

**This item is the archived peer-reviewed author-version of:**

Reducing inequality in childcare service use across European countries : what (if any) is the role of social spending?

**Reference:**

Van Lancker Wim.- Reducing inequality in childcare service use across European countries : what (if any) is the role of social spending?  
Social policy and administration - ISSN 0144-5596 - 52:1(2018), p. 271-292  
Full text (Publisher's DOI): <https://doi.org/10.1111/SPOL.12311>  
To cite this reference: <https://hdl.handle.net/10067/1484840151162165141>

# **Reducing inequality in childcare service use across European countries: What (if anything) is the role of social spending?**

## **Abstract**

Childcare services are increasingly put forward as one of the most important policy levers to combat poverty and inequality. Higher income families use childcare services to a much larger extent than lower income families, however. Almost all European countries increased expenditures on childcare over the past years. But has an ever-increasing public spending on childcare provision led to more equality in its use? In this article, the relationship between spending and childcare use as well as between spending and inequality in childcare use over the period 2006-2012 is empirically analyzed using a random effects model drawing on country-level panel data ( $n = 156$ ), derived from the EU-SILC and OECD SOCX databases. Since governments can spend money in different ways, it is discussed whether a public or a market-based strategy to subsidize childcare provision is related to more equality. The results suggest that more spending leads to higher levels of childcare use, but not directly to lower levels of inequality. For achieving equity in childcare use, government investment should lead to an expansion of childcare places across the income distribution. The findings allow to formulate new hypotheses regarding the role of the private market in childcare services provision.

## **Keywords**

childcare, spending, inequality, convergence, service provision, social investment

# **Reducing inequality in childcare service use across European countries: What (if anything) is the role of social spending?**

## **Introduction**

Childcare services are increasingly regarded one of the most important policy levers to combat poverty and inequality. The provision of high-quality childcare is expected to increase employment rates by allowing parents to engage in paid employment as well as to benefit the cognitive and non-cognitive development of young children. These benefits are in particular important for children from a disadvantaged background, increasing the probability of later educational success and improving labour market prospects (Heckman 2006; Waldfogel and Washbrook 2011). These scientific findings have been translated in a political focus on early childhood by international bodies such as the OECD (2006; 2008), World Bank (Paes de Barros et al. 2009), and United Nations. In 2010, the Director General of UNESCO even deemed childcare “the greatest of equalizers” (Morabito *et al.* 2013). Given this, it is no surprise that European governments are encouraged to invest more in childcare services. In its 2013 Social Investment Package, the European Commission stresses the importance of investing in early childhood through high-quality childcare provision in order to break the intergenerational chain of poverty and exclusion (European Commission 2013).

Such optimism seems ill-advised, though. Previous research clearly shows that the use of childcare services is socially stratified across European countries: children living in higher income households or in households with a higher educated mother are much more likely to be enrolled compared with their peers living in lower income households or with a lower educated mother (Author 2011; 2013). It is argued that such inequality in use is detrimental to the idea

that the provision of childcare services might be an effective way to tackle social inequalities in early life. As a result, children starting with an initial advantage because they grow up in families providing them with a stimulating learning environment, enjoy disproportional rewards from being exposed to high-quality childcare relative to their disadvantaged peers. Such scenario is the exact opposite of what is intended by international organisations when they advocate an increase in spending on childcare services.

In this article, I aim to further our knowledge on childcare as a potential equalizer by investigating the impact of spending on inequality in childcare use. Almost all European countries have increased expenditures on childcare over the years. But does such increase in government expenditures also lead to a better performance in terms of equity? On the basis of several cross-sectional waves of EU-SILC data (2006-2012) and spending data derived from the OECD SOCX database (2005-2011), the aim of this article is, first, to empirically investigate the country-level relationship between government spending on childcare and inequality in childcare use. Second, since governments can spend money in different ways with potentially different outcomes, it is discussed whether governments should pursue a public or a market-based strategy to subsidize childcare provision in order to increase equality in its use.

## **Background**

In the pedagogical literature, the term childcare often refers to early childhood education and care (ECEC) services, a generic term including not only formal care services such as day-care centres and crèches but perinatal and home-help services as well (see Kamerman 2000 for an overview of different policy measures that are included under the ECEC umbrella). In this

article I will use the term childcare (services) to refer to *formal care services*, as it is used in the social policy literature and in EU policy documents (e.g. Plantenga and Remery 2009).

Previous research decisively shows that the use of childcare services is socially stratified in the majority of developed economies. Cross-country comparative studies provide ample evidence that higher income families or families with a highly educated mother use childcare services to a much larger extent than lower income families or families with a lower skilled mother (Author 2011; 2013). Other research endeavours focusing on single countries found similar patterns, for instance in the US (Fuller and Xiaoyan 1996; Meyers *et al.* 2004; Greenberg 2011) and in several European countries (e.g. Abrassart and Bonoli 2015; Krapf 2014; Vandebroek *et al.* 2014; Author 2012; Del Boca and Pasqua 2005; Spieß *et al.* 2003). Only Denmark, Iceland and to a lesser extent Sweden report equity in childcare use amongst young children from different socio-economic backgrounds (Meager and Szebehely 2012).

How can such inequality in childcare use be explained? Earlier studies focused on the impact of costs on the labour supply of women and found that expensive childcare services decrease the labour supply of women with low earnings potential, such as women with lower levels of education (Blau and Robins 1988; Connelly 1992). Recent studies, however, tend to focus more on the availability of places in childcare in determining enrolment decisions (Wrohlich 2011), although some scholars argue that the impact of childcare costs should not be underestimated still (Abrassart and Bonoli 2015). Single-country studies found that the social differential in childcare use within countries is most strongly related to structural factors, such as shortage in the number of available childcare slots, the availability and generosity of parental leave schemes, and employment opportunities in the labour market (Del Boca and Vuri 2007). Already in 2008 the European Commission highlighted that the demand for formal systems of

childcare was not being met by European countries, in particular for children under the age of three (European Commission, 2008). Given the fact that labour market opportunities are not evenly distributed across families, with e.g. vast differences in maternal labour market participation by educational level (Evertsson et al. 2009), and that childcare providers generally prioritize working parents, disadvantaged families with only a weak labour market attachment are often unable to secure a place in formal childcare services (European Commission 2014). Hence the relationship between (maternal) employment and childcare use is reciprocal, in that the availability of childcare enhances the opportunities for mothers of young children to work while being employed is often an important condition to use childcare in the first place (Steiber and Haas 2012). Moreover, high-educated mothers rely on their human capital to select childcare services for their young children while low educated mothers face information constraints and end up on waiting lists. Disadvantaged families are hardly able to plan their childcare needs well in advance since they often find themselves in precarious and flexible forms of employment, if they are employed at all (Vandenbroeck et al., 2008). Some scholars emphasize the importance of personal preferences in explaining childcare use, but empirical studies have shown how differences in parental preferences are also molded in differences in availability, as one can hardly desire what is not available (Henly & Lyons, 2000; Vandenbroeck *et al.* 2014). Yet, even in countries where childcare slots are available as a legal right, such as Sweden or Denmark, not all parents enroll their children. Previous research showed that parents with more traditional attitudes regarding motherhood and employment are less likely to work and to use formal childcare (Fortin 2005). Since such traditional attitudes are more common amongst low educated mothers, this might explain part of the social gap in childcare use (Duncan *et al.* 2003).

The few macro-level quantitative studies that were carried out so far emphasize the role of government involvement in levelling the playing field: countries spending more on childcare services achieve higher levels of childcare as well as more equity in childcare use (Author 2013; Allen 2003; OECD 2006). These previous research endeavours were static, however, looking at inequality in childcare use at one point in time. Such an approach might be misleading if increased government spending on childcare services over time does not bring about less inequality in childcare use over time.

### **Research questions**

Although there is a large body of research investigating the impact of social spending on income inequality (e.g. OECD 2008), to my knowledge no study looked into the relationship between social spending and inequality in childcare service use. Some researchers explored the determinants of childcare spending and childcare provision. Bonoli and Reber (2010) empirically investigated political arguments for public spending on childcare expansion across OECD countries. They found that childcare demand, as measured by women's employment, as well as partisan effects (as measured by the presence of social democratic and religious parties, and the share of women in parliament) are related to public spending on childcare. Moreover, they also found evidence for a crowding out effect: countries that spend more on old age have little budgetary room to manoeuvre and usually spend less on 'new risk policies', including childcare services. Henderson and White (2004) investigated the determinants of childcare service provision and early childhood education services. They too found that demand factors such as women's employment rates and size of the population are positively associated with childcare provision. Moreover, their results suggest that total social expenditure is positively related to levels of childcare provision.

The question remains however whether spending on childcare services has an impact on inequality in childcare use. There are two potential mechanisms through which government spending could impact on childcare equity.

*First*, the impact of government spending on childcare inequality could be of a direct nature. If governments spend more money on childcare services in the form of additional childcare slots that are available only to disadvantaged parents or are located in disadvantaged neighbourhoods, or in the form of subsidies (e.g. vouchers, tax relief) accruing to disadvantaged parents, then increasing levels of government spending might yield lower levels of inequality in childcare use. This is of course conditional on the assumption that childcare use amongst higher income or higher educated families, for instance relying on non-subsidized services, does not increase *faster* than childcare use amongst lower income or lower educated families. This is basically a strategy of *targeting* childcare funding towards disadvantaged children (e.g. Hatfield et al. 2014; Elango et al. 2015).

*Second*, an indirect way through which government spending on childcare services might impact on inequality in childcare use is by a general expansion of the number of available childcare places, akin to the well-documented saturation effect in higher education (Arum et al. 2007). Educational expansion tends to reduce inequality in educational attainment from the moment higher education attendance of advantaged groups reaches a certain threshold. Simply put: if the majority of eligible persons from an advantaged background attend higher education, any further expansion reduces inequality in attendance. An important implication is that strong expansion can reduce inequality, even when social selection in education persists (Shavit et al. 2007). A similar reasoning can be developed for childcare use. Previous findings (see above)

suggest that in case of rationing, advantaged families will benefit first and foremost from the available childcare supply, and that childcare use will be highly correlated with employment opportunities. Once demand is met amongst advantaged families, however, any additional place will start reducing inequality. A strong expansion of childcare use, then, should coincide with a reduction in inequality. More spending should lead to more equality because availability becomes more widespread, which is a strategy of universalizing childcare coverage (Esping-Andersen 2005). In this case, the relationship between spending on childcare services and childcare inequality is mediated by the level of childcare use.

Given these two potential mechanisms, I will explore the following research questions:

Research question 1: *does higher spending on childcare services lead to higher levels of childcare use?*

Research question 2: *does higher spending on childcare services lead to less inequality in its use?*

Research question 3: *does an increase in childcare use coincide with a decrease in inequality in its use?*

[Figure 1 about here]

Figure 1 shows how the direct and indirect mechanisms might influence childcare inequality. If government spending influences childcare inequality in a direct way, one would expect an increase in government spending to be directly related to lower levels of inequality (pathway

a). If the indirect mechanism is more relevant, one would expect that higher spending leads to higher childcare participation rates (pathway b) but not necessarily to lower levels of inequality, while higher levels of childcare use, then, should be related to lower levels of inequality (pathway c). In that case, not spending as such but expansion of coverage is key.

Adding to the complexity of the issue, governments differ in the way *how* public budgets are spent. Some countries (e.g. the United Kingdom and the Netherlands) subsidize parents through a voucher system or tax credits while leaving actual provision to the market, other countries subsidize not-for-profit providers (e.g. Belgium, France, Portugal), while in still others childcare services are mainly provided by the government (e.g. Sweden, Denmark). In a context of demand-side subsidies such as childcare vouchers or tax credits and private-market supply of services, quality is often low, prices are high, and availability is volatile (Lloyd and Penn 2012). For instance, the Dutch government switched from publicly funding services to demand-side subsidies with its 2005 Childcare Act, emphasizing parental choice whilst leaving provision to the private market (Morel 2007). Although recent evaluations show that the number of childcare slots available grew considerably, for-profit companies providing childcare services tended to settle in well-off neighbourhoods with high demand and ditto purchasing power, in pursuit of maximizing returns (Noailly and Visser 2009; Akgunduz and Plantenga 2014). In fact, subsidizing parents does not necessarily influence the spatial availability and quality of service provision, unless a mixed strategy of regulation, supply-side and demand-side subsidies is adopted (Penn 2014). The literature hence suggests that a demand-side strategy will be less effective in reducing inequality in childcare participation. Due to data limitations, these factors are not included in the multivariate models below, but I will come back to this issue in the discussion.

## **Data, variables and method**

### *Data*

Data are drawn from EU-SILC (*European Union Statistics on Income and Living Conditions*) and the OECD SOCX (*Social Expenditures*) database. The EU-SILC is used by Eurostat to monitor childcare use in European countries. It includes a variable measuring the number of hours a young child was enrolled in various types of formal services (centre-based, professional child minders, day-care centres) in a regular week. I have data for 23 European countries over seven years (from 2006 to 2012). Focus is on the youngest children aged 0-2 which allows for comparison of homogenous groups, something that is not possible for children over the age of three as the role of educational systems then becomes very diverse (e.g. compulsory schooling starts at different ages in several European countries).

### *Estimation method*

The analysis is based on an unbalanced panel in which 156 observations are distributed across 23 countries (N) and 7 years (T). Reliable data<sup>2</sup> on maternal employment is not available for the Slovak Republic in 2009, 2010, 2011, and 2012, and France is not included in the 2008 EU-SILC data. Panel data are appropriate to study dynamics of change, but Ordinary Least Squares (OLS) regression models are not suitable for such data due to the presence of serial correlated error terms (Hicks 1994). For instance, one cannot assume that social spending within a country is independent over time, which means that the error terms of different years will be correlated.

Several estimation methods to properly analyze panel data are proposed in the literature. Bonoli and Remer (2010) estimated a pooled regression analysis with panel-corrected standard errors (PCSE). However, Beck and Katz (1995) noted that this estimation method is only suitable for Ts larger than 20. Since I have more N (country observations) than T (time points), a PCSE pooled regression model is less appropriate for my purposes. To deal with this problem, it is suggested to use Fixed Effect (FE) or Random Effect (RE) models (Bartels 2008). Both modelling approaches account for unobserved heterogeneity inherent in clustered data. In fact, an F-test and the Breusch-Pagan LM test showed that the presence of fixed effects (FE) as well as random effects (RE) cannot be rejected. Here I use the RE estimation technique because this is a more efficient method of estimation in small samples. In contrast, FE models absorb approximately  $1/T$  degrees of freedom (Wooldridge 2003). Formally, a Hausman (1978) specification test indicated that a RE was preferable to a FE model as well. As a robustness check, however, I also estimated FE models (results in annex) which can be interpreted as lower-bound, conservative estimations. The results are consistent with those of the RE models. Data and models used throughout this article are available on the author's website.

### *Variables*

The dependent variables are *childcare use for children aged 0-2 years* and *inequality in childcare use for children aged 0-2 years*. Care use is measured as the number of children aged 0-2 years enrolled in formal childcare services as a proportion of all children aged 0-2 years. I apply a full time equivalent (FTE) measure of care use in order to take into account differences in the intensity of care use (i.e. hours of attendance per week). Formally, FTE care use represents the proportion of children who would be receiving childcare if all existing care use would be full-time (30 hours per week or more). The calculation is as follows:  $FTE = \text{proportion}$

of children in formal childcare \* average number of hours per week (as % of 30 hours per week). As a robustness check, the participation rates (head counts) were tested as well, with similar results.

*Inequality* is measured using a relative index of inequality (RII) in FTE childcare use on the basis of equivalized disposable income. Such regression-based RII is often applied in the empirical literature on socioeconomic disparities in health (Kakwani *et al.* 1997; Keppel *et al.* 2005). It offers some advantages over other inequality indices, such as the inequality ratio (IR) that was used in previous research on childcare inequality (Author 2011). E.g. the RII is calculated over the full range of the income distribution and not only over low and high income levels, as is the case with the IR. This allows meaningful comparison between countries.

First, income quintiles for families with young children are calculated based on equivalized disposable household income in order to rank these families from low to high incomes. Second, for each country in the dataset, a slope index of inequality (SII) is calculated by means of an OLS regression in which FTE childcare use is the dependent variable and income quintile the independent variable, adjusted for age. The SII is in fact the slope of the regression line and should be interpreted as the absolute effect on FTE childcare use of moving from one income level to the next. The age adjustment captures cross-country differences in the age children usually start being enrolled in childcare services. Third, because the SII is sensitive to the mean FTE use of the sample population, the SII is divided by the weighted average of FTE childcare use in each country in order to obtain the RII. See Mackenbach and Kunst (1997) and Keppel *et al.* (2005) for further reading on the calculation and application of a regression based relative index of inequality. The RII takes a value of 0 if childcare use is equal across income levels, a positive value if inequality is biased against lower incomes and a negative value if inequality

favours lower incomes. I also tested a concentration coefficient as an indicator of inequality in childcare use, with robust results.

The independent variable of interest is *spending on childcare services*. Data are obtained from the detailed OECD SOCX database which categorizes absolute amounts of yearly spending on ECEC services. The database allows to make a distinction between spending on pre-primary education for children above 3 years and spending on childcare services for childcare below 3 years old. This is a superior measure of childcare spending compared with earlier research, since these included much broader categories of spending on other child-related policies. At the same time, childcare spending is still a broad category which can include spending on services, regulation, as well as on tax deductions or vouchers for parents. As discussed in the previous section, such distinction is highly relevant and I will come back to this issue when discussing the results. The variable is expressed as % of GDP.

One important issue is that the data include the period 2008-2010 in which the Great Financial Crisis struck, with dire consequences for living standards, employment rates, and economic growth in many European countries (Jenkins et al. 2013). For that reason it is indispensable to control for employment and economic development in the multivariate models (see below). Moreover, spending measured as % of GDP might be biased since the GDP denominator fell in many countries during the economic downturn. Corroborating this, table A2 demonstrates that in many countries, including Greece, Estonia, Italy, and Portugal, childcare use actually decreased while spending remained constant or even increased. Therefore I tested an alternative measure of spending, measured as the amount of spending on ECEC per child in real terms (i.e. adjusted for inflation). Since the results (not shown) do not change at all, spending is reported as % of GDP, which is easier to interpret.

Because (inequality in) childcare use is expected to be driven not only by deliberate (political) efforts to increase childcare provision, but also by demand and demographic as well as economic pressures, I include the following control variables. First, *Maternal employment*, calculated as the employment rate of mothers with a youngest child under 3 years (adhering to the ILO definition of employment of having worked at least 1 hour during the reference week) as a proxy for childcare demand. Because the relationship between maternal employment and childcare service use is reciprocal (Steiber and Haas 2012), the variable should be positively related to childcare use. Moreover, if more mothers from a disadvantaged background engage in paid employment compared with their advantaged counterparts, then childcare demand should be negatively related to inequality in childcare use. The variable is calculated on the basis of EU-SILC. Second, the *proportion of the population 0-5* calculated as a share of the total population to control for demographic pressures. Third, the natural logarithm of *GDP per capita*, expressed in 2010 US dollars, to control for level of economic development. It is expected that the level of economic development (at least partly) determines the scope for social spending. Fourth, research suggests that family policy measures such as parental leave will have an impact on childcare use as well as on inequality in childcare use (Hegewisch and Gornick 2011). To capture this, I also include a variable *period of well-paid leave* and its square, drawn from the Multilinks database<sup>1</sup>. Well-paid is defined as amounting to at least 60% of average wage. I use a measure of well-paid leave, and not the total length of (paid or unpaid) leave, because it is expected that precisely the combination of long duration with reasonable compensation will be a disincentive for disadvantaged mothers to engage in paid employment (e.g. Nieuwenhuis 2014). The trend is expected to be curvilinear, with short and well-paid leaves associated with lower inequality in childcare use and long, well-paid leaves with higher inequality. Here I follow the approach outlined in Keck and Saraceno (2013) where squared

leave is centred at 9 months. A positive sign for this estimate would indicate that a well-paid leave scheme that lasts more than 9 months is associated with higher levels of inequality in childcare use. Finally, due account will be taken of a potential saturation effect, i.e. that the effect of more government investment above a certain threshold of ECEC use will be limited, by including dummy variables in the regression models for countries in which FTE childcare use has surpassed a certain threshold (similar to the approach used in the literature on inequality in higher education, e.g. Arum et al. 2007). The threshold is set at 2 standard deviations of the mean, but other thresholds have been tested as well, with similar results.

Bonoli and Remer (2010) noted that childcare is a domain in which issues of reverse causality are particularly salient. Moreover, the process of change affected by social spending is bound to be slow: one cannot expect investments in childcare to have an immediate impact on childcare use, certainly not in the case of supply-side subsidies. To account for (at least part) of this inertia and for the issue of reverse causality, the independent variables are lagged one year. Descriptive statistics for the variables are shown in Table 1.

*[Table 1 around here]*

## **Descriptive results**

### *Trends in childcare spending*

Table 2 summarizes changes in spending, childcare use and inequality in childcare use in 23 European countries. Average spending on childcare services increased from 0.63% to 0.78% of

GDP between 2005 and 2011. Countries such as Iceland, the Netherlands, Ireland, Sweden, Poland, and Norway quite substantially increased their childcare efforts. E.g. the Netherlands and Poland almost doubled their budgetary effort (89% and 82%), Ireland increased its budget by 71%. Still, Ireland spends less than average on childcare services. In three countries spending declined: Slovenia, the Slovak Republic, and Hungary. In several countries, the increase was modest or non-existent (e.g. Greece, Italy, France). In 2011, spending levels ranged from 0.1% of GDP in Greece to 2.0% of GDP in Denmark. The coefficient of variation slightly decreases, which indicates (some) convergence in spending levels across countries over time.

*[Table 2 around here]*

#### *Trends in childcare use and childcare inequality*

Table 2 shows that across 23 countries included in the sample, FTE use shows a modest increase of 3 percentage points (p.p.). Such general figure disguises substantial variation between countries, however. In some countries FTE use increased strongly; in particular in Germany (+13 p.p.), Luxemburg (+12 p.p.), Slovenia (+12 p.p.), Iceland (+9 p.p.), France (+8 p.p.), Norway (+7 p.p.), and Greece (+7 p.p.). In other countries FTE childcare use decreased, notably in Denmark (-5 p.p.), Spain (-5 p.p.), Italy (-5 p.p.), and the United Kingdom (-7 p.p.). Here too, the coefficient of variation provides some evidence for convergence in childcare use. Given the importance attached to childcare services at the European level, this is what one would expect to observe.

Table 2 demonstrates that inequality in FTE childcare use did not decrease substantially (-1%, -0.002). In 2006, the RII ranged from 0.01 in Iceland (an RII of 0 means that children from

different income groups use FTE childcare to the same extent) to 0.58 in Ireland. The coefficient of variation remained the same which means that inequality levels did not converge between countries. Some countries report an above-average decrease of inequality: Slovenia, Austria, Hungary, France, the Slovak Republic, Greece, and the Netherlands. Others report an increase in inequality: Denmark, Iceland, Italy, Estonia, Portugal, the United Kingdom, and Belgium. From a social investment point of view, the challenge for most countries lies in increasing childcare participation while simultaneously ensuring equity. This is what happened in Austria, Poland, the Netherlands, and Slovenia.

### **Multivariate results**

The first two columns in Table 3 display models estimating the impact of lagged spending on childcare use (RQ1), the next two columns display models estimating the impact of lagged spending on inequality in childcare use (RQ2), while the final columns display models estimating the impact of childcare use on inequality in childcare use (RQ3). The  $R^2$  statistic shows that lagged spending is much better able to predict FTE childcare use (m1) than inequality in FTE childcare use (m3).

*[Table 3 around here]*

A drawback of a RE model is that the coefficients are difficult to interpret because both within-entity and between-entity effects are included. Model 1 (m1) in Table 3 shows that childcare spending as a percentage of GDP in  $t-1$  is strongly related to childcare use in  $t$ . More specifically, the estimate shows the average effect of childcare spending on childcare use when spending changes across time and between countries by one unit. Here, a 1 p.p. change in

childcare spending in t-1 yields a 16 p.p. increase in FTE childcare use. Estimates based on a FE model yield a 12 p.p. increase in FTE childcare use per 1 p.p. change in spending (results available in annex). The estimates in model 2 (m2) suggest that spending in t-1 is associated with higher use in t, even controlled for demographic pressures, economic development, the availability of well-paid leave, and maternal labour market participation. The estimates of these control variables demonstrate that not demographic pressure, childcare demand through maternal employment, or economic development in t-1, but the length of well-paid leave is related to more childcare use in t. The impact of well-paid leave is curvilinear: well-paid leave schemes that last for more than 9 months are associated with lower levels of childcare use; shorter periods of leave are associated with higher levels of childcare use.

As for research question 2, model 3 (m3) shows a non-significant estimate of spending in t-1 on inequality in FTE childcare use. To be precise, a 1 p.p. increase in spending on childcare is associated with a 0.03 unit reduction of inequality; this is less than half a standard deviation. Controlled for demographic pressures, economic development, maternal labour market participation, and well-paid leave in model 4 (m4), the estimate becomes even smaller. The results therefore suggest that spending in t-1 does not yield less inequality in FTE childcare use, at least not in a direct way. Confirming theoretical expectations, the duration of well-paid leave is related to inequality in childcare use. The availability of well-paid leave schemes is related to higher levels of inequality either when it's very short or when it lasts for more than 9 months. This corroborates previous research suggesting that long periods of well-paid leave are in fact a labour market disincentive for mothers with low earnings potential (Nieuwenhuis 2014). In contrast, maternal employment, demographic pressures nor economic development seem to be related to inequality in childcare use.

To test whether the indirect mechanism through childcare expansion holds, I test the relationship between FTE childcare use and inequality in childcare use in models 5 and 6. The relationship between FTE childcare use and inequality in childcare use is negative and significant: a 1 p.p. increase in FTE childcare use is associated with a 0.0032 unit reduction in inequality ( $=-0.323/100$ ). The coefficient remains robust even controlled for spending in model 6. To put this in perspective, cutting inequality in half over the period 2006-2012 would have required an across the board increase in FTE childcare use of about 31 p.p., *ceteris paribus*<sup>3</sup>. No European country came even close to such achievement. Model 7 adds a dummy to test for a saturation effect. While the coefficient for FTE childcare use and the other coefficients hardly change, the dummy is not significant. This suggests that it is not necessary for a certain threshold to be surpassed before inequality can start to attenuate; achieving more equity in childcare use is possible at lower levels of average childcare use as well.

The fact that 1) more spending is not related to less inequality but more FTE childcare use is; and 2) more spending is associated with more FTE childcare use, suggests that the relationship between spending on childcare and inequality in its use is mediated by levels of childcare use. Mediation means that the direct effect between an independent variable (here: spending on childcare) and an outcome (here: inequality in childcare use) is modified or suppressed by a confounding variable (here: FTE childcare use) (Hayes 2013). Important to note is that mediation can occur even if the direct relationship is not significant, as seems to be the case here (Cohen et al. 2013).

One approach to make inferences about the indirect effect is to calculate the size of the indirect effect and its accompanying p-value. The coefficient is calculated as the product of the coefficients depicting the relationship between spending and childcare use on the one hand (-

.139 in model 2), and between childcare use and childcare inequality on the other (-.323 in model 5). For calculating the p-value for the indirect effect I apply the partial posterior method as outlined in Falk and Biesanz (2016). The calculation yields an indirect effect with a coefficient of -.045 with  $p = 0.004$ . This means that an increase in spending with 1 p.p. of GDP is significantly associated with a 0.05 unit reduction in inequality, about a standard deviation. The relationship, however, only works through its increase in overall childcare use.

## **Discussion**

What conclusion should be drawn from all this? The estimate of the FTE childcare use suggests that childcare use and childcare inequality are inversely related and that inequality tends to attenuate as participation rates go up. The models yield no evidence for a direct effect of spending on childcare inequality, but point towards an indirect effect mediated by FTE childcare use.

If there is a shortage in availability of childcare places, additionally created places will first and foremost benefit higher income families. These families generally have higher levels of work intensity and a direct need for childcare, and they are generally better equipped to navigate through the administrative system and to secure a childcare slot in time (e.g. Vandebroek et al. 2008). In order to decrease inequality in childcare use, the results suggest that spending should lead to a major expansion of childcare places available for all children across the income distribution. As mentioned *supra*, countries may pursue this goal through different strategies, in particular regarding the role of the private market.

*[Figure 2 around here]*

Consider the examples of Norway and the Netherlands. Both strongly increased spending on childcare services from 2006 onwards. Norway followed a supply-side strategy with the expansion of publicly and privately provided childcare services (via municipal grants to finance services, similar to the Swedish practice, e.g. Havnes and Mogstad 2014), while the Netherlands followed a demand-side trajectory including an expansion of direct subsidies for families with children whilst leaving service provision to the market (Akgunduz and Plantenga 2014). For a brief period, both countries succeeded in simultaneously increasing childcare use and mitigating inequality.

Figure 2 shows that between 2006 and 2012, FTE childcare use increased by about 20% in both countries, starting from 30% FTE use in the Netherlands and 38% FTE use in Norway (see table A2). In order to achieve this, the Netherlands doubled its spending on childcare services, while spending increased by 60% in Norway. At the same time, inequality declined with 35% in Norway until 2011 to increase again in 2012 while in the Netherlands it declined with 17% until 2010 after which it started to rise again.

Although the current state of the literature (*supra*) suggests that only a public supply-side investment model is able to bring about more equality in service use, the case of the Netherlands suggest that spending on parents and not on services might be an effective strategy to increase childcare participation without compromising equal access as well, at least temporarily. Morgan (2005) argued that path-dependency limits the set of policy choices open to policymakers for investing in childcare services. E.g. it will prove difficult to pursue a public expansion strategy in liberal market economies. The finding that there may be different policy trajectories towards achieving equity in childcare use, is promising from that respect. To be sure, this does not

preclude government intervention at all, since even in the case of demand-side subsidies governments will need to be involved in coordinating the childcare market in order to secure quality and accessibility for all (Warner and Gradus 2011). The example of the Netherlands shows that a ‘market strategy’ is not necessarily a cheap option for the Exchequer.

Obviously, the results are tentative in nature and should be interpreted with due caution. In contrast to what happened in the Netherlands, for instance, the United Kingdom provides a counter-example of a private market strategy associated with higher levels of childcare inequality and lower levels of FTE childcare use over time (see Table 2). Although the UK and Dutch governments implemented similar childcare policies (Lloyd and Penn 2010), i.e. encouraging a childcare market to develop whilst subsidising parents in the form of tax credits, the Netherlands clearly outperforms the UK in terms of FTE use and equity. One potential explanation relates to the cost of childcare. According to the latest OECD figures (OECD, 2014), typical fees charged to parents are comparable in both England and the Netherlands (about 50 to 55% of average wage). However, government subsidies to parents play out in different ways in both countries: net childcare fees are much lower in the Netherlands (24% of average wage) compared to the UK (45% of average wage). Given that the UK government spends more on childcare subsidies than the Dutch government, this suggests that the private market as such is not the main culprit for childcare inequality, but rather how public subsidies actually affect parents. Spending more is not a *sufficient* condition to reduce inequality in childcare use; it matters *how* the money is spent.

In order to decisively test whether spending on the demand- or supply-side of the childcare market are both effective strategies to ensure equality in childcare use, further research should ideally be able to make a distinction between government spending on public and private

childcare providers, or between spending on services and spending on parents. Unfortunately, such data does not yet exist.

## **Conclusion**

In this article, I examined the role of public spending on childcare provision in mitigating inequality in childcare use across European countries over time. First of all, the descriptive results suggest that while spending and childcare use increased during the period 2006-2012, European countries made no further headway in achieving equity in childcare use.

Second, the multivariate results suggest that more spending on childcare services brings about higher childcare participation rates. Third, spending more on childcare services is not *directly* associated with lower levels of inequality in childcare use. The results do suggest an *indirect* effect: spending should lead to a wider availability of childcare places for young children across the income distribution. For many European countries, however, a great effort in terms of spending will be required. That is an important lesson for scholars and policymakers alike, because more equality in its use is a precondition for the social investment idea that the provision of childcare services is an effective way to combat poverty.

Finally, the results give rise to new hypotheses on the role of the market in childcare provision. Countries subsidize childcare services in a variety of ways, and the results presented here suggest that a market strategy combining demand-side subsidies with private provision might work to increase childcare participation for children across the income distribution, at least in the short term. It remains to be seen whether this is a viable policy option in the long term.

## Notes

- 1 A database with comparative family policy indicators for European countries assembled for the Multilinks EU FP7-project. See <http://www.multilinks-project.eu/> for more information and access to the database (last accessed 15-07-2015).
- 2 For the Slovak Republic, the maternal employment rates decline sharply from 2009 onwards on the basis of EU-SILC, while being stable in the prior survey years. A similar exercise on the basis of the Labour Force Survey did not reveal such decline, nor do the official employment statistics for the Slovak Republic.
- 3 The mean RII of the sample was 0.220 in 2006 (cf. table 2). Given a coefficient of -0.351, a ceteris paribus reduction of RII with 0.11 would take an increase of FTE childcare use of 31 p.p. ( $0.351 * 0.31 = 0.11$ ).

## References

- Abrassart, A. and Bonoli, G. (2015), Obstacles to Childcare Services for Low Income Families, Journal of Social Policy, 44, 4: 787-806.
- Allen, S. (2003), Working parents with young children: Cross-national comparisons of policies and programmes in three countries., International Journal of Social Welfare, 12: 261–273.
- Akgunduz, Y. E. and Plantenga, J. (2014), Childcare in the Netherlands: Lessons in privatisation, European Early Childhood Education Research Journal, 22, 3: 379-385.
- Arum, R, Shavit, Y and Gamoran A (2007), More Inclusion than Diversion: Expansion, Differentiation, and Market Structure in Higher Education. In Y Shavit, R Arum, A Gamoran (eds) Stratification in Higher Education: A Comparative Study. Stanford: Stanford University Press.
- Bartels, B. (2008), "Beyond" fixed versus random effects: a framework for improving substantive and statistical analysis of panel, time-series cross-sectional, and multilevel data, The Society for Political Methodology: 1-43.
- Beck, N. L, and J. N Katz. (1995), What to do (and not to do) with time-series cross-section data, American Political Science Review, 89, 3: 634-647.
- Blau, D.M. , and P.K. Robins. (1988), Child-Care Costs and Family Labor Supply, The Review of Economics and Statistics, 70, 3: 374-381.
- Bonoli, G., and F. Reber. (2010), The political economy of childcare in OECD countries: Explaining cross-national variation in spending and coverage rates, European Journal of Political Research, 49, 1: 97-118.
- Cohen, J., Cohen, P., West, S. G., and Aiken, L. S. (2013), Applied multiple regression/correlation analysis for the behavioral sciences. Routledge.

- Connelly, R. (1992), The effect of child care costs on married women's labor force participation, The Review of Economics and Statistics: 83-90.
- Del Boca, D. and S. Pasqua. (2005), Labor supply and fertility in European and the US. In T Boeri, D Del Boca and C Pissarides (eds), Women at Work: An Economic Perspective, Oxford: Oxford University Press.
- Del Boca, D. and D. Vuri. (2007), The mismatch between employment and child care in Italy: the impact of rationing, Journal of Population Economics, 20, 4: 805-832.
- Duncan, S., Edwards, R., Reynolds, T. and Alldred, P. (2003), Motherhood, paid work and partnering: values and theories, Work, Employment & Society, 17, 2: 309-330.
- Elango, S., García, J. L., Heckman, J. J., and Hojman, A. (2015), Early Childhood Education (No. 21766). National Bureau of Economic Research.
- Esping-Andersen, G. (2005), 'Children in the welfare state. A social investment approach', DemoSoc Working Paper Number 2005–10, Barcelona: Universitat Pompeu Fabra.
- European Commission (2014), Key Data on Early Childhood Education and Care in Europe. 2014 Edition. Eurydice and Eurostat Report. Luxembourg: Publications Office of the European Union
- European Commission (2013), Commission Recommendation of 20.2.2013: Investing in children: breaking the cycle of disadvantage. C(2013) 778 final, Brussels, 20.2.2013.
- Falk, C. F., & Biesanz, J. C. (2016). Two cross-platform programs for inferences and interval estimation about indirect effects in mediational models. SAGE Open, 6, 1. DOI: 10.1177/2158244015625445.
- Fortin, N. M. (2005), Gender role attitudes and the labour market outcomes of women across countries, Oxford Review of Economic Policy, 21, 3: 416-438.
- Fuller, B. and L. Xiaoyan. (1996), Market Failure? Estimating Inequality in Preschool Availability, Educational Evaluation And Policy Analysis, 18, 1: 31-49.
- Greenberg, J. P. (2011), The impact of maternal education on children's enrollment in early childhood education and care, Children and Youth Services Review, 33, 7: 1049-1057.

- Hatfield, B. E., Lower, J. K., Cassidy, D. J., & Faldowski, R. A. (2015), Inequities in access to quality early care and education: Associations with funding and community context. Early Childhood Research Quarterly, 30, 316-326.
- Hausman, J. A. (1978), Specification tests in econometrics, Econometrica: Journal of the Econometric Society: 1251-1271.
- Havnes, T. and Mogstad, M. (2014), Is universal child care leveling the playing field?, Journal of Public Economics, in press.
- Hayes, A. F. (2013), Introduction to mediation, moderation, and conditional process analysis. New York: The Guilford Press.
- Hegewisch, A. and J. C Gornick. (2011), The impact of work-family policies on women's employment: a review of research from OECD countries, Community, Work & Family, 14, 2: 119-138.
- Henley, J.R., and S. Lyons (2000), The Negotiation of Child Care and Employment Demands Among Low-Income Parents, Journal of Social Issues, 56, 4: 683-706.
- Hicks, A. M (1994), Introduction to pooling. In Th Janoski and A M Hicks (eds), The comparative political economy of the welfare state, Cambridge University Press.
- Jenkins, S. P., Brandolini, A., Micklewright, J., and Nolan, B. (Eds.) (2013). The great recession and the distribution of household income. Oxford University Press.
- Kakwani N, Wagstaff A and Van Doorslaer E (1997), Socioeconomic inequalities in health: measurement, computation, and statistical inference, Journal of econometrics, 77, 1: 87-103.
- Kamerman, S (2000), Early childhood education and care: an overview of developments in the OECD countries, International Journal of Educational Research, 33, 3: 7-29.

- Keck, Wolfgang, and Chiara Saraceno (2011) "The Impact of different Social-Policy Frameworks on Social Inequalities among Women in the European Union: The Labour-Market Participation of Mothers, Social Politics, 20, 3: 297-328.
- Keppel, K, E Pamuk, J Lynch, O Carter-Pokras, I Kim, V Mays, J Percy, V Schoenbach and JS Weissman (2005), Methodological issues in measuring health disparities, Vital and health statistics. Series 2, Data evaluation and methods research, 141: 1.
- Kittel, B and H Obinger (2003), Political parties, institutions, and the dynamics of social expenditure in times of austerity, Journal of European Public Policy, 10, 1: 20-45.
- Krapf, S (2014), Who uses public childcare for 2-year-old children? Coherent family policies and usage patterns in Sweden, Finland and Western Germany, International Journal of Social Welfare, 23, 1: 25-40.
- Lloyd, E., and H Penn (2010), Why do childcare markets fail? Comparing England and the Netherlands, Public Policy Research, March-May 2010: 42-48.
- Lloyd, E, and H Penn (2012), Childcare Markets: Can They Deliver an Equitable Service?: The Policy Press.
- Mackenbach, JP and AE Kunst (1997), Measuring the magnitude of socio-economic inequalities in health: an overview of available measures illustrated with two examples from Europe, Social Science & Medicine, 44, 6: 757-771.
- Meagher, G and M Szebehely (2012), Equality in the social service state: Nordic childcare models in comparative perspective" In J Kvist, J Fritzell, B Hvinden, and O Kangas (eds), Changing Social Equality. The Nordic welfare model in the 21st century, The Policy Press.
- Melhuish, EC (2004), A literature review of the impact of early years provision upon young children, with emphasis given to children from disadvantaged backgrounds. Report to the Comptroller and Auditor General, National Audit Office.

- Meyers, M K., D Rosenbaum, C Ruhm and J Waldfogel (2004), Inequality in early childhood education and care: what do we know?" In K. Neckerman (ed) Social Inequality, Russell Sage Foundation.
- Morabito, Ch, Vandembroeck, M and R Roose (2013), 'The Greatest of Equalisers': A Critical Review of International Organisations' Views on Early Childhood Care and Education. Journal of Social Policy, 42, 3: 451-467.
- Morel, N (2007), From Subsidiarity to 'Free Choice': Child- and Elder-care Policy Reforms in France, Belgium, Germany and the Netherlands, Social Policy & Administration, 41, 6: 618-637.
- Morgan, K J (2005), The "production" of child care: How labor markets shape social policy and vice versa, Social Politics: International Studies in Gender, State & Society, 12, 2: 243-263.
- Nieuwenhuis, R (2014), Family Policy Outcomes. Combining Institutional and Demographic Explanations of Women's Employment and Earnings Inequality in OECD countries, 1975-2005, doctoral dissertation, University of Twente.
- Noailly, J and Visser, S (2009), The Impact of Market Forces on Child Care Provision: Insights from the 2005 Child Care Act in the Netherlands, Journal of Social Policy, 38, 3: 477-98.
- OECD (2006), Starting Strong II: Early Childhood Education and Care, Paris: OECD.
- OECD (2008), Growing Unequal : Income Distribution and Poverty in OECD Countries, Paris: OECD.
- OECD (2014), PF3.4: Childcare support, OECD Family database, <http://www.oecd.org/els/family/database.htm> .

- Paes de Barros, R., Ferreira, F., Molinas Vega, J. and Saavedra Chanduvi, J. (2009), *Measuring Inequality of Opportunities in Latin America and the Caribbean*, Washington, DC: The World Bank.
- Penn, H (2014), Childcare markets in an age of austerity. European Early Childhood Education Research Journal, 22, 3: 386-396.
- Plantenga, J and Remery, Ch (2009), The provision of childcare services: A comparative review of 30 European countries, Luxembourg: European Commission: Directorate-General for Employment, Social Affairs and Equal opportunities.
- Shavit Y, Yaish M, Eyal B-H. (2007), The persistence of persistent inequality. In: Scherer S, Pollak R, Otte G, Gangl M (eds), Origin to Destination. Trends and Mechanisms in Social Stratification Research. Frankfurt: Campus Verlag.
- Spieß, CK, Kreyenfeld, M and Wagner, GG (2003), Distributional analysis of child care subsidies in Germany, European Early Childhood Education Research Journal, 11, 2: 159-175.
- Steiber, N and Haas, L (2012), Advances in explaining women's employment patterns”, Socio-Economic Review, 10, 2: 343-367.
- Vandenbroeck, M, Geens N and Berten H (2014), The impact of policy measures and coaching on the availability and accessibility of early child care: A longitudinal study, International Journal of Social Welfare, 23, 1: 69–79.
- Vandenbroeck M, De Visscher S, Van Nuffel K and Ferla J (2008), Mothers’ search for infant child care: The dynamic relationship between availability and desirability in a continental European welfare state, Early Childhood Research Quarterly, 23, 2: 245-258.
- Waldfoegel, J and Washbrook, E (2011), Early Years Policy, Child Development Research: 1-12.

Warner, M E and Gradus R H.J.M (2011), The Consequences of Implementing a Child Care Voucher Scheme: Evidence from Australia, the Netherlands and the USA, Social Policy & Administration, 45, 5: 569-592.

Wooldridge, J.M (2003), Introductory econometrics: a modern approach: South-Western College Pub.

Wrohlich, K (2011), Labor supply and child care choices in a rationed child care market, Discussion Papers, German Institute for Economic Research, DIW Berlin.