outcomes of a mechanism design problem. Other studies modelling child care supply and rationing use data from Italy, Belgium and Germany ((Del Boca and Vuri (2007), Vandelannoote et al. (2014), Wrohlich (2004)).

Finally, recent research have examined whether implementing child-care policies is effective in increasing mothers' labor supply even in countries where it is already very high, such as Sweden or Norway. Lundin et al. (2008) evaluated the effect on female labor supply of a child-care price reform introduced in 2002 in Sweden. Their analysis showed no effect of the reduced child care prices on labor supply, suggesting that, in a well-developed and highly subsidized child care system, further reductions seem to have a negligible impact. Havnes and Mogstad (2011) investigate the impact on maternal employment of a large expansion of child-care coverage in Norway in the 1970s. They also find no effect of the increased capacity on maternal employment and suggest that the newly subsidized child care may have crowded out informal child-care arrangements. Only Hardoy and Shone (2013), in their evaluation of the 2003 'Child Care Centre Agreement' reform in Norway, reported some positive effect on mothers' employment decisions, but the reform did not affect the labor supply of already-employed mothers.

3. Child-care costs and availability

i) Child care costs

Research on the relationship between child care and labor market participation in the U.S. and the U.K. has mainly focused on the effect of child-care costs on employment decisions (Heckman 1974; Blau and Robins 1988; Connelly 1992; Ribar 1995; Viitanen 2005, among others). These studies use different approaches to estimating these impacts, taking into account the potential endogeneity of observed costs. In one of the first studies on this topic, Heckman (1974) estimates a child-care price function that incorporates measures of the availability of child care. Blau and Robins (1988) include a regional average of day care expenditure as a proxy for price, but do not control for household-specific information such as the age of the youngest child. Connelly (1992) uses predicted expenditures as an instrument for child-care costs in an accompanying labor force participation equation; the cost instrument controls for regional variation and family characteristics. Ribar (1995), in his structural approach, considers expenditures per hour of care per child as a measure of child care costs.

These studies indicate that family behavior is significantly influenced by child-care policies. Blau and Robins (1988) estimate child care price elasticities for married women of -0.38 with respect to labor supply and -0.34 with respect to the demand for formal child care. These estimates implied that if the child-care prices were zero, 87% of mothers would work rather than the 58.8% actually working now. In performing this policy experiment, Blau and Robins compute the response using the characteristics of the average woman in the sample. In contrast, Connelly (1992) evaluates the impact of such a policy on the labor market decisions of each woman in the sample. She finds a less substantial labor supply effect: if universal no cost child care were available, the model predicts that 68.7% of women would be employed. These results refer to the U.S., but similar findings have been obtained for the U.K. (Viitanen 2005) and for Canada (Powell 1998). All these studies show that child-care costs are a very significant determinant of the demand for these services and employment decisions, ranging from 0.38 to 0.07.

Other studies focusing on other countries find quite different results. In countries like U.S., Canada, U.K., where the child-care services are provided in the private sector, the focus is on the costs and quality of the services. In most the European countries, the focus has shifted from the cost of childcare to its availability, since most countries offer subsidized child care. In spite of relatively generous public subsidies and a

reputation for high quality, only a very limited proportion of Southern European families use public childcare, whereas a large proportion uses informal care. Del Boca et al (2003) attempt to explore the determinants of the use of child-care among dual-worker families. Given the limitations of available data, they match two different data sets: the Bank of Italy (SHIW) and ISTAT Multiscopo. They find evidence that the availability of public child-care has a strong impact on its demand and that increases in costs of public child-care reduce the use of public as well as private care, indicating a shift to informal child care. Having healthy grandparents living nearby goes a long way in explaining this choice, especially in the presence of infants and toddlers. The evaluation of child-care policies must take into account the importance of these factors. This is particularly the case in countries like Italy, where most families with children have only one child, and children would benefit from the socialization experiences provided by the child-care system.

ii) Availability

More recent studies from Europe have explicitly investigated the effect of child-care costs in areas where formal child care is widely available and where it is not, limiting the price effects. Using data from Northern European countries. Gustaffsson and Stafford (1992) investigate the responsiveness of the decision of women to work and use public child care in response to variation in child care fees, availability of places, and spouse's income in Sweden. They found that in regions where child care does not appear to be "rationed", higher fees significantly lowered the probability of mothers' market work and public child-care choice; in areas where "rationing" is more severe, there is little evidence of significant price effects. When households are restricted in their choice, the true effect of price is difficult to measure.

Del Boca and Vuri (2007) analyzed the effect of child-care costs on mothers' employment and child-care decisions in the Italian context (where part-time jobs are not widely available), taking into account the effect of rationing in the provision of care services as well as in the labor market. Their results indicate that rationing is an important factor in interpreting price effects on employment and utilization of child care. Their results show that the supply of public child-care services need to reach at least 40% if they are to increase female labor market participation up to the Lisbon target of 60%. The European Commission's recommendation of a 33% increase in public child care therefore falls short.

Kornstad and Thoresen (2002) examine the case of Norway and develop a model to simulate the female labor supply effects of the Norwegian home care allowance reform, taking rationing into account. They find that mothers' labor supply will be reduced by about 9% through the home care allowance reform, but the predicted effect is considerably less pronounced if availability constraints are eliminated. Hank and

Wrohlich (2004) models availability restrictions explicitly in the budget constraint, and assumes that rationing only occurs for subsidized childcare. Her results show that policy reforms in Germany targeted at an increase in childcare availability had larger effects on the maternal labor supply than reducing child-care costs.

Vandelannoote et al. (2014) focus in particular on the childcare market of Flanders. They take into account the fact that not only is informal formal childcare characterized by rationing, but that there is also excess demand for non-subsidized and subsidized formal childcare options. They find a small negative effect of childcare costs on both participation and hours-of-work decisions and that Flemish mothers with young children are less sensitive to price changes of childcare than to the availability of formal childcare slots. Their empirical estimates confirm earlier findings for Germany and Italy, indicating only small price effects and relatively large supply effects.

Table 3 reports the signs and the significance of the coefficients associated with child-care costs on labor market participation and child-care utilization. The sign and significance of the estimates are quite similar across studies.

Table 3 Studies evaluating the effects of child care costs on labor supply

Study	Country	Data	Labor supply
Blau and Robins (1998)	U.S.	Employment Opportunity Pilot Project 1980	-0.38
Connelly (1992)	U.S.	Wave5 of 1984 SIPP panel	-0.20
Ribar (1995)	U.S.	Wave5 of 1984 SIPP panel	-0.07 to -0.09
Powell (1997)	Canada	Canadian national Child care survey 1988	-0.38
Viitanen 2005	U.K.	Family Resources Survey (FRS) 1997/8–2003/4	-0.14

Table 4 reports empirical results from studies analyzing European countries where the provision is mostly public, such as in Sweden, Norway, Germany and Italy. These studies show that child-care costs are significant only in areas where child care is not rationed.

Table 4 Studies evaluating the effects of child-care costs and availability on labor supply

	Country	Data	Labor supply
Kornstad and Thoresen (2002)	Norway	The Home Care Allowance Survey 1998	-0.14
Gustaffson and Stafford 1992	Sweden	Swedish Household Survey for 1984	-0.07 -1.88 NR
Wrohlich (2004)	Germany	German Socio-Economic Panel from the year 2002	-0.03 east -0.7 west
Del Boca Vuri (2007)	Italy	Bank of Italy Survey Survey Multiscopo ISTAT survey 1998	-0.12 0.44 NR

Table 5 shows the policy implications of some comparable empirical estimates, Viitanen (2005) for the U.K., Wrohlich (2004) for Germany, Connelly (1992) for the U.S., and Del Boca and Vuri for Italy (2007), where subsidies are either 50% or 100%. Connelly reports substantial increases in labor force participation: 5.2 percentage points for subsidies covering 50% of child-care costs and 9.9 percentage points for subsidies of 100 percent of costs. Viitanen (2005) reports an even larger increase in the labor force participation: 13.8 percentage for 50% subsidies and 25.4 percentage points for 100% subsidies. Running a policy simulation of a 100% subsidy to child care costs for East and West Germany, Wrohlich (2004) finds an increase in the participation rate of mothers with preschool children of about 3.0 percentage points in the West Germany and about 1.5 percentage points in the East (starting from a labor force participation of 63% in East and 43% in West Germany)

Table 5 Labor Supply Simulations

Study	Country	Baseline	100% subsidy
Connelly (1992)	US	58.8	+9.9%
Viitanen 2005	UK	50.7	+25%
Wrohlich (2004)	Germany	43%West, 63%East	+3% West +1.5% East
Del Boca and Vuri (2007)	Italy	40.8%	+27% NR +5% R
Vandelannoote et (2014)	Belgium	81.5%	+3.49 +6.34NR

The same simulation exercise run for the sample of women in Italy who are not rationed in the child care market, i.e., those affected by the change in child-care costs, leads to an increase in the employment rate of about 27 percentage points when the area is not rationed (NR) and by only 5.4 percentage points if the area is rationed (R). This confirms that employment is barely affected by child-care costs when there is rationing in the provision of child-care services. The results from Del Boca and Vuri (2007) for the non-rationed areas appear to be greater than the results obtained in the studies related to Germany (Wrohlich 2004), Belgium (Vandelannoote et al. 2014) and the U.S. (Connelly 1992), but are in line with predictions made for the U.K. by Viitanen (2005) that if childcare costs were fully subsidized, 75.5% of women would be employed.

4. Heterogenous effects.

Most of the results discussed to this point indicated that the effect of child care costs on the labor supply of women is rather limited on average, while for some subpopulations the impact is much larger and significant. Research based on data from several countries indicates that the impacts of child care costs are stronger for women at the bottom of the income distribution, and for single mothers and with lower education levels, as any standard neoclassical model would lead one to believe. Using Australian data, Doiron and Kalb (2005) found that the elasticity of participation with respect to child care costs for

married women with a preschool child is around -0.05, while for single mothers the corresponding elasticity is -0.136. Michapoulos and Robins (2000) analyze the case of the US and Canada and report a higher elasticity for single mothers. Anderson and Levine (1999) reviewed several econometric studies and concluded that the overall elasticity of labor force participation of mothers with regard to childcare prices lies between -0.05 and -0.35, but women with few skills are more affected by child care subsidies than higher-skilled women. Blundell et al. (2000) analyze the impacts of child care costs across households characterized by different household employment structures and compare the effects of women married to employed and unemployed partners; they find larger elasticities for the latter (-0.066 versus -0.075). Childcare subsidies aimed at lower income and less skilled groups are more effective than subsidies benefiting households with higher incomes.

In addition to the cost side of child care, the impact of availability on participation decisions also varies across education and income classes. Del Boca et al. (2009) analyzed the impact of child-care availability across different European countries (Belgium, the Netherlands, Italy, Spain, France, Denmark and the U.K) and by level of education. Childcare availability has a positive effect on the probability of employment for women at all levels of education, but the effect appears to be stronger for less educated women: increasing childcare availability by 10% increases the probability of working from 53 percent to 67 percent for less educated women, and from 79 percent to 86 percent for more educated ones. Also the impacts of the length of parental leave and family allowances are more significant for women with lower educational attainment. The specific differences related to child care characteristics are coherent with the general results that women living in low-income households are more responsive to economic incentives (in kind and monetary incentives) than high-income women (Aaberge, Colombino and Strom 2005). Brilli, Del Boca and Pronzato (2015) show that the impacts of child care availability in Italy is greater both for mothers' labor supply (language skills) among households living in areas where child care is more rationed.

5. Conclusions

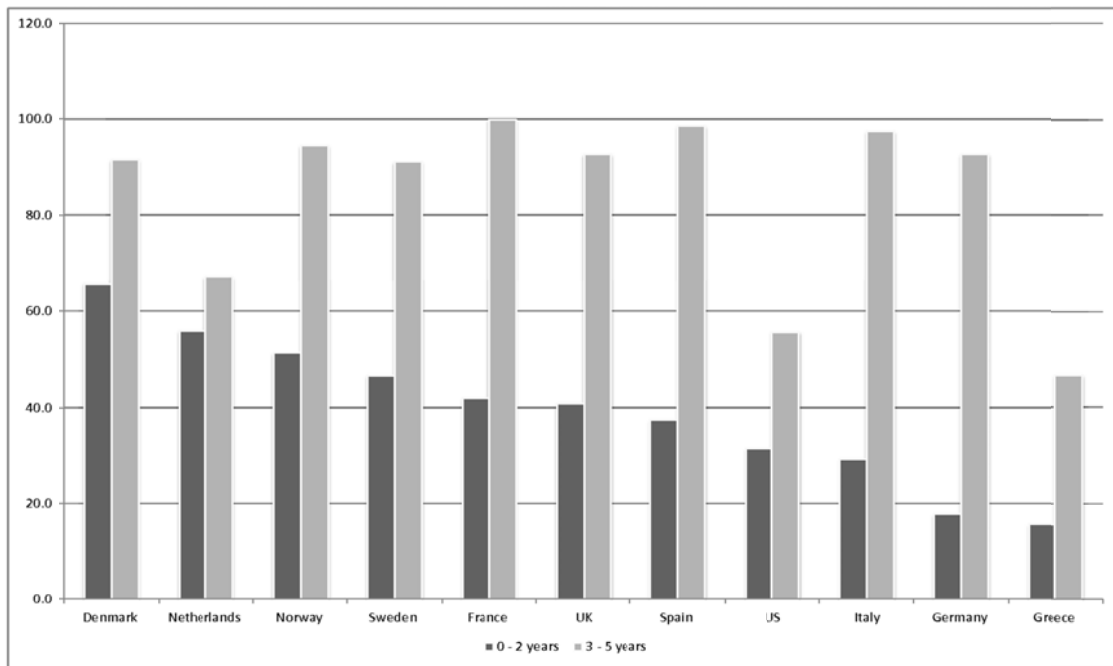
In this paper we review and discuss the most important questions raised in the analysis of the relationship between child care and mothers' labor supply. When having a child, parents face several decisions concerning child care and employment. First of all they face the decision whether or not to rely on non-parental child care. Secondly, they have to decide how much they are willing to spend on child care and what child care characteristics (hours, location, quality) are important to them, given their preferences and constraints. Analysis of the impact of child care on labor supply is complex because of the potential

endogeneity of a large number of factors. The cost of child care is partly the outcome of a choice between lower and higher quality child care. When quality is unobserved, measuring the effect of price will be difficult. Similarly, when quality is observed for a particular type of child care, it is likely to be the outcome of a choice, and is thus potentially endogenous.

While in the U.S. and U.K. most research has focused on child-care costs, in Continental Europe more attention is devoted to child-care availability and rationing. The empirical results from this literature show that the impact of child-care costs is quite large and significant in areas where places in child-care are widely available, but is not significant where child care is rationed. Results from European studies show that not allowing for rationing can potentially affect the estimated effect of childcare fees on labor supply: child care availability appears to be more important than costs.

Child-care policies (both in terms of subsidies and in terms of the number of affordable and available places) are among the most important tools for encouraging mothers' labor supply. However, the responsiveness of the women's labor supply and child-care use varies significantly across groups characterized by different family structure, income, education levels and ethnicity. Most of the results seem to suggest that child care policies have heterogeneous effects on the population: in particular, they are stronger for mothers' labor supply among more disadvantaged backgrounds

Figure 1. Enrollment rates of children under age 6 in formal care or early education services, 2008.
Source: OECD Education database. Formal care and early education services.



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