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Summary Report of Key Findings for WP6

Daniela Del Boca, Chiara Monfardini and Sarah Grace See

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Daniela Del Boca¹, Chiara Monfardini² and Sarah Grace See³

Abstract:

This report summarizes the key findings of the Work Package 6: “Child Care and Child Outcomes.” The general objective of the work package was to explore child care arrangements and the determinants and consequences of their usage for different families and different family members using an interdisciplinary child development process framework. Child care arrangements refer to parental care, family members’ care, public child care, and private care, while child outcomes are from the economic, socio-demographic, and psychological dimensions. The factors affecting child development are related to the demographic aspects of the household (fertility and family structure); the socio-economic characteristics such as education, income, family background, and psychological traits (attitudes, personality, parenting styles); and the differences related to the cultural backgrounds of different countries of origin. To achieve this general objective, we focused on the following specific objectives: (1) To study how parental time allocation decision and income investment on children depend on family structure in different institutional contexts, (2) To analyse different dimensions of children outcomes and their determinants in terms of time and income investments and child care decisions, (3) To address gender differences (i.e., whether parents’ characteristics and child care have different impacts on the cognitive outcomes of girls and boys), (4) To study how different forms of parental and formal child care influence children outcomes in migrant and native families, (5) To deepen the understanding of the motivations of parents for using a particular source of child care, (6) To study families with disabled children in different countries of Europe concerning child care and implications on well-being of all family members, and (7) To study the social and health implications of child home versus municipality day care in Finland, and to compare the results with other European countries addressing association, if any, between specific child care arrangements and later cognitive achievement of children. We find overall positive effects of early parental and non-parental care on child outcomes. The results regarding parental care indicate the role of family policies supporting both parents’ investments as well as children themselves. The results regarding non-parental care show that both availability as well as quality of child care matter and that the impact on child outcomes is greater for children from disadvantaged backgrounds.

Keywords: child care, child outcomes, maternal employment, early investments, timing

Affiliations:

1. University of Turin, Collegio Carlo Alberto, Institute for the Study of Labor
2. University of Bologna, Institute for the Study of Labor
3. Collegio Carlo Alberto

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1. General objective of Work Package 6

The Working Package 6 aimed to look at the different forms of child care arrangements exemplified among parental care, family members' care, public, and private care. Specifically, WP6 looked at the determinants and consequences of child care use for different families. The effects on child outcomes were explored along the dimensions of economics, socio-demographics, and psychology, as well as in relation to the child development process. The deliverables paid special attention to the following factors affecting child development: the demographics (gender, family structure), socio-economics (education, income), psychological traits (attitudes), and cultural (migration) background. We focused on the seven specific objectives to achieve this general objective.

The first specific objective pertained to parental time and income investments on children according to family structures in different institutional contexts. Del Boca, Flinn, & Wiswall (2014) estimated a model that compared parental time and financial investments. They also compared time investments from fathers and mothers. Del Boca, Monfardini, & Nicoletti (2017) looked at time investments from parents and from children themselves. Del Boca, Piazzalunga, & Pronzato (2014) looked at grandparental child care, comparing it with parental care. Mencarini Pasqua, & Romiti (2016) looked at parental investments for children from two-parent and single-parent families.

The second specific objective pertained to different dimensions of children outcomes and how they are determined by time and income investments and child care decisions. Maternal education and employment are recurring issues. Brillì (2015) presented a behavioural model showing the effects of maternal employment and non-parental child care on children's cognitive development. The studies by Bulgarelli & Molina (2016), Del Boca, Pasqua, & Suardi (2016), and Brillì, Del Boca, & Pronzato (2016) provided empirical evidence on the relationship between maternal employment, child care experiences, and child cognitive outcomes over the short, medium, and long term. Nazio (2015) assessed the degree of gender specialisation in the amount of time mothers and fathers devote to unpaid child care under various family structures, and how parental and family characteristics are reflected in children's time use patterns.

The third specific objective pertained to gender differences through an investigation on whether parents' characteristics and child care have differential impacts on the cognitive outcomes of boys and girls. Addabbo, Di Tommaso, & Maccagnan (2016) looked into the determinants of science education capability among Italian adolescent boys and girls, taking into account household, individual, and school factors. Using data from the PSID-CDS, See (2016) looked

at parental supervision from fathers and mothers and how they affect male and female adolescents' participation to health risk behaviours such as smoking cigarettes and consuming alcohol.

The fourth specific objective pertained to how different forms of parental and formal child care influence children outcomes in migrant and native families. Del Boca, Piazzalunga, & Pronzato (2016) explored the impact of early child care on child cognitive outcomes using the Millennium Cohort Study for the United Kingdom, while Bulgarelli & Molina (2016) used a sample of Italian pre-schoolers.

The fifth specific objective pertained to a deepening of the understanding of the motivations of parents for using a particular source of child care. Koslowski, McLean, & Naumann (2015) utilized both quantitative and qualitative approaches to explore the determinants and consequences of different child care arrangements for different families and family members.

The sixth specific objective pertained to families with disabled children in different European countries. Di Giulio, Philipov, Iaschinsky (2014) looked at child care arrangements among families with a disabled child, and how this affected the family and the well-being of the family members.

The seventh specific objective pertained to the social and health implications of child home care versus municipality day care in Finland, comparing the results with other European countries addressing association, if any, between specific child care arrangements and later cognitive achievements of children. Hiilamo, Haataja, & Merikukka (2015) looked at the school performance of Finnish six-year-old children with younger sibling(s) who stay at home, compared with children attending public day care. Meanwhile, Del Boca, Monfardini, & See (2016) took a macroeconomic approach and compared the relationship between cognitive/education outcomes among European countries and government expenditures and early investments.

In addition to the above, Brillì et al. (2013) reviewed the relevant literature related to each specific objective. For each specific objective, we summarise the results obtained over the course of the FamiliesAndSocieties project.

2. Parental time allocation and income investments on children

The first specific objective of WP6 was to study how parental time allocation decision and income investment on children depends on family structure in different institutional contexts.

2.1. Time versus income investments

Del Boca, Flinn, & Wiswall (2014) estimated a model of the cognitive development process nested within a model of household behaviour, from birth until adolescence. This strategy accomplishes the goal of “correcting” for the endogeneity of inputs in the estimation of the production technology, allowing for the estimation of the household preferences that lead to these input decisions, albeit with explicit assumptions about the form of household utility. This enables to conduct more realistic policy experiments by manipulating the time and budget constraints that the household faces (e.g. through income transfers) to understand how households adjust their input choices to changes in the policy environment and how this ultimately impacts the child development process.

Using data from the Panel Study of Income Dynamics and the Child Development Supplement, they found that both parents' time inputs are important for the cognitive development of their children, with different impacts in various phases of the life cycle. Mother's time is a crucial input in the production process of child outcomes, and that the father's time is almost equally productive, especially in some stages of development. Using detailed time budget information, mothers and fathers spend a considerable amount of time away from their jobs and with their children. The time parents spend actively or passively engaged with their children has an effect on cognitive development that decreases with the child's age, particularly in the case of mothers. The estimates indicate that money expenditures on the child have an impact on cognitive development that increases with the child's age, though their impact at any age is modest.

An important contribution of this research is the ability to trace the connections between the level of household income and child development (Blau, 1999, Loken et al., 2012). A higher level of family income does not necessarily indicate a higher level of family resources being devoted to children. This is due to the fact that, for most households, household income is primarily generated by labour market earnings, and these require substantial time commitments from parents. To the extent that parental time investments are important factors in producing good cognitive outcomes in their children, this tends to decrease the resources devoted to the children. This channel may dampen or even reverse the assumed positive relationship between income and child development. Even when households are provided higher levels of non-labour income, the impact on child outcomes is small, due to the limited value of investment goods purchased in the market for increasing cognitive ability and to the fact that households use a

substantial proportion of such income gains to obtain additional parental leisure and household consumption goods.

Using a simple dynamic production technology for child quality and a Cobb-Douglas specification of a household utility function, they employ unique data from the PSID-CDS on investments in children to recover estimates of the parameters that characterize the child development process. The main message of the article is that household time and money investments in children can only be properly understood when household preferences, production technologies, and choice sets are simultaneously considered. While the average household attaches a substantial weight to child quality in its utility function, its welfare is by no means only tied to the cognitive performance of the child. In terms of the child cognitive ability production technology, parental time inputs were found to be more valuable in producing child quality than were money expenditures on children (at least those made by the household). The value of parental time inputs decreased with the age of the child, while there was some increase in the value of money inputs as the child matured. These results are somewhat consistent with those of Cunha & Heckman (2008) and Cunha et al. (2010) in that gains to investment are greatest when the child is young. However, the analysis suggests that the productivity of money investments in children (by the household) have limited impacts on child quality no matter what the stage of development.

2.2. Self-investments

Del Boca, Monfardini, & Nicoletti (2017) provided an empirical assessment of the role played by self-investments of adolescents in shaping their cognitive development, by taking it into account into the augmented value-added specification of the cognitive production function. Here, cognitive ability depends on a set of contemporaneous and lagged inputs and on lagged ability, wherein the crucial inputs are the time spent by the mother with the child and the time spent by the child on his/her own doing formative activities believed to improve cognitive development (referred to as “time inputs” or “time investments”). Using the PSID-CDS, they analyse the determinants of tests measuring reading abilities and mathematical skills. The results show that the child’s self-care or self-investment becomes more significant with age, much more than the time inputs received from the mothers.

They implement the within-pupil between-subject estimation using three cognitive test scores rather than school test scores in different subjects. More specifically, they use test scores for symbolic learning and reading, comprehension and vocabulary, and mathematical abilities to estimate the effect of the lagged cognitive ability on the contemporaneous ability with a child

fixed effects approach to control for unobserved child characteristics. They then use this estimated effect of the lagged cognitive ability in a second-step estimation which, by exploiting within-family between sibling variation to control for family fixed effects, allows to evaluate the effect of investments. Therefore, the novelty of the procedure is to introduce a two-step estimation to evaluate the effect of the lagged cognitive ability as well as of the mother's and child's time investments on the contemporaneous cognitive ability.

This is the first analysis comparing the impact of parental and child time investments on cognitive outcomes in adolescence, applying an augmented value-added model that relaxes assumption that past inputs are irrelevant after controlling for the lagged test; within-pupil between-subject estimation relaxes the assumption that unobserved child-specific characteristics are independent of lagged test scores (Todd & Wolpin, 2003).

The estimation results show that adolescent cognitive development seems to be affected much more by the time invested by the child during adolescence than by the time invested during childhood. In contrast, maternal time investments during childhood matter more than during adolescence. When comparing the time children spend on their own versus the time they spend with their mother doing formative activities during adolescence, they find that the child's own time investment affects their test scores much more than the time investment of their mother. This finding highlights the importance of self-investments during adolescence and suggests potential channels through which cognitive development can be influenced at later ages, such as policies using financial transfers to encourage student effort and educational activities.

2.3. Grandparental care

Del Boca, Piazzalunga, & Pronzato (2014) used the Millennium Cohort Survey (MCS) for the UK to focus on the impact of grandparent versus other forms of care on child outcomes. The MCS provides very detailed information about different types of child care as well as several child outcomes. The results show that grandparental care does not differ significantly from, or are comparable in size and sign of, parental care. Compared with other types of child care, that provided by parents and grandparents to two-year-old children has a more positive impact on the child's ability to name objects, but a more negative impact of the child's ability to construct objects and grasp mathematical concepts. However, the positive association with naming abilities is stronger and significant for households with advantageous backgrounds (i.e., higher incomes and education), while the negative association with construction abilities is stronger for households with lower incomes and education.

2.4. Two-parent vs. single-parent households

The disparity in child outcomes according to household structures show that those from two-parent households perform better than those from single-parent households, and this may be ascribed to the difference in type of care or activities performed. Using Italian time diaries, Mencarini, Pasqua, & Romiti (2016) investigated differences in the behaviour and scholastic achievements of children from 5 to 18 years old from intact and non-intact families in relation to parental investments of time and money. Using the Italian Time Use Survey for the year 2008, which contains a detailed time diary for all family members above the age of three, they compared the amount of time spent by children living with both parents on more formative activities such as reading and studying, with that spent by children living with a single mother. They find that children from single-mother households spend less time reading and studying, especially in low-income households with low-educated mothers. Additionally, the negative effect of having a single mother is higher for single children.

3. Dimensions of children outcomes and their determinants

The second specific objective of WP6 was to analyse different dimensions of children outcomes and their determinants in terms of time and income investments and child care decisions. This was motivated by existing research exploring the determinants of child outcomes, which suggest that children's cognitive and non-cognitive outcomes are largely determined early in life. Because children are more malleable than adults, investments made in early childhood appear to have greater cumulative effects than investments made at later stages of life. Thus, the returns to investments in early childhood education have been found to be particularly high, especially for disadvantaged children (Carneiro & Heckman, 2003). As the family continues to be the primary investor in the human capital of children, the disparities in child outcomes are largely attributable to differences in the socio-economic status of the family. Parents vary not only in terms of their financial and monetary resources, but in terms the amount and the quality of the time they spend with their children.

An issue closely related to the questions raised about the investment of resources is how the increased participation of women in the labour force affects child development. Some observers have expressed concerns that maternal employment could have a negative effect on children, as working reduces the amount of time mothers have to spend with their children. This perception is widespread in countries with high levels of female employment, and in which child care options are more heterogeneous. Meanwhile, advocates of public intervention in child care provision offer two main arguments: (1) child care provides basic forms of care for children

and support mothers' participation in the labour market, and (2) child care provides early childhood education and may contribute to children's cognitive and non-cognitive development, leading to gains in the accumulation of human capital which benefit society.

Inputs from families as well as from the school system during early childhood play a very significant role in later cognitive, social, and behavioural outcomes. Child care institutions are important arenas for children's development, and expanding child care coverage is an explicit goal in many countries. Child care services provide opportunities for early socialisation, which can be particularly helpful to children from single-child families. Generally, investments in child care appear to lessen the intergenerational transmission of socioeconomic disadvantage. The potentially negative effect of maternal employment can then be offset by the provision of high quality child care, especially for disadvantaged children.

3.1. Time investments and maternal employment

Brilli (2015) analysed the effects of maternal employment and non-parental child care on children's cognitive development, distinguishing between maternal care and care provided by market services, taking into account the additional trade-offs that mothers make between spending time on leisure activities and on caring for their children. She estimates a behavioural model in which the maternal labour supply, time allocation, as well as the non-parental child care and the expenditures on the child, are considered as endogenous choices of the mothers. The child development process is seen as dependent on the amount of time a mother spends on child care, the amount of money she spends on goods for her child, and the amount of time the child spends in non-parental child care. The estimation of such a model allows to deal with the endogeneity and the simultaneity of all the mother's choices.

She uses the actual measure of maternal time instead of using a proxy allows to treat all of the mother's choices as endogenous, by linking information on the amount of time mothers spend with their children and the use of non-parental child care services, and by allowing both choices to be endogenously made by the mother. She also refers to a recent body of literature which assessed the effects of maternity leave policies on the subsequent development of new-born children, and which produced mixed results.

The contribution of this paper to the literature is threefold. First, a model is estimated which incorporates four endogenous choices of mothers' decisions regarding time allocation and investments in their children: namely, maternal labour supply, maternal time with the child, non-parental child care use, and expenditures on goods for the child. As the model imposes no restrictions on the relationship between the mother's labour supply and the amount of time the

mother spends on child care, it allows a direct estimation of the impact of maternal time investments on the development of the child, accounting for the fact that the mother chooses not only how many hours she works and how much time her child spends in non-parental child care, but also how much time she devotes to caring for her child instead of leisure activities. Second, this paper represents the first attempt to estimate the elasticity of children's abilities with respect to both the amount of time they spend with their mother and the amount of time they spend in non-parental child care. To the best of the author's knowledge, there are no studies that simultaneously evaluate the productivity of both the mother and of non-parental child care, taking into account the selection of mothers into work and child care use. To fill this gap, she uses a novel approach to linking data on the amount of time a mother spends on child care with information on the use of non-parental child care. Third, the research connects the literature that looks at the effects of maternal employment on children's cognitive outcomes with recent works evaluating the effects of maternity leave policies. The model is used to simulate the effects of policies aimed at increasing the amount of time the mother spends with the child after childbirth, in order to uncover the implications of these policies for the mothers' time allocation choices, expenditures on their children, and their use of non-parental child care.

The results show that the time a mother spends on child care is at least as productive as non-parental child care. Moreover, the productivity of maternal time varies with the mother's education: mothers with high levels of education have substantial productivity gains from substituting their time with non-parental child care, while the productivity of maternal time with the child is not statistically different from the productivity of non-parental child care for mothers with low levels of education

The estimated model is used to simulate the effects of leave policies. The results show that an unpaid leave has detrimental effects on children's test scores in the short run, while a paid leave has positive effects. This result confirms that mothers do not spend all of their time outside of work with their children, and that household income—which the mother can use to invest in the child's development process, either by purchasing goods or by paying for non-parental child care—also plays a role. Moreover, the heterogeneous productivity of mothers in the child development process and in the labour market yields different time allocations between child care and leisure, as well as different responses in terms of expenditures and non-parental child care use. Thus, in a paid leave policy scheme in which the payment is proportional to the mother's wage, highly educated mothers may be expected to increase their expenditures on goods for the child and on non-parental child care more than less educated mothers; this translates into a larger positive effect of the policy on the children of highly educated mothers

than on the children of less educated mothers. Hence, in contrast to a policy scheme in which the payment is equal for all mothers, this policy scheme would likely exacerbate the inequality in child achievement by the mother's level of education. The policies are found to have no effects in the long run.

3.2. Parent-child interactions and family constellations

With a sample of Italian children less than 14 years of age, Nazio (2015) looked at children time use among households categorized as: pure married, cohabiting, blended, and single-parent. She finds that two-parent households in Italy tend to follow a traditional gender division of labour (i.e., male breadwinner model), and that children from two-parent households receive more child care time. Unsurprisingly, the amount of child care time by mothers far exceeds those of fathers. The difference in parental involvement is biggest at the child's birth to early years, then declines progressively as the child grows older. Whereas children in cohabiting families seem to have an advantage over children from married parents, those from single parents and blended families experience a larger recourse to a structuring of their time and activities outside the family (more formal provision of education and courses).

She also finds that highly educated mothers are more likely to provide more engaged child care time. Mothers from higher social classes are better equipped to devote more 'engaged' time to their children and provide them with verbal and cognitive stimulus, translating to a more successful intergenerational transmission of cognitive and non-cognitive skills. Children living in families from higher social classes are likewise more likely to spend less time watching television and more in playing with PC or reading than those from a lower social background. Maternal employment plays a significant role in child care and child outcomes. Employment reduces the time available for child care for both parents, albeit more so for fathers. If the presence of others adult members seem to free mothers' time for engaged child care (possibly taking over more routine tasks), the differences between family types are not so pronounced, with the exception of single parents (who are the sole caregivers, thus have the entire amount on them) and partially for cohabiting mothers doing half an hour more child care per day, and 10 more minutes engaged child care (only barely statistically significant) than married mothers, net of other controls.

3.3. Child care and maternal education

Comparing children who experienced centre-based and home-based care arrangements in their early infancy, Bulgarelli & Molina (2016) showed that highly educated mothers are more likely to use formal centre-based care, and that children who had centre-based care during more epochs in their early infancy obtained better scores on linguistic and cognitive tests in preschool age with respect to children who had less centre-based experiences. They find significant effects of care types on children score outcomes when interacted with socio-economic backgrounds such as maternal education. Children from lower educational background had a higher IQ if they attended day care facilities; on the other hand, children whose mothers had a university degree showed a lower IQ if they attended day cares. This interaction was especially significant for pupils and observable for pre-schoolers.

3.4. Maternal employment and formal child care

Using a sample of Italian natives between 19 and 30 years old, Del Boca, Pasqua, & Suardi (2016) find that maternal employment significantly decreases the likelihood of achieving good grades in high school. This is offset by the use of public child care, which are greater for children who come from families with lower levels of education/income. The probability of getting good results in high school is also linked to socio-economic status.

Formal child care attendance between 0 and 2 years is found to positively affect school achievements in high school and increases the likelihood of obtaining high grades. High-educated mothers are also found to positively influence children's grades by as much as 34%, while low-educated mothers (and lower probability of being employed) decreases the likelihood of a child achieving good grades in high school. In this case, the "compensating" effect of child care use is important for later achievements in school.

3.5. Child care supply

Brilli, Del Boca, & Pronzato (2016) find positive effects of public child care on children's language test scores – a percentage change in public child care coverage increases mothers' probability to work by 1.3 percentage points, with the effect stronger in areas where the supply of child care is more limited. Exploiting cross-sectional variation in child care coverage across provinces, they concluded that a percentage change in public child care coverage increases children's Language test scores by 0.85 percent of one standard deviation of the scores distribution, and the effect is higher in areas where the supply of child care is more limited.

4. Differential impacts by gender

The third specific objective of WP6 was to address gender differences, by investigating whether parents' characteristics and child care have different impacts on girls' and boys' cognitive outcomes. This is in line with the evidence showing gender gap both in children and adult outcomes. For instance, female earnings have consistently lagged behind male earnings, despite increased female labour force participation. Similarly, girls have scored lower in achievement tests compared to boys, especially in Science, Technology, Engineering, and Mathematics (STEM). Meanwhile, non-cognitive and behavioural outcomes remain ambiguous, depending on outcome measurements, although evidence points to boys being more likely to take risks as compared to girls.

The two empirical papers here explore gender differences in outcomes and how interventions such as environment and parental supervision help in improving the child outcomes.

4.1. On cognitive outcomes

Gender-based disparity in education consistently show boys outperforming girls in the sciences, and child care can be used to close the gap. Using Italian PISA data, Addabbo, Di Tommaso, & Maccagnan (2016) looked at science education capability, focusing on the real opportunities that children have to become knowledgeable (educated) adults, by including some measures of non-cognitive skills. In addition to the test scores, they used indicators such as enjoyment in science, interest in science, general and personal values of science, self-efficacy (confidence in performing science-related tasks), awareness and perception of environmental issues, and responsibility for sustainable development.

Using a multiple indicators multiple causes model (MIMIC) allowed them to estimate the science capability as a latent construct of which it is possible to observe only some functioning, as well as to allow for the presence of exogenous cause variables that determine the latent capability.

The results showed that school activities that promote sciences improve girls' capability, and interactive methods of teaching improve both girls' and boys' capabilities. Similarly, the households' educational resources and possession are positively correlated with science education capability.

The major contribution of the paper is to provide a new concept of science education capability that is defined not only on test scores but on a broader set of indicators. This definition of the education capability is particularly relevant, as the results show, for analysing gender differences. Moreover, a MIMIC model is utilised, which allows to consider capabilities as

latent variables of which some indicators are observed, and to estimate the effect of individual, family, and institutional variables on the latent capability.

4.2. On non-cognitive outcomes

Parents are found to play significant roles in affecting non-cognitive and behavioural outcomes as well. Unsupervised children and youths are more likely to engage in risky behaviours such as skipping school, getting drunk or high with drugs, stealing, and hurting someone (Aizer, 2004; Averett et al., 2011). Children who do not receive adult supervision after school, also called “latchkey children”, are found to be the ones to most likely engage in substance use and other risky behaviours (Coley et al., 2008), have behaviour problems (Vandell & Ramanan, 1991), and experience depression and score lower academically (Richardson et al., 1993), as compared to those who arrive home with the mother or other adults present. Eighth-graders who participate in adult-supervised after-school activities are also found to use drugs significantly less often than those who are not involved in such activities (Jenkins, 1996).

The collection of time diaries, especially one taking the point of view of the child or teenager, provides a breakthrough in measuring parental time supervision directly and makes it possible to derive new insights into the role of parents in determining child outcomes. See (2016) re-examined the relationship between parental supervision and adolescents’ engagement in risky behaviours of cigarette smoking, marijuana smoking, and alcohol consumption. Parental time from fathers and mothers are also looked at separately, disentangling the relative importance of each in determining teenage behaviours. This is related to the recent changes in household structure (Hofferth, 2006), the decision-making process in the family, child care choices (Aizer, 2004), as well as increased female labour force participation and maternal work schedules (Richardson et al. 1993). The common practice in the literature has been to aggregate parental influence as one entity. If separated, maternal role has been relatively more explored in line with cognitive and educational outcomes, while paternal role has been investigated with respect to behavioural and non-cognitive outcomes (Cobb-Clark & Tekin, 2014).

Using a sample of adolescents 10-21 years old from the Child Development Supplement and Transition to Adulthood of the Panel Study of Income Dynamics, different measures of supervision are considered calculated using the time each parent spent with the child and aggregated into weekly hours. The results highlight the role of fathers in mitigating cigarette smoking in the past month, regular alcohol consumption in the past year, and marijuana smoking in the past month, especially among teenage boys.

This research adds to the relatively few studies examining adolescent behaviour as an outcome, especially as compared to ones of cognitive, achievement, and education addressing the issue of unobserved heterogeneity by including family fixed effects as an identification strategy. The application of identification strategies using a household fixed effects approach is made possible due to the observation of biological siblings in the dataset, and an individual fixed effects approach that is made possible due to repeated observations of the same individual.

The literature shows a rampant use of contemporaneous measurements of risky behaviours and parental time (Fertig et al., 2009), which raises the issue of simultaneity and endogeneity bias: do teenagers engage in risky behaviours as a consequence of the time spent with parents, or do parents spend time with their teenage offspring based on the latter's behaviours? With a panel dataset, this analysis uses lagged measurements of parental time to address the potential issue of simultaneity between contemporaneous behaviours and supervision, a solution also adopted in Zick et al. (2001).

5. Children outcomes, parental and formal child care in migrant and native families

The fourth specific objective of WP6 was to study how different forms of parental and formal child care influence children outcomes in migrant and native families. There is evidence on significant differences for children of different backgrounds, and that formal care may foster the development of the child to the same extent as maternal care. Formal child care is more beneficial to disadvantaged children, compensating the possible detrimental effect of living in disadvantaged circumstances. Thus, it may play also a significant role in reducing disparities. In addition, subsidised child care helps low-income mothers not to experience hour-related problem at work (Press et al., 2006).

The two empirical studies here look at how child care can affect child inequalities, particularly in closing the gap observed according to socio-economic characteristics and family background.

5.1. Formal care in UK

Del Boca, Piazzalunga, & Pronzato (2016) looked at the association between formal child care and child cognitive outcomes using the Millennium Cohort Study. They do an empirical analysis, allowing the effect of formal child care to be different for children from different family backgrounds, controlling for a large number of variables that are regarding the child, the mother, the father, and the household. They also do a simulation of how an increase in formal child care attendance can affect inequalities across children.

The findings show that the effects of formal child care vary for children from different family backgrounds. Child care attendance has a positive impact on child cognitive outcomes, which are stronger for children from low socio-economic background. Children in formal care perform significantly better in School Readiness at age 3, Naming Vocabulary at age 5, and Number Skills at age 7, with the effect being significantly larger for children with low-educated mothers. The research also simulates how an increase in formal child care attendance can affect children of different socio-economic backgrounds (proxied by income deciles). The findings show that attending pre-kindergarten reduces the dispersion in terms of cognitive outcomes, until when children in families with an income below or equal to the sixth (ninth) decile are allowed to be in formal care. The percentage of children with low scores decreases steadily (with the only exception being Picture Similarity).

5.2. Formal Care in Italy

Children with migration background generally have worse outcomes, but child care can act as a factor to close this inequality gap. Taking into account the family origins, Bulgarelli & Molina (2016) took a psychological approach and analyses the effect of early type of care (0-3 years of age) on the Theory of Mind and Emotional Understanding competences of a group of Italian pre-school children, considering gender migration background, and maternal education.

The results show that ToM and EU are not directly affected by type of care in early infancy, gender, and parents' origin. Children with migration backgrounds (both parents born in foreign countries) had better linguistic performances when they received home-based care in early years and had worse outcomes when they attended day care or centre-based services in early childhood. At the same time, the research finds evidence of interaction between maternal education and type of care. Children's outcomes at preschool age are affected by maternal education – children's IQ and VQ increase with higher maternal education. Children with low-educated mothers had higher IQ scores while those with high-educated mothers had lower IQ scores with the attendance of day care.

This is a first investigation of this topic in the Italian context.

6. Motivations of parents for using a particular source of child care

The fifth specific objective of WP6 was to deepen the understanding of the motivations of parents for using a particular source of child care.

Child care decisions are largely determined by time and space constraints, which is related with work-family life balance/conflict. Koslowski, McLean, & Naumann (2015) find mismatch between the demands of work and child care structure, such that parents struggle to juggle the two. This is true across several countries with different institutional settings. Parents use complex and dynamic strategies, and resort to accessing different modes such as grandparents, relatives, and babysitters to address these constraints and to complement the usage of formal child care services, considering their employment obligations.

In Germany where public child care is highly subsidised, parents' use of private in-home care is relatively low. The availability of provision for children less than 3 years old remains low despite an expansion in legislation, not to mention regional disparities in access to child care facilities. The Hungary case sees a similar shortage in public places for eligible children, leading to overcrowding. While there is no cost for attendance, parents are concerned with the costs for food and other activities. There is also an inequality with respect to access to child care, with those from the lowest socio-economic groups (e.g., Roma people) having the most difficult accessibility. Children in family day care and home child care services remain low, with those not in nursery often assumed to be in the care of the parents (usually mothers) themselves or of the grandparents. The Italian case has a similar shortage with significant geographic variation, especially for children under three years old. Because of the existence of long waiting lists for pre-school, lack of trust in the quality of the public system, and inadequate incentives for female labour market participation, it is common for mothers to stay at home and/or to access informal care by other family members such as grandparents. In Slovenia where there is high female labour market participation, the challenge is the (mis)match between work hours and kindergarten hours. Meanwhile, Sweden has a relatively high attendance for pre-school – most children are enrolled full-time by the age of 2, mostly in public settings. As such, the concerns are centred on the quality of ECEC and on opening times including child care for parents who work irregular hours. Private provision of child care, both regulated and unregulated, is more common in UK. Affordability is a big concern, with the existence of high government expenditures and some of the highest fees payable by parents. There is also a mismatch in work hours and child care time.

7. Families with disabled children in European countries

The sixth specific objective of WP6 was to study families with disabled children in different countries of Europe concerning child care and implications on well-being of all family members.

Di Giulio, Philipov, & Iaschinsky (2014) looked at families with disabled children, and found them to face stigmatization and exclusion, along with substantial psychological and physical stress. They have i) more traditional gender roles with stay-at-home or part-time employed mother and breadwinner father, (ii) fathers working longer hours to meet the increased financial needs of the family, (iii) less leisure and family time and more pressure on the parents due to greater tension/stress which are likely to lead to divorce or break up, and (iv) healthy siblings tend to leave the parental home much later than those in families without disabled children, as they provide help to the rest of the family. There are observable disparities between Eastern and Western countries.

8. Social and health implications of child home care versus municipality day care in Finland

The seventh specific objective of WP6 was to study the social and health implications of child home versus municipality day care in Finland; and to compare the results with other European countries addressing association, if any, between specific child care arrangements and later cognitive achievement of children.

8.1. Finland case

A child home care allowance (CHCA) scheme was introduced in Finland in the mid-1980s as a way to offer an alternative support to families who did not take advantage of public child day care services while their youngest child was less than three years of age. If the family had an older child under the formal school age (7 years old), the support was extended through sibling supplement until the older child started elementary school; in other words, the government supported home care of children until formal school age.

The CHCA scheme has been criticized as a trap for women, since it offers an incentive for women to stay at home instead of participating to the labour market (Sipilä, 1995; Hiilamo & Kangas, 2010). Hiilamo, Haataja, & Merikukka (2015) investigated if CHCA is also a trap for pre-school children who stay at home with one of the parents (usually mother) who takes care of a younger sibling. More specifically, the research is interested in the school performance of Finnish six-year-olds who stay at home as compared to children attending public day care. Two dichotomous outcome variables are used: (1) school performance at age 15 to 16 and (2) entry into further education by age of 21.

The study uses Birth cohort 1987 data, linked to highly reliable administrative registers that provide crucial life-course information about the cohort members and background information about their parents. The authors merged the original cohort data with the Social Insurance Institution (SII) benefit register on CHCA, parental benefits and unemployment benefits.

The authors compare educational outcomes of two groups of cohort 1987 members, who had a younger sibling entitling the family to CHCA, one where the cohort member was at home with the younger sibling and the other where both children were in public day care. The results indicate that staying at home with a younger sibling before the formal school age is not associated with poorer educational outcomes. There is weak evidence that boys with low-educated mothers may perform worse in school if they stay at home, while girls with poor mothers may get worse school grades if they stay at home with younger sibling. Therefore, to answer the question if CHCA is a trap for six-year-olds our response is a cautious “no”. However, there are concerns that day care is a more suitable solution to improve educational outcomes for children from disadvantaged backgrounds.

8.2. Cross-country macroeconomic comparison

The relevance of investments made in early years is underlined with a macroeconomic, cross-country analysis of how government expenditures in education affect outcomes in Del Boca, Monfardini, & See (2016). By combining data from the PISA, Social Expenditures Survey, and World Development Indicators, education outcomes are regressed on government education expenditures and early investments. Results show that higher early investments, as evidenced by a higher share of the cohort having attended pre-primary education, improves cognitive and education outcomes. In light with the 2008-09 European debt crisis, a parallel analysis was also done among a subset of countries that were moderately, or were relatively less affected by the fiscal crisis, and the results show that the patterns are driven by this group, implying a more active protectionist role among these countries.

9. Conclusions

The WP6 looked at child care and child outcomes, their determinants and consequences. One striking result among several studies is that parental care is separable, as mothers and fathers have different roles in affecting child outcomes. Most of the existing literature considered parental care as synonymous to maternal care, in line with the increased female labour force participation and the traditional family value system. However, recent changes in the

institutional, demographic, and family beliefs have encouraged a more active father role in the child rearing process.

With respect to time and financial investments, results indicate that parents' financial investments are important (Brilli, 2015) but are less productive than time investments in producing child quality (Del Boca, Flinn, & Wiswall, 2014).

Disparities according to demographic and socio-economic characteristics exist, and may be attributable to the difference in type of care or activities performed. The disparity in child outcomes according to household structures show that those from two-parent households perform better than those from single-parent households, and this may be ascribed to the difference in type of care or activities performed. Child care can then provide a channel to reduce inequality gaps, as it benefits more the disadvantaged children. Maternal education and socio-economic status play a (positive) significant role in child care usage and child outcomes, as well as in the time use of the child.

The findings highlight some important aspects to consider in formulating effective policies (Del Boca, Flinn, & Wiswall, 2016).

1. Family-friendly policies such as parental leave must consider both parents, as time investments from parents are separable. Moreover, they should consider the timing of intervention according to the effectiveness in improving child outcomes.
2. A closely related issue with the timing of care is the duration (and age of entry) of enrolment in child care. See (2015) finds preliminary evidence that longer external care, particularly more than 36 months of formal care, improves short-run verbal child outcomes.
3. Our empirical findings confirm the hypothesis that early investments (private and public) in children are likely to significantly increase cognitive outcomes and are crucial to success later in life. Multiple actors contribute to the child development process. While mothers' input, particularly in early childhood, is clearly crucial, fathers and even grandparents are also important. High-quality formal child care can also be very beneficial, especially for children in low-income households. Policy-makers should carefully consider the influence of all these inputs when designing programs to improve children's cognitive and non-cognitive skills.
4. The results of the analyses and policy simulations discussed here suggest that policies encouraging and supporting parents' efforts to spend more time with their children during early stages of development and policies promoting the development of high-quality formal child care have positive impacts on child outcomes. The results also show that the positive

association between formal child care and positive child outcomes is stronger for children in more disadvantaged homes. Children in families with higher income and more education already receive substantial early investments within their families and have more resources and opportunities available to them. Low-income households often lack the resources needed to support and stimulate child development, so children in these homes are likely to receive less investment from their families and to have access to fewer resources.

5. The positive link between parental leave and child outcomes are coherent with a comparative study of 18 OECD (Organization for Economic Cooperation and Development) advanced industrialised countries, which assessed the outcomes of parental leave policies on several child outcomes (Tanaka, 2005). Covering more than three decades (1969-2000), the study shows very positive impacts given that parental leave policies provide parents with additional time to invest in taking care of their young children.
6. These results have important implications for governments support both to parental leave policies as well as to policies supporting the provision of affordable child care. There is a strong case for providing public funding of early childhood programs for disadvantaged children. Universally accessible reduce inequalities across children from different socio-economic backgrounds.
7. Policies must also consider different sub-populations. While there is a general need for the expansion of child care provision for adequate and homogenous coverage, different subgroups have different needs and policies must give particular attention to those from disadvantaged backgrounds in order to reduce inequality gaps.

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