

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

Daniela Del Boca

University of Turin and Collegio Carlo Alberto

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Daniela Del Boca is Professor of Economics University of Turin and Fellow Collegio Carlo Alberto.
Email: dani.delboca@unito.it

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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. Focusing on studies examining the US, Canada and several European countries, we compare and discuss their methodologies and empirical results as well as their implications for child care policies. Most of the results suggest that the impact of child care availability and costs are stronger for mothers' labor supply among more disadvantaged backgrounds. Child care programs aimed at lower income and less educated families have important implications for EU targets on child poverty and mothers' employment.

Keywords: child care, household choices, mothers' labor supply

JEL codes: J13, I2

1 Introduction

In spite of the growing similarities across European countries, women employment rates are still quite different across countries: while the Southern European countries are still below the Lisbon target of at least ten percentage points, the Northern European countries are much above it with on average a female employment rate of 70% (European Commission 2013).

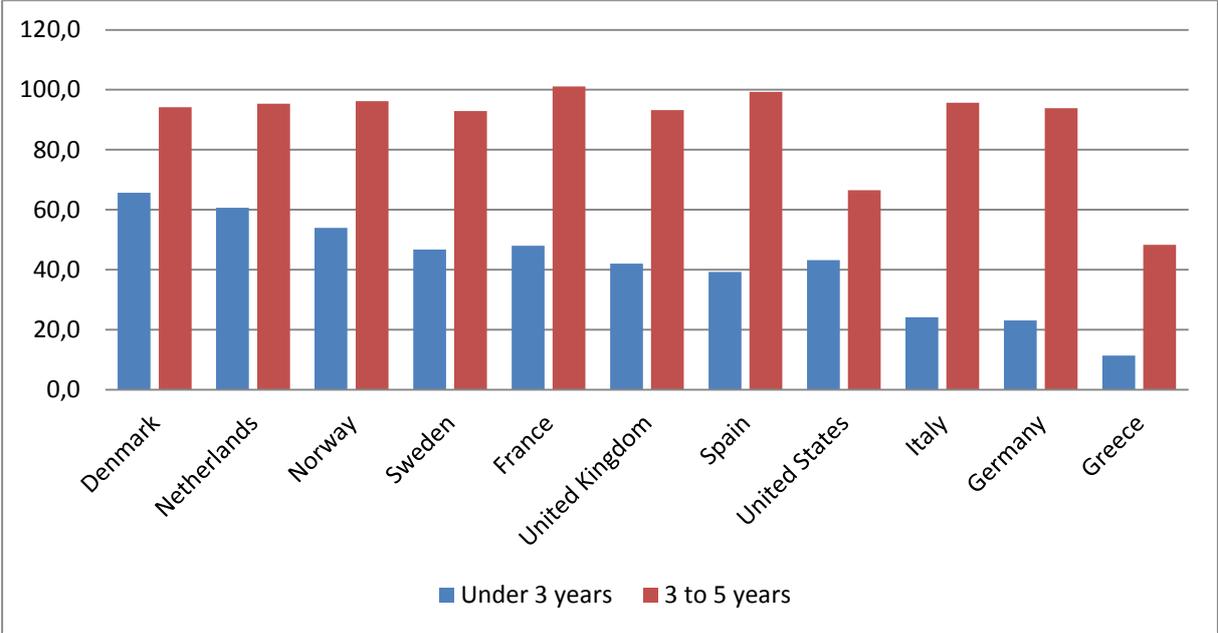
Recent studies have linked the cross country differences of women labor market participation with the generosity of welfare state support of working mothers, in particular policies providing affordable child care opportunities (Del Boca et al 2009, Nicodemo and Waldman 2010). Child care policies have been in fact recognized as one of the most important and effective policies to support the labor market participation decision of mothers as well as to reduce inequality among children from different backgrounds (Del Boca 2015, Havnes and Mogstad 2011).

The design of child care policies to increase the availability and reduce the costs of child care are crucial parts of the strategy of Europe 2020 targets with the objective of increasing women employment and reduce poverty rates. There are in fact important implications for child care programs and mothers' participation in the labor market related to child poverty. The risk of poverty is closely related to the employment rates of mothers, or more precisely, to their non-employment rates. In most countries identified among the best performers with regard to child poverty, mothers' employment rates are the highest (Moreno Miguez 2012).

In order to reduce the differences across countries, the European Council set the so-called Barcelona targets for providing child care in EU Member States specifying that at least 90 per cent of children between 3 years old and the mandatory school age, and at least 33 per cent of children under 3 years of age should have access to formal child care provision (set in 2002, reaffirmed in 2011). Yet, more than a decade after the targets were set, there are still large differences in child care coverage across Member States in particular for the younger age group (European Commission 2013).

Formal child care for children has increased more in the Northern European countries. 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). Examining the total coverage in formal child care arrangements, a large number of Member States have met or surpassed the Barcelona objective of a 33 per cent coverage rate (among them Denmark, Sweden, Belgium and United Kingdom), while others are still way below (Italy, Greece).

Figure 1. Participation in child care among children under 3 and 3-5 years of age in selected countries. 2010



Source: OECD Education database. Formal care and early education services.

There are significant differences in the type of provision of child care. In Northern European countries child care is universal and highly subsidized. In Southern European countries child care is mostly public but its availability is low, while in the US, the UK and Canada child care is privately provided and subsidized programs are directed only to children from low income households. Publicly-financed systems are the ones which can provide more equitable access to high quality child care (Datta Gupta and Simonsen 2011) Consequently, in the Nordic European countries, where more generous and universal child care opportunities have been implemented, women’s labor market participation is much higher than in the Southern European countries and children’s poverty rates are much lower.

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 their availability and discuss the different impact across different groups. The empirical results discussed show that in Europe child care availability appears to be more important than costs. In the US instead child care costs significantly affect women’s labor supply. 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. Child care programs aimed at lower income and less educated families are then 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. We consider mostly mothers' labor supply, since fathers' labor supply has not been found responsive to changes in costs or availability of child care.¹ 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 child care 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 households.

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 child care and labor supply. The literature can be broadly classified according to the assumptions made regarding parental demand for child care and the aspects of child care considered.

A first stream focused primarily on mothers' labor supply, while in the second more recent stream labor supply is model jointly with the child care decision. A third stream of literature explores also the structure of the child care market and the issue of rationing.

In the first stream of research, child care is considered mainly as part of the costs of working, and the demand for care is completely determined by the parental labor supply decision (Presser and Baldwin 1980). The advantage of this type of modeling is that it simplifies a more complicated decision-making

¹ Blundell et al. (2000) and Doiron and Kalb (2002, 2005) are among the few studies to look at married men. Their results suggest that employment of men is hardly affected at all by childcare costs.

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 (Presser and Baldwin 1980).

The pioneering study of the second stream of literature 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 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 child care 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 directly the fact that the largest proportion of child care expenditures is paid by actors other than the household.

In the third stream of research, it is recognized that governments intervene directly in the regulation and the provision of public child care. In some countries in particular (Italy, Germany and Belgium for example) child care is rationed, that is supplied in limited number and there is excess demand (Del Boca and Vuri (2007), Vandellannoote et al. (2014), Wrohlich (2004)). The government's decisions regarding the number of places in child care depend on the local budget constraint and its own preferences. 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 child care); on the other, they may wish to increase children's educational outcomes, which is especially important for lower income families. In conditions of excess demand, governments may use "rationing" as a means of maximizing its objective function, and introduce selection criteria to give priority to households for which public child care access appears to be more valuable. 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 (Brilli et al. (2015)).

There are in fact costs and benefits attached to the different selection criteria that need to be chosen. The benefits of child care on mothers' labor supply (as well as child well-being) are stronger in contexts where selection criteria give priority to more disadvantaged households. However, in these contexts the "selected" households are entitled to pay lower fees and consequently contribute less to the costs

of child care reducing the monetary revenues (Del Boca et al. 2015). On the opposite, in contexts where the “selected” households are more heterogeneous, they pay higher fees and contribute more to the costs of child care. There are then important trade-offs between the selection criteria and the costs for the public providers, implying different levels of sustainability of the public child care.

3 Child care costs and availability: overview of empirical studies

In countries like the U.S., Canada and the U.K., where the child care services are provided in the private sector, the focus of studies is on the costs of the services. Research on the relationship between child care and labor market participation in the U.S., the U.K. and Canada 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 the 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 $-.38$ with respect to labor supply and $-.34$ with respect to the demand for formal child care. These estimates implied that if the child care prices were zero, 87% of mothers would be available to 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 child care, free of cost for the families, was 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 1997). All these studies show that child care costs are a very significant determinant of the demand for these services and employment decisions.

Other studies focusing on other countries find quite different results. In most of the European countries, the focus has shifted from the cost of child care to its availability, since most countries offer

subsidized child care but often only to selected households. In spite of relatively generous public subsidies and a reputation for high quality, only a very limited proportion of Southern European families use public child care, whereas a large proportion uses informal care. Del Boca et al. (2005) attempt to explore the determinants of the use of child care among dual-worker families. Given the limitations of available data in Italy, they match two different data sets: the Bank of Italy (the Bank of Italy survey provided information on hours of work and wages but not on child care) and ISTAT Multiscopo (which provide information on child care but not on parents' wages). They find evidence 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.

There is a correlation between private and public in the sense that in some areas where more women work both public and private respond to the relatively higher demand. Moreover it could be the case that governments combine their supply of public child care with one of private child care to compensate for limited resources, and to exploit the higher flexibility of private services. They can accomplish these objectives, either by outsourcing several services, by booking a certain number of slots in private facilities or by allowing the private providers to manage part of their supply (Antonelli and Grembi, 2010).

Another variable considered in this model is the availability of healthy grandparents living nearby; this variable goes a long way in explaining the choice for informal care, especially in the presence of infants and toddlers. The empirical analysis of the effect of grandparental child care on female labor force participation is complex due to endogeneity issues. It is not possible to exclude the possibility that there are unobserved preferences related both to child care and labor market decisions. Most studies analyzing the role of grandparents use as an instrumental variable information on whether grandparents are alive to exogenously predict the probability of using grandparental child care (Arpino et al. 2012)

More recent European studies 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 Swedish data, 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. 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. 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% access to public child care therefore falls short.

Kornstad and Thoresen (2007) 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. Wrohlich (2004) models the availability restrictions explicitly in the budget constraint, and assumes that rationing only occurs for subsidized child care. Her results show that policy reforms in Germany targeted at an increase in child care availability had larger effects on the maternal labor supply than reducing child care costs.

Vandelannoote et al. (2014) focus on the child care market of Flanders. They take into account the fact that not only informal child care is characterized by rationing, but that there is also excess demand for non-subsidized and subsidized formal child care options. They find a small negative effect of child care costs on both participation and hours-of-work decisions. Flemish mothers with young children are less sensitive to price changes of child care than to the availability of formal child care 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 of the coefficients associated with child care costs on labor market participation and child care utilization. The sign and size 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 elasticities
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 (NR)

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

	Country	Data	Labor supply elasticities
Kornstad and Thoresen (2007)	Norway	The Home Care Allowance Survey 1998	-0.14
Gustaffson and Stafford (1992)	Sweden	Swedish Household Survey for 1984	-0.07 R -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 Multiscopo ISTAT survey 1998	-0.12 R 0.44 NR

Note: NR = Non rationed; R = rationed areas.

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). Connelly reports substantial increases in labor force participation of about 9.9 percentage points, while Viitanen (2005) reports an even larger increase in the labor force participation of about 25.4 percentage points.

Similar simulations have been conducted for Germany, Belgium and Italy, distinguishing between rationed (R) and non-rationed areas (NR). 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 West Germany and about 1.5 percentage points in the East (starting from a baseline of labor force participation of 63% in East Germany and 43% in West Germany). Vandelannoote et al. (2014) report similar results for Belgium: larger coefficients for non-rationed areas (6.34) and smaller (3.49) for rationed ones.

Table 5 Studies performing Labor Supply Simulations

Study	Country	Baseline	100% subsidy (percentage point change compared to baseline)
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 al. (2014)	Belgium	81.5%	+6.35% NR +3.49% R

The same simulation exercise has been provided for Italy. According to their results 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 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).

Finally, recent research focusing on Northern European countries has examined whether implementing child care policies is effective in increasing mothers’ labor supply in countries where it is already very high. Lundin et al. (2008) evaluate the effect on female labor supply of a child care price reform introduced in 2002 in Sweden. Their analysis shows 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 more recent reform “Child Care Centre Agreement” in Norway, report some positive effect on mothers’ employment decisions, but the reform did not affect the labor supply of already-employed mothers. These results seem to indicate that even in countries where child care is universal and of high quality, a proportion of parents prefer to take care directly of their children (with long parental leave for example) and not to use formal child care.

4 Does child care have equalizing effects?

Most of the results discussed to this point indicate 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) find 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. Anderson and Levine (2000) review several econometric studies and conclude that the overall elasticity of labor force participation of mothers with regard to child care 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). All studies mentioned suggest that child care 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) analyze 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. Child care 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 child care 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). Taking into account rationing and selection criteria, Del Boca et al. (2015) show that the benefits in terms of child well-being and mothers' labor supply are stronger in contexts where selection criteria give priority to more disadvantaged households .

5 Conclusions

In this paper we review and discuss 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 are important to them, given their preferences and constraints.

The literature shows different results across different institutional environments. In the U.S., the U.K. and Canada, where child care is mostly private, most research has focused on child care costs, and report that mothers' labor supply is quite sensitive to costs variations, implying the importance of child care subsidies.

In Continental Europe (Germany, Italy, Belgium) more attention has been devoted to child care availability and rationing. There, empirical results show that the impact of child care costs is significant only in areas where places in child care are widely available, but is not significant where child care is rationed. Furthermore, results show that not allowing for rationing can potentially affect the estimated effect of child care fees on labor supply.

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.

Given that child care programs appear to be more effective for more disadvantaged mothers (with both lower education and lower incomes), these results appear to have important policy implications for the Europe 2020 targets addressing both child poverty and women employment.

Summarizing, the comparison of data and empirical results in our review seems to confirm that universal, high quality child care (as in Northern Europe) seems to be the best policy aimed to reduce poverty and increase mothers' labor market participation. In the Anglo-Saxon countries, the high costs of private child care have contributed to low labor market participation of low income mothers during child rearing years, and to a high child poverty rate. In Southern Europe, it is mainly the lack of availability of affordable child care that have discouraged a very large proportion of mothers from participating in the labor market and contributed to increased child poverty.

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ImPRovE: Poverty Reduction in Europe. Social Policy and Innovation

Poverty Reduction in Europe: Social Policy and Innovation (ImPRovE) is an international research project that brings together ten outstanding research institutes and a broad network of researchers in a concerted effort to study poverty, social policy and social innovation in Europe. The ImPRovE project aims to improve the basis for evidence-based policy making in Europe, both in the short and in the long term. In the short term, this is done by carrying out research that is directly relevant for policymakers. At the same time however, ImPRovE invests in improving the long-term capacity for evidence-based policy making by upgrading the available research infrastructure, by combining both applied and fundamental research, and by optimising the information flow of research results to relevant policy makers and the civil society at large.

The two central questions driving the ImPRovE project are:

How can social cohesion be achieved in Europe?

How can social innovation complement, reinforce and modify macro-level policies and vice versa?

The project runs from March 2012 till February 2016 and receives EU research support to the amount of Euro 2.7 million under the 7th Framework Programme. The output of ImPRovE will include over 55 research papers, about 16 policy briefs and at least 3 scientific books. The ImPRovE Consortium will organise two international conferences (Spring 2014 and Winter 2015). In addition, ImPRovE will develop a new database of local projects of social innovation in Europe, cross-national comparable reference budgets for 6 countries (Belgium, Finland, Greece, Hungary, Italy and Spain) and will strongly expand the available policy scenarios in the European microsimulation model EUROMOD.

More detailed information is available on the website <http://improve-research.eu>.

Bea Cantillon (Coordinator)

E-mail: bea.cantillon@uantwerpen.be

Phone: +32 3 265 53 98

Address: University of Antwerp – Sint-Jacobstraat 2 (M.177) – 2000 Antwerp - Belgium

Tim Goedemé (Manager)

E-mail: tim.goedeme@uantwerpen.be

Phone: +32 3 265 55 55

Mobile: +32 494 82 36 27

Address: University of Antwerp – Sint-Jacobstraat 2 (M. 185) – 2000 Antwerp - Belgium