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Explaining patterns of inequality in childcare service use across 31 developed economies: a welfare state perspective

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Wim Van Lancker (corresponding author)

Herman Deleeck Centre for Social Policy, University of Antwerp

wim.vanlancker@uantwerpen.be

Joris Ghysels

TIER, Maastricht University

joris.ghysels@maastrichtuniversity.nl

Abstract

Childcare services are increasingly regarded a major policy lever to combat social inequalities in early life. Yet, it was shown that inequality in the use of childcare services is the norm rather than the exception in European and OECD countries. As a result, social inequalities between disadvantaged and advantaged children are likely to be reinforced instead of being narrowed. The aim of this article is to conduct a macro-level analysis exploring which welfare state characteristics are associated with inequality in childcare use. We find that government involvement in the availability, affordability and quality of service provision is related to lower levels of inequality in childcare use. The results also suggest an impact of labour market opportunities and parental leave schemes. The findings contribute to a proper understanding of the institutional mechanisms underlying inequality in childcare service use.

Keywords

welfare state, childcare, inequality, social investment, family policy, comparative

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1. Introduction

The aim of this article is to study inequality in childcare use from a welfare state perspective. Childcare services are increasingly seen as a most promising instrument for mitigating social inequalities by policymakers and scholars alike, and its provision is promoted at the policy level in just about all developed economies, in Europe (European Commission, 2013) as well as in the US (Obama, 2007).

The emphasis on childcare fits neatly into the social investment perspective, which is now the dominant approach to social policymaking in Europe and elsewhere (Nolan, 2013; Morel et al., 2012; Cantillon and Vandenbroucke, 2014). The underlying idea is that investing in young children by means of high-quality childcare not only yields short and long-term benefits for the children themselves, but also for society as a whole.

The potential benefits of childcare services are mainly realized through two channels. *First*, childcare is expected to increase maternal employment rates, which in turn leads to greater gender equality by distributing labour and care more equally between partners and by enabling women to earn a wage of their own (Stier et al., 2001). *Second*, childcare is seen as beneficial for young children because it enhances human capital and leads to better learning outcomes and school readiness in the short run, and better social and labour market prospects in the longer run (Heckman, 2006). Yet these benefits are conditional on the quality of the childcare services, usually measured by *inter alia* staff to child ratios, teachers' qualifications, curriculum, group size (Leseman, 2009). It is one of the most established findings in the ECEC literature that low-quality services may be harmful and produce detrimental outcomes in terms of cognitive and non-cognitive development of young children relative to home care (Sylva et al., 2011; Van Huizen and Plantenga, 2015). We will come back to the issue of quality in the discussion.

The expected returns of high-quality childcare are relatively larger for disadvantaged families. The increase in female labour market participation was a socially stratified process so far, with low-educated women participating to a much smaller extent than their higher-educated counterparts (Evertsson et al., 2009). Moreover, due to the process of educational homogamy, dual earnership also was adopted in an uneven way in modern societies (Blossfeld and Drobnic,

2001), exacerbating the labour market disadvantage and the welfare gap between low-skilled and high-skilled families (OECD, 2009). Disadvantaged families thus have the most to gain in terms of labour market participation and household income. Children living in poverty are expected to benefit relatively more in terms of development because they start from a disadvantaged position and consequently stand to gain the most (Magnusson et al., 2007). It is well established that child poverty has adverse long-term effects on the life chances of these children as well as on their opportunities to become productive adults (Duncan et al., 1998; Hackman et al., 2010). Bestowing upon children a stimulating learning environment may counteract the unequal resources and abilities of parents to promote their children's development, language competence and school readiness, and hence narrow the development gap (Phillips and Lowenstein, 2011). Because learning begets learning, the effects of equalizing initial endowments are long-lasting, carrying through later life and improving social mobility (Barnett, 1995; Elango et al., 2015).

In this article we focus on a precondition for these great expectations to materialize: children from a disadvantaged socio-economic background should be enrolled in high-quality childcare services. If participation in childcare services is unequal across socioeconomic groups and disadvantaged children use childcare services to a lesser extent than their better-off counterparts, the development gap between them is likely to widen instead of narrowing (Van Lancker, 2013). This would be the opposite of what governments want to achieve with the expansion of childcare services. As a matter of fact, inequality in access to and use of childcare services is the norm rather the exception in European and OECD countries (Ghysels and Van Lancker, 2011; Van Lancker, 2013). Cross-country differences in the extent of childcare inequality are large, which suggests that the social context in which childcare services are provided are fundamental to understand how these inequalities come about. A proper understanding of the mechanisms underlying inequality in childcare service use is crucial for its success as a policy instrument to mitigate social inequalities in early life, yet previous attempts to explain inequality in childcare use were rather idiosyncratic and focused on specific countries or regions (e.g. Abrassart and Bonoli, 2015; Meagher and Szebehely, 2012; Meyers et al., 2004; Spieß et al., 2003; Fuller and Liang, 1996), primarily examining the role of individual, family- and service-level characteristics. Since the comparative welfare state literature lacks insight into what features of the social context are more or less conducive for achieving more equality in childcare use, we engage in macro-sociological analysis in which we focus on how aggregate social mechanisms rather than micro-level household characteristics

are associated with childcare inequality[1]. Similar to studies examining income inequality as a macro-level phenomenon (Kuznets, 1955; OECD, 2011), this article conducts a macro-level analysis exploring which welfare state characteristics are associated with the observed inequality in childcare use for a broad set of countries.

The first section draws on the comparative welfare state literature to infer hypotheses on the determinants of childcare inequality. The second describes the data and methodology applied. Subsequently, an overview is provided of childcare use and inequality across 31 countries. This is followed by a bivariate exploration of the processes underlying the inequality in childcare use, formalized in a multivariate regression exercise. We conclude with a brief discussion of the results and some caveats.

2. The configuration of welfare states and childcare inequality: theory & hypotheses

Hitherto, the field of comparative social policy research was dominated by the welfare regime approach, which is basically an attempt to flesh out the *content* of welfare states based on the relationship between the market, the state and the family (Esping-Andersen, 1990; also Arts and Gelissen, 2002). Although the issue of services was generally neglected in much of the comparative literature (Jensen, 2008), the analytical framework of market, state, and family was previously applied in understanding patterns of inequality in access to education (Allmendinger and Leibfried, 2003; Triventi, 2013) and health care services (Van Doorslaer et al., 2006; Reibling, 2010). On the following pages we develop a set of hypotheses regarding the association between the content of welfare states and childcare inequality. We discuss how universalism, the state-market mix, and the degree of defamilization may be related to inequality in childcare use. Subsequently we elaborate an explorative empirical analysis in order to understand which of the welfare state characteristics effectively relate to inequality in childcare use.

2.1 Universalism

A key principle in the classification of welfare states, universalism, is a complex notion that is interpreted and applied in different ways (Anttonen, 2002). Esping-Andersen (1990), for instance, discusses universalism in conjunction with social rights and citizenship, in particular the question of whether entitlements to benefit schemes promote equality of status or social

stratification. Others use it to describe a logic of redistribution, referring to the targeting and distribution of (cash) benefits (e.g. Korpi and Palme, 1998). In research that tries to connect social services to welfare regimes, universalism is interpreted in terms of accessibility: for a service to be universal, it should be accessible to all in need of that particular service (Rauch, 2007). Accessibility is determined by multiple aspects of service delivery, however, and a dysfunction in any of these aspect may induce inequality in its use. First and foremost, for a service to be accessible it must obviously be available. Indeed, there is a strong argument that equality in care use will not be achieved when childcare supply is rationed. For instance, there is some evidence that, in a situation of rationing, the availability of childcare will decline disproportionately in more disadvantaged and lower-income neighbourhoods (Henley and Lyons, 2000; Vandenbroeck et al., 2008). Moreover, childcare rationing has a discouraging effect on maternal labour supply (Wrohlich, 2011; Del Boca and Vuri, 2007; Vandelannoote et al., 2015). Given the fact that low-skilled mothers have fewer labour market opportunities than their higher-skilled counterparts, inequality in access to childcare services stemming from rationing might result in a negative feedback loop, exacerbating inequalities in the labour market as well.

Related to this first aspect, and referring to universalism as connected to social rights, is the matter of service guarantee (Rauch, 2007). Currently, in Finland, Norway, Denmark, Estonia and Sweden, children below 3 have a legal right to formal childcare services. Hence, one might expect inequality to be smaller in these countries than in countries without such guarantee *ceteris paribus*. Yet, an important distinction between access and use should be acknowledged. Policy makers may set effective quality standards, may legalise access, may even guarantee effective access within a prescribed period, but ultimately parents have to make a choice. They may choose not to rely on formal childcare for a variety of reasons, like cultural considerations (e.g. family values), informal care (e.g. grandparental care) or other publicly offered alternatives (e.g. extended parental leave) to which we will return in the following sections. This suggests that universalism as a social right might not be a sufficient condition to guarantee equal use.

Finally, availability also depends on affordability, the out-of-pocket fee parents are required to pay for service use. Research shows that the impact of childcare costs is greater for mothers with lower earnings potential, such as the low skilled (Baum, 2002). A recent inquiry into inequality in childcare use in Switzerland found a strong impact of the progressivity of the fee structure on inequality: the less income-related the fee structure of the services provided, the

less likely children of low income families are to participate in childcare (Abrassart and Bonoli, 2015). As such, we might expect an impact of private cost on childcare inequality.

2.2 State-market mix

Several authors report an increasing tendency towards marketization of care services (Lloyd and Penn, 2012; Brennan et al., 2012). This evolution is not confined to the liberal welfare regimes where market forces are traditionally seen as the major provider of welfare, but also manifests itself in the Nordic countries. Although the childcare landscape in most countries still reflects a 'mixed economy', where the public sector as well as the private and the voluntary sectors are engaged in providing childcare services, the phenomenon of marketization might increase inequality in childcare participation (OECD, 2006). An increasing body of research suggests that for-profit childcare provision might be associated with lower quality, higher private costs and problems of rationing, especially in disadvantaged neighbourhoods (OECD, 2012). This is primarily the case in the absence of government involvement (Akgunduz et al., 2015; Rigby et al., 2007). Government involvement can range from licensing and regulation, over subsidizing consumers or services, to direct provision (Plantenga and Remery, 2009; White and Friendly, 2012). In the United Kingdom and the United States, for example, a two-tier system is in place. Families are encouraged to satisfy their care requirements in the private market by means of demand-side subsidies such as tax credits or rebates and childcare vouchers. At the same time, in line with the logic of public welfare as a measure of last resort in the liberal welfare regime, services targeted at disadvantaged children, families and neighbourhoods are directly funded and provided by the government (*Sure Start* in the United Kingdom and *Head Start* in the United States being among the most well-known examples). In countries such as Belgium, most childcare services are set up by private not-for-profit providers yet publicly funded to a large extent. A similar system exists in France and Portugal where the majority of services are independently established but dependent on state funding. In Sweden, most services are provided by the municipalities, centrally regulated and publicly funded.

In conjunction with marketization, the level of government involvement is expected to determine childcare inequality outcomes. If government intervention is low and restricted to licensing, for instance, high-quality facilities will be expensive because they entail high production costs (higher staff wages and qualifications, lower staff-to-child ratios). Consequently, access might be restricted to parents who can afford it (OECD, 2006). This effect

may be offset by a higher level of government intervention in the form of subsidies, so that high-quality care becomes affordable, or by directly providing high-quality services (Immervol and Barber, 2005). Other researchers warn, however, that demand-side subsidy programs may lead to a higher take-up of services of lower-quality if service provision is left to for-profit providers and quality is not monitored adequately (Sosinsky, 2012). If quality is perceived to be low, however, take-up of services might be lower instead. A recent Eurofound (2013) report found a strong link between perceived quality of childcare services and use of those services. If low-income families perceive high-quality services to be unaffordable, or perceive affordable services to be of low quality, they may very well forsake enrolling their children. At the same time, higher income families are able to purchase high-quality care in the market. Inequality might also be connected to the spatial availability of high-quality childcare. There is evidence for some countries that high-quality childcare services are more available in more affluent areas (Vandenbroeck et al., 2008; Burchinal et al., 2008).

2.3 Defamilization

After the publication of his *Three Worlds of Welfare Capitalism* (1990), Esping-Andersen was widely criticized by feminist scholars for neglecting the work-care nexus in classifying welfare states (Lewis, 1992). His critics argued that the welfare regime approach should be supplemented with the concept of defamilization, i.e. the degree to which women are able to uphold an acceptable standard of living independently of their families (Lister, 1994).

Childcare services and parental leave schemes are generally seen as the most important (de-)familizing policy tools. Indeed, childcare services relieve women (at least to some extent) from (child) care duties, enabling them to take up paid work in the labour market (Gornick and Meyers, 2003). As a matter of fact, childcare use and maternal labour market participation are highly correlated and the relationship between the two is presumably reciprocal: availability of childcare services enhances the options of mothers of young children to engage in paid employment, which will in turn induce greater demand for childcare services (Steiber and Haas, 2012). Given the fact that labour market opportunities are not evenly distributed across educational levels, one may expect countries with high employment levels among low-skilled mothers, and thus low levels of employment inequality, also to report low levels of childcare inequality.

It might also be the case that families who are unable to obtain formal childcare rely on informal care channels instead. Although the availability of informal care is generally on the decline, it is often assumed that more disadvantaged families (including low-income families, families with a low-educated mother, minorities, immigrant parents) are more likely to depend on informal arrangements (i.e. the extended family, grandparents, other relatives) as their primary source of childcare (Henley and Lyons, 2000). Recent research finds that this might be due to a combination of personal preferences and the availability and affordability of nearby formal care arrangements (Debacker, 2008). Thus we may expect the availability of informal care arrangements and the use of formal childcare services to be inversely related.

Parental leave, then, enables parents to interrupt employment in order to provide care for their children themselves while fostering parents' bond with the labour market by maintaining the contractual link between employer and employee (Hegewisch and Gornick, 2011; Ray et al., 2011). Reasonable periods of particularly well-paid leave are found to be beneficial to maternal employment rates (Nieuwenhuis et al., 2012): young women are encouraged to strengthen their labour market attachment before giving birth in the knowledge that they will suffer only minor income loss and will be able to safely return to their jobs afterwards, especially if the leave period is aligned with the availability of childcare services. What constitutes a 'reasonable period' of well-paid leave is not clear, however. Jaumotte (2003) found that the impact of parental leave on employment becomes negative beyond a duration of 20 weeks, Keck and Saraceno (2013) empirically showed that about 9 months is optimal, while still others asserted that the optimal leave period may be more than 40 weeks (OECD 2011).

In countries offering only limited public support for childcare services, long periods of leave act as a disincentive for female employment and provide support for the breadwinner model. This impacts in particular on women with low levels of education, because their lower earnings potential provides fewer financial incentives to return to work (assuming they were in work prior to childbirth), and they often have fewer resources to pay for formal childcare (Hegewisch and Gornick, 2011). It was indeed shown that women with lower earnings are more likely than high-earning women to make use of long care leaves (Morgan and Zippel, 2003). However, when long leaves are unpaid, mothers in less affluent families may not be able to afford to take them. A similar mechanism is at play in the case of so-called home care allowances or cash-for-care schemes. During the 1980s and 90s, countries such as Finland, France, Hungary and Norway introduced an allowance for parents to stay at home with their children as an alternative to formal childcare services, *de facto* extending the period of parental leave up to three years.

Such 'refamilizing' policies actually create an incentive for mothers with low earnings potential not to use childcare. Thus we may expect countries with long well-paid parental leave schemes to exhibit higher levels of childcare inequality.

Cultural factors should also be taken into account, as they may be the cause or the effect of social policy development and may influence parents' attitudes and decisions concerning care arrangements (Pfau-Effinger, 2004; Keck and Saraceno, 2013). A large body of research examined the role of cultural factors on employment decisions of mothers, finding that women with traditional values on motherhood and gender roles report a lower commitment to paid work (Fortin, 2005; Cloïn et al., 2011; Steiber and Haas, 2012). Moreover, several studies show that norms differ along educational lines and that specifically lower-educated women hold more traditional views on gender roles and motherhood (Crompton, 2006; Duncan, 2005; Duncan, et al. 2003). There is also evidence that the role of norms on employment and care decisions of mothers across educational groups differs between countries (Steiber et al., 2016). Although the overall picture is one of greater acceptance of working mothers in recent decades, a report on European Union countries suggests that norms on motherhood, employment and care use became more traditional in several Central and Eastern European countries (Plantenga and Remery, 2009). In a context where the dominant cultural norm is against working mothers, it is more difficult to behave differently (Van der Lippe and Siegers, 1994). Research demonstrated that the positive effect of higher education on attitudes towards work and motherhood is greater in countries with less traditional views on maternal employment (Sjöberg, 2004). A such, the dominant norm on motherhood and care-work decisions is expected to have an impact on childcare inequality as well.

Table 1 summarizes the dimensions of the welfare state that are potentially related to childcare inequality together with their expected relationship.

[Table 1 about here]

3. Data, measurement, and analytical strategy

3.1 Data

Data are drawn from the *European Union Statistics on Income and Living Conditions* (EU-SILC), wave 2009. The EU-SILC is the main data source for cross-national research on income

and living conditions in the European Union as well as for monitoring progress in childcare use, and currently the only database allowing calculation of childcare use amongst young children in a 'regular week' for all EU Member States plus Norway and Iceland. The analysis is complemented with data for the US, drawn from the *Early Childhood Program Participation* (ECPP) included in the *National Household Education Surveys Program (NHES)*, wave 2012, and Australia, based on the *Household, Income and Labour Dynamics in Australia* (HILDA) survey (wave 10, reference year 2010). Both surveys allow replication of the EU-SILC variables. Cross-sectional weights are applied to adjust for non-response[2].

There is no single database available that offers a set of comparable indicators to test the hypotheses derived from the literature review, certainly not for multiple years. Therefore we gather cross-sectional, country-level data and indicators from different databases and cross-national surveys. When necessary, these data are supplemented with country-specific sources. Detailed information, sources and definitions of all variables used throughout this study are available in table A1 in annex.

3.2 Measurement of inequality of childcare use

The dependent variable is inequality in childcare service use. Childcare services refer to *formal care services* including day care centres (including (early) Head Start and Sure Start), nursery schools, professional child minders and family day care providers. In the EU-SILC, HILDA, and NHES surveys, respondents are asked about the number of hours their children are enrolled in formal childcare services during a usual week. In earlier research, this information was used to calculate participation rates or childcare participation rates: the number of children making use of formal childcare services during a usual week as a percentage of all children of the same age. Here we calculate a *full time equivalent (FTE) measure* of formal care service use in order to take into account differences in the intensity of care use (i.e. hours of attendance per week). This allows for meaningful cross-country comparisons. In the Netherlands, for instance, using formal care for only a few hours a day is quite common, while in Denmark childcare use is almost always fulltime. Simply relying on a participation rate would suggest that childcare use in the Netherlands and Denmark is quite similar, while the reality is substantially different in both countries. Following Meagher and Szebehely (2012) and Rauch (2007), FTE childcare use represents the proportion of children who would be receiving childcare if all existing care use were full-time (30 hours per week or more). The calculation is as follows: FTE = proportion of

children in formal childcare * average number of hours per week (as % of 30 hours per week). E.g. if all children are enrolled in formal childcare for 15 hours a week, FTE care use will be 50%. Figure A1 in annex shows a scatterplot of participation rates against intensity of use for each country in the sample.

The empirical analysis is limited to children younger than three at the end of the interview year. This leaves us with a sample of 22.590 children for which we have full information. Although research suggests that non-parental care should ideally start around the age of one (e.g. Han et al., 2001), children are commonly enrolled much earlier in a number of countries. Furthermore, this age bracket avoids confusion about the influence of the schooling system, as many countries achieve full coverage in the education system starting at age four, while others cater for these children in childcare services up to the age of five.

Apart from a measure of childcare use, we also need an indicator of social status to assess inequality. In the literature, socioeconomic status is generally measured through one of three variables: income, occupational class or education. Here we use the educational level of the mother. Because employment, and hence occupation and income levels are strongly correlated with childcare use, using these indicators risks multi-collinearity. Furthermore, maternal education proves critical for children's development and well-being. Not only do high-educated mothers rely on their human capital to select childcare services for their young children, a large body of research shows that they also use it to facilitate their children's cognitive and social development (Augustine et al., 2009). Children in our sample who are under the age of three are allocated to one of three groups (low, medium and high) according to the educational level of the mother (or father in cases where the mother is absent), as measured with the *International Standard Classification of Education* (ISCED). The variable reflects the highest level of education attained (or the highest current level). We define low educated persons as those not having completed secondary education, medium educated persons to have completed secondary education, and high educated persons to have completed tertiary education (see UNESCO Institute for Statistics, 2012). We also tested socioeconomic status measured by educational level of the father and by parental educational level (using the highest educational level of one of the parent). The results are available upon request; when the interpretation of the results differs according to the choice of educational measure, this will be discussed in the text. The distribution of educational levels and the number of observations for each country are reported in Table A2 in annex.

To gauge inequality, we compute a *relative index of inequality* (RII) in FTE childcare use. The RII is a regression-based inequality index that is often applied in the empirical literature on socioeconomic disparities in health (Kakwani et al., 1997; Keppel et al., 2005). It offers some advantage over other inequality indices previously applied in the literature on childcare inequality, such as the inequality ratio (IR). The IR is calculated by dividing the FTE childcare use rates of the least versus the most educated. This can be misleading if one of these groups is very small, since a same level of inequality is qualitatively different whether it affects a small or a large group in society. In contrast, the RII takes into account the relative position and size of educational groups and is calculated over the full range of educational levels. This is desirable, since the distribution of educational levels differs greatly across the countries included in this sample (see table A2 in annex).

The RII is calculated as follows. First, for each country in the dataset, we calculate a slope index of inequality (SII) in FTE childcare use on maternal educational level. Following Pamuk (1985), the SII is calculated as a regression of the following form:

$$\gamma_i = \alpha + \beta x_i + \varepsilon_i \qquad (1)$$

where γ_i is FTE childcare use of child i, x_i is the level of education of the mother of the child (or father when the mother is absent), and ε_i the error term. Here, the regression slope β is the SII, which can be interpreted as the absolute effect of moving from a lower to a higher level of education on FTE childcare use. A positive value of the slope indicates that FTE childcare use amongst young children increases with higher levels of maternal education. For instance, in the case of Austria, β takes a value of .09 meaning that FTE childcare use amongst young children increases with 9 percentage points for each higher level of maternal education. Because it is an absolute measure, the SII is sensitive to the mean FTE childcare use. If FTE childcare use increases to the same extent for all educational levels, the SII will increase while the relative distance remains the same. This is problematic for comparing countries with different levels of FTE childcare use. For that reason, we follow Pamuk (1985) in estimating a relative index of inequality (RII) of the following form:

$$RII = 100 * \left(\frac{\beta}{\bar{\gamma}}\right) \qquad (2)$$

Where β is the regression slope and $\bar{\gamma}$ is the weighted mean FTE childcare use amongst young children (see also Mackenbach and Kunst 1997, and Regidor 2004 for further reading). The RII should be interpreted as the proportionate increase in FTE childcare use when moving from a

lower to a higher level of maternal education. The RII takes a value of 0 if FTE childcare use is equal over maternal educational levels, a positive value if inequality is biased against lower educational levels and a negative value if inequality favors lower educational levels. To return to our example of Austria, an RII of 66% indicates that FTE childcare use of children with low educated parents is 66% lower than that of children with higher educated mothers. The SII and RII values together with the number of observations for all countries in our sample are presented in table A3 in annex, standard errors are calculated according to the method proposed in Schwarz (2007).

3.3 Independent variables

Drawing on the relationship between the state, the market and the family, we identified three sets of welfare state characteristics (universalism, the state-market mix, and defamilization) that may be related with childcare inequality. Table 2 summarizes these dimensions; a detailed explanation of these measures and their data sources is provided in table A1 in annex.

For gauging parental *out-of-pocket fees*, we rely on OECD calculations of 'typical' monthly net childcare costs (fees minus cash government subsidies and tax benefits), i.e. out-of-pocket expenses for full-time care use in a 'typical' formal childcare facility for a low-income family (assuming two children, aged two and three, where the male earns 67% and the female 50% of the average wage respectively, see Richardson, 2012 for details). Information on whether families have a *legal entitlement to formal care services* is gathered from the Multilinks database and dummy-coded.

To measure the extent of government involvement in the childcare market, we include two variables. First, *public spending on childcare services* (in % of GDP), calculated on the basis of the detailed OECD Social Expenditures (SOCX) database. Second, we test a measure of *public or subsidized supply* operationalized as the number of available childcare slots in public or publicly funded facilities as a share of children aged 0-2 years (no data for Iceland, Malta, US and Romania). An aggregate measure of *perceived quality of childcare services* is derived from the Quality of Life 2012 survey. Respondents were asked to rate the quality of child care services in their country on a 10-point scale, ranging from very poor quality to very high quality.

The *employment rate of low-skilled mothers* with a youngest child under the age of three is calculated on the basis of EU-SILC. We also construct a measure gauging the *dominant norms*

on motherhood on the basis of the European Values Survey (EVS) wave of 2008 for European countries and the International Social Survey Programme (ISSP) wave of 2012 for the US and AU (no data for Malta). We use the question "A pre-school child is likely to suffer if his or her mother works" and collapse the answer categories "strongly agree" and "agree" into one weighted proportion measuring the degree to which maternal employment is perceived as detrimental to a young child. For testing the impact of parental leave provisions, we include a measure of 'well-paid leave' drawn from the Multilinks database. Well-paid is defined as amounting to at least 60% of average wage. The variable is transformed to reflect a curvilinear relationship with childcare inequality. The variable is centred at 9 months, following Keck and Saraceno (2013), and subsequently linearized so that high values reflect either very short or very long periods of leave while a zero value reflects 9 months of well-paid leave. We also tested the curvilinear relationship by adding the square of parental leave to the model, with similar results. Finally, as regards *use of informal care*, we apply a similar method of measurement as for FTE formal childcare use: informal care relates to care provided by grandparents, relatives and friends in a regular week, and we combine intensity and effective use of such care arrangements into an FTE measure of informal care.

[Table 2 around here]

3.4 Analytical strategy

Given the exploratory purpose of our paper, the nature of our data and the small number of observations (maximum n = 31, minimum n = 27), attention is paid first and foremost to the quality and plausibility of hypotheses (Bonoli, 2013). To this end, we carefully examine correlations to investigate whether the selected indicators are plausible correlates of childcare inequality. Following Cohen's guidelines for size magnitudes of correlational effects (Cohen 1988: 78-81), we consider correlation coefficients of medium (> 0.3) and large (> 0.5) strength as being plausible.

To get more purchase on this and to assess the robustness of the results, we subsequently estimate a variety of multivariate regressions with childcare inequality as the dependent variable. For the interpretation of the results we focus on the strength and direction of the relationship (size and sign of the estimated coefficients). Because of the small sample and the

non-random selection of countries, common statistical significance testing procedures are not applicable. We nevertheless want to obtain an indication of the precision of the estimates in order to understand whether the chosen welfare state characteristics are plausibly associated with childcare inequality or not. Therefore, we follow the approach suggested by Kenworthy (2004) to test the relationship between dependent and independent variables in a multitude of specifications and to discuss the distribution of the obtained coefficient estimates instead of focusing on the statistical significance of coefficients. We return to this issue in section §4.3. Full models, the dataset and the code are available upon request and on the corresponding author's website. Finally, it should be noted that we deliberately chose not to engage in multilevel analysis, even though the setup of our dataset would allow us to. A multilevel approach would only enable us to test the impact of welfare state characteristics on the probability of *individual children* from different social backgrounds to use formal childcare, but not to examine how childcare inequality at the macro-level is related to these macro characteristics, which is the purpose of our contribution.

4. Empirical results

4.1 Inequality in childcare use

Figure 1 panel A shows that the diversity in FTE childcare use of 0 to 2 year-olds is large, ranging from more than 70% of young children enrolled in formal care in Denmark, around 60% in Iceland and Sweden, over 30% in Cyprus, Estonia, Italy, and Spain, to 10% or less in Central and Eastern European countries such as Bulgaria, Hungary, Romania, Poland, and the Slovak and Czech Republic.

[Figure 1 around here]

Panel B of figure 1 shows inequality in FTE formal childcare use measured by the RII. In Malta, Denmark, Iceland, and Estonia, inequalities are small and children from different social backgrounds are more or less equally represented in formal childcare services. In all other countries in our sample, children with a low-educated mother are less likely to use formal childcare services than children with a higher-educated mother. The inequalities are particularly striking in low-use countries such as Poland, Romania, Bulgaria, United Kingdom, Ireland,

Austria, and Lithuania. In general, inequality in FTE childcare use and average levels of FTE childcare use seem to be inversely related (r = -0.61). Nevertheless, inequality can be salient in countries with higher levels of FTE formal care use such as France, the Netherlands, and Luxembourg. Inequalities are lower in Australia, Sweden, Norway, Slovenia, Cyprus, Spain and Italy.

4.2 Bivariate correlations

Table 3 shows correlation coefficients between the dependent and independent variables. *Prima facie* it seems that the level of out-of-pocket fees for low income families is not related to childcare inequality. Government spending on childcare services is only weakly related to inequality and therefore doesn't seem a plausible candidate to explain childcare inequality either. FTE informal care use, low skilled maternal employment rates, and the dominant norms on motherhood are borderline cases with correlation coefficient close to 0.3. The signs of the coefficient are in the expected direction: more low-skilled maternal employment is related to less inequality, more conservative norms on motherhood and higher levels of informal care are related with more inequality.

The correlation table suggests an association of medium strength between inequality and the length of well-paid leave, the existence of a legal entitlement to a place in childcare, the extent of subsidized supply of childcare places. As expected, well-paid leave that is either very short or very long is associated with more inequality, a legal entitlement and subsidized supply with less inequality. Finally, the perceived quality of the services is strongly related to childcare inequality. The higher the perceived quality of childcare services, the lower levels of inequality a country tends to exhibit.

[Table 3 about here]

4.3 Regression results

The above bivariate explorations provide preliminary evidence for all three dimensions of universalism, government involvement and defamilization identified in the theoretical section.

To test the robustness of these explanations, we now turn to OLS regressions in which RII is regressed on the explanatory variables.

Since we have a fairly large number of country characteristics (explanatory variables) that may be related to childcare inequality but only a limited number of observations (countries), we face a typical 'small-N' problem in multivariate regression. Although small-N regressions in comparative welfare state analysis are widely criticized (Shalev, 2007; Goldthorpe, 1997), we agree with Ebbinghaus writing that "a small-N study can be useful when the cases are well selected to test a given theory, any disconfirming case can help to eliminate hypotheses" (2005: 139). Our aim is to assess the robustness of the correlation of childcare inequality at the country level with the welfare state characteristics we identified earlier; these results should serve a starting point for further scrutiny (see also Esping-Andersen, 2007).

In doing so, we estimate regressions testing each explanatory variable against all possible combinations of the other explanatory variables, adding them stepwise to the model. Given 9 explanatory variables, we run 2^9-1 regressions for each explanatory variable, amounting to a total of 4.590 regressions. For example, when considering the role of government expenditure, we run the following set of regressions:

$$Y_{RII} = \alpha + \beta EXP_i + \varepsilon_i$$

$$Y_{RII} = \alpha + \beta EXP_i + \delta SOCIALRIGHT_i + \varepsilon_i$$

$$Y_{RII} = \alpha + \beta EXP_i + \gamma SUPPLY_i + \varepsilon_i$$

$$Y_{RII} = \alpha + \beta EXP_i + \gamma SUPPLY_i + \delta SOCIALRIGHT_i + \varepsilon_i$$

…

We regress government expenditure on childcare services in country *i* (EXP_i) on RII, adding in each regression a new combination of the other explanatory variables to the model until all possible combinations have been exhausted. For each explanatory variable, we subsequently focus on the distribution of the obtained coefficients instead of statistical significance. Kenworthy (2004) argues that such an approach provides a test of the sensitivity of the results in small-N regressions to different model specifications. For instance, if the coefficient of EXP_i is close to zero in a variety of specifications, it is unlikely to be a plausible candidate to explain childcare inequality. The same holds when the estimated coefficients are highly variable in different model specifications. In contrast, characteristics with consistently large estimated

coefficient sizes across a variety of specifications are likely to be a more important part of the policy context that favours (or hinders) childcare equality. Our results hence give an indication of the relative independence of the size of an association because it shows how variable the estimate is when that particular characteristic is combined with all other characteristics in a stepwise way.

We performed several sensitivity analyses (not shown) to assess the robustness of our findings. First, to check for outliers, we re-estimated all regressions using a jack-knife procedure omitting one country in each estimation. Second, Poland and Ireland were identified as potentially influential cases, hence we estimated all regressions without these countries. Finally, we estimated all regressions including per-capita gross domestic product (GDP) and the share of low skilled mothers with young children to control for differences in economic development and the educational composition of the population. In all three cases, the interpretation of the results was unaffected.

To summarize, we are *not* cherry-picking the best fitting model but aim to grasp whether the overall size of the coefficients of a set of welfare state characteristics are substantial and theoretically meaningful in relation to childcare inequality. If the size of the coefficient of an explanatory variable turns out to be irrelevant (close to zero) in a variety of regressions, we discard it as an important institutional correlate of childcare inequality. Figure 2 shows standardized regression coefficients for each explanatory variable in a boxplot. We focus on the median coefficient and the extent of the variation in interpreting the results. For sake of comparison: A decline in inequality (RII) with a standard deviation (0.31) would almost eliminate childcare inequality in Belgium and the United States, would bring childcare inequality in the United Kingdom to Dutch levels, and France to Spanish levels (per country values of all variables are provided in table A4 in annex, a summary of the standardized coefficient for each explanatory variable in table A5).

[Figure 2 about here]

FTE informal care use and the dominant norms on motherhood are not likely to be direct drivers of childcare inequality. While the bivariate correlations suggest a low to medium sized association, the median coefficient of both variables estimated is close to zero. The multivariate

results suggest that out-of-pocket fees are more strongly related to inequality than one would expected from the bivariate correlation table. The magnitude of the effect is small, however. A one standard deviation (SD) increase in parental fees (= 9 p.p. as % of the average wage) is related to a 0.15 SD increase in childcare inequality. To put this in perspective: this would be the equivalent of France doubling its childcare prices for low income families, or Denmark raising its prices with 82%. The level of low skilled maternal employment and government expenditures on childcare are more strongly related to childcare inequality, but there is large variety in the range of coefficients obtained for both variables. Moreover, these estimates are sensitive to the choice of the inequality measure. In sensitivity analyses where we calculated RII's on the basis of parental or paternal educational levels, the coefficients for these variables are closer to zero (not shown).

The length of well-paid leave and the perceived quality of childcare services are strongly and consistently related to childcare inequality. First, the interpretation of a curvilinear transformed relationship is difficult, but the strength of the relationship can be illustrated as follows: hypothetically (*ceteris paribus*) introducing a 9 month period of well-paid leave in countries without a well-paid parental leave entitlement (such as the United States, Australia, Slovak Republic, Malta, or Ireland) is related to a 0.5 SD decrease in childcare inequality. The reverse equally holds: well-paid leave exceeding 9 months is related to higher levels of childcare inequality. Second, a SD increase in the perception of quality (= an increase of the score with 0.8 points) is related to almost 0.4 SD decrease in childcare inequality. This is the equivalent of Spain reaching Danish levels of perceived quality, or Poland reaching French levels.

Finally, the results suggest that the level of publicly provided or subsidized childcare services, the legal entitlement to a childcare place, and perceived quality of childcare services are most strongly related to childcare inequality. First, increasing the number of subsidized places per 100 children with one SD (= 14 places) is associated with a 0.6 SD decline in childcare inequality. This is the equivalent of France increasing public supply to Danish levels. Second, having a legal entitlement to a childcare place is associated with a 0.7 SD lower level of childcare inequality compared with countries without such entitlement.

5. Discussion

The results suggest that all three dimensions of welfare states characteristics we identified in this article (i.e. universalism, the state-market mix, and defamilization) matter to characterise

the level of childcare inequality in developed economies. In particular, the regression estimates show that the institutional organisation might be most relevant to understand childcare inequality. The organisation of leave schemes, government involvement in the supply of childcare services, affordability, and quality of childcare services are all (conditionally) associated with inequality in childcare use at the country level. Maternal labour market participation and government spending on childcare services are more inconsistently associated with childcare inequality, while we cannot discern an association between childcare inequality and the use of informal care or dominant norms on motherhood.

The fact that we cannot find evidence for a relationship between childcare inequality and the use of informal care suggest, *ceteris paribus*, low income families do not substitute formal care services for informal ones such as grandparents and relatives. The *ceteris paribus* clause is obviously important here, because countries with a high degree of informal care tend to be countries with a low level of subsidized supply (r = -0.46) and perceived quality (r = -0.57), which are important correlates of childcare inequality. In other words, low government involvement and low perceived quality are more characteristic of unequal care countries than the likelihood of relying on informal care arrangement in a particular country.

We cannot discern a relevant association between childcare inequality and dominant norms on motherhood or government spending, but the impact of these characteristics could be of an indirect nature. Consider the case of dominant norms on motherhood. Insofar as long and well-paid parental leave provisions are a reflection of these norms, their impact might be important yet uncaptured by our model. This cannot be accounted for given the methodology applied and the data at hand. Similarly, from the rather surprising finding that government spending is not directly related to childcare inequality it doesn't follow that governments can achieve equality in childcare use without a substantial level of spending being involved. The strong effect of public supply suggests that government involvement in ensuring sufficient number of places is important (the public supply and spending variables are strongly correlated, r = .77). Therefore the estimates suggest that it matters *how* money is spent. Some countries resort to demand-side subsidies, providing vouchers to parents to buy care in the market, while other countries provide supply-side subsidies, funding services directly (Lloyd and Penn 2012). The results from our regression exercise suggest that in particular the latter option is related to more equality in childcare use. In the same vein, imposing a legal entitlement will not lead to equality by itself, but only insofar as it forces governments to meet demand. In sum, our interpretation of the coefficient of public spending is that a high level of spending is not a *sufficient* condition to

ensure more equality in childcare participation. Ideally we would like to differentiate between types of public spending (e.g. on parents or on services) but unfortunately such data is not available to date.

The impact of the duration of well-paid leave provides evidence that countries should pursue a coherent set of policies for ensuring equality in childcare use. That is an important observation, since the objectives of family and labour market policies may be at odds. Long periods of well-paid leave encourage low skilled mothers to become home care providers. At the same time, our results confirm the reciprocal relationship between childcare and maternal employment: a higher share of low skilled maternal employment is associated with a lower level of inequality in childcare use. Policymakers should be well aware of such incoherencies when implementing social policy. It is for instance no coincidence that Finland is the only Scandinavian country reporting high levels of inequality in childcare use and low levels of maternal employment, despite its legal entitlement to childcare services. Its much contested yet popular home care allowance proves to be a disincentive for low skilled mothers to engage in paid employment (Ellingsæter, 2012).

Our results suggest that keeping private costs for low income families at bay should also be part of a strategy to ensure more equality in childcare participation. Although most of the European countries have implemented an income-related tariff system for their publicly provided or subsidized childcare services (European Parliament, 2007), in some countries there is much more headway to be made in making childcare services affordable for low income families (notably Ireland and the United States, see table A4). Moreover, the affordability of childcare depends not only on childcare costs as such, but also on the broader tax-benefit system and labour market policies and how these affect family income. OECD analyses showed that in some countries employment is unattractive to low-income families, irrespective of childcare costs (Immervoll and Barber, 2005).

Finally, our findings suggest that quality matters a great deal. Quality matters because disadvantaged children reap the benefits of childcare attendance in terms of cognitive and non-cognitive development only if the quality of the care provided is sufficient. This is usually measured in terms of 'process quality', such as the child-to-staff ratio, group size, staff qualifications and competence requirements, physical space and classroom size, and curriculum of the provision (see the overview in OECD, 2012; Urban et al., 2012), although there is still a debate going on about what exactly constitutes sufficient quality and how quality standards should be translated in national guidelines (Working Group on Early Childhood Education and

Care, 2014). We find, however, that it also matters how parents *perceive* the quality of childcare services provided, at least at the country level. Levels of inequality in childcare use are higher in countries with poor ratings of childcare quality. This is consistent with recent findings from Germany (Schober and Spiess, 2015) that maternal employment decisions may be related to the 'observable quality' of childcare services, in conjunction with availability and cost. In German regions with high levels of childcare availability and where childcare use is the dominant norm, quality issues seem to play much less of a role in determining maternal employment decisions. A recent Eurofound report (2013) found that difficulties to access childcare coincide with negative perceptions of the quality of the services on offer. As a matter of fact, our indicator of perceived childcare quality is not only consistently associated with childcare inequality, but with government involvement in childcare supply as well: the higher the level of public supply in a particular country, the higher the perceived of quality of childcare services ($r = 0.47$). In any case, our results seem to confirm the truism that parents are not likely to enrol their children in childcare services they distrust (Working Group on Early Childhood Education and Care, 2014). Further research should try to untangle how quality perceptions impact on different socio-economic groups. It could, for instance, be the case that while low income families resort to home care when perceptions of quality are low, high income or high educated parents find solace in high quality yet expensive for-profit childcare services. To disentangle this, one should ideally be able to make a distinction between childcare use in private and public facilities; unfortunately, such data does not yet exist (to our knowledge).

Some caveats should be mentioned. Some possible explanations of childcare inequality, such as the local and regional distribution of childcare slots, the complex systems of government subsidies, and the relevant rules and regulations (for instance regarding national quality guidelines, priority rules for disadvantaged families) could not be taken into account due to data limitations. Moreover, the inability to reliably distinguish private from public spending on childcare services impedes our endeavour. Finally, the cross-sectional nature of our analysis could disguise the fact that welfare state institutions might have an impact over (a long period of) time. Future research should set out to exploit time variation in welfare state characteristics using panel data and methods, once such data become available. The results of our country-level study could also serve a starting point for a multilevel analysis, in which the impact of welfare state characteristics on the probability of using childcare for children by socioeconomic background could be modelled.

6. Conclusion

In one of its first comprehensive reports on childcare, the OECD noted that "a public supply-side investment model managed by public authorities brings more uniform quality and superior coverage of childhood populations than parent subsidy models" (OECD, 2006: 114). We may now add that they also bring more equality. Achieving equality in childcare use is a necessary condition for childcare services to be effective in facilitating maternal employment and breaking the intergenerational chain of child poverty by furthering human capital and child development.

In the majority of countries, however, participation in childcare is stratified by maternal educational level. Children from families with a low-educated mother use formal childcare to a much lesser extent than children living in families with a high-educated mother. The only countries succeeding in equalizing use at high levels are Denmark and Iceland. All other countries in our sample report low rates of formal childcare use, high levels of inequality in formal care use, and in most cases a combination of both.

This study constitutes a first attempt at improving our understanding of inequality in childcare use by relating it to welfare state characteristics and policies. It contributes to the comparative welfare state literature conceptually, by moving beyond welfare regimes and testing combinations of specific welfare characteristics. Moreover it contributes to middle-range theory, by suggesting several hypotheses on how the social structure of the welfare state affects childcare inequality to be tested in future research.

We find that a higher degree of government involvement is related to lower levels of inequality in childcare use. In particular a higher number of public or subsidized supply of childcare places, the existence of a legal entitlement to a childcare place, and lower net childcare costs for low income families are drivers of more equality in childcare use. In contrast, long periods of well-paid leave are associated with more inequality. We also find evidence that the perception of parents of the quality of the service on offer is an important correlate of childcare inequality: childcare is used more equally across educational levels in countries where the quality of the services is perceived to be higher. Overall, our results suggest that for childcare inequality to be mitigated, government will need to step in.

Endnotes

1 This functionalist approach towards childcare inequality, in which inequality is seen as a social phenomenon in its own right that can be explained by macro-social mechanisms such as welfare state characteristics, goes back to Merton's writings of social mechanisms as "social processes having designated consequences for designated parts of the social structure" (Merton, 1968, p. 43; see also Mayntz, 2004).

2 More information on the EU-SILC survey and its quality reports can be found here: http://ec.europa.eu/eurostat/statistics-explained/index.php/EU_statistics_on_income_and_living_conditions_(EU-SILC)_methodology_–_data_quality; Information on HILDA: https://www.melbourneinstitute.com/hilda/; Information on NHES: https://nces.ed.gov/nhes/index.asp.

3 One reviewer pointed out that the educational differences in formal childcare use we find in Sweden contradicts official Swedish enrolment statistics showing equality in childcare use amongst educational groups. We would like to stress that although we find a significant difference in childcare use across educational groups, the difference is small and Sweden remains one of the best performing countries. Yet, the difference can be related to the fact that official statistics include only childcare facilities in the education system, while we take also private facilities into account. Earlier research (Van Lancker and Ghysels, 2012) has shown that the private sector in Sweden, although limited in scope, is mainly used by high income families. More generally, our measure of childcare use cannot be readily compared with official statistics in many countries, since we calculate a FTE measure for a specific group of children aged 0 to 3.

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Table 1. Overview of welfare state dimensions potentially related to childcare inequality.

Dimension	**Expected relationship**
Universalism	
Legal entitlement to childcare	Social right → less inequality
Out-of-pocket fees	Higher fees → more inequality
State-market mix	
Subsidized supply of childcare places	More subsidized supply → less inequality
Government spending	More spending → less inequality
Perceived quality	Higher quality → less inequality
Defamilization	
Low skilled maternal employment	More employment → less inequality
Length of well-paid parental leave	Very short or very long periods of leave → more inequality
Dominant motherhood norms	More traditional norms → more inequality
Use of informal childcare	More informal care use → more inequality

Note: the → sign indicates an association, not a causal relationship.

Table 2. Summary of dependent and independent variables.

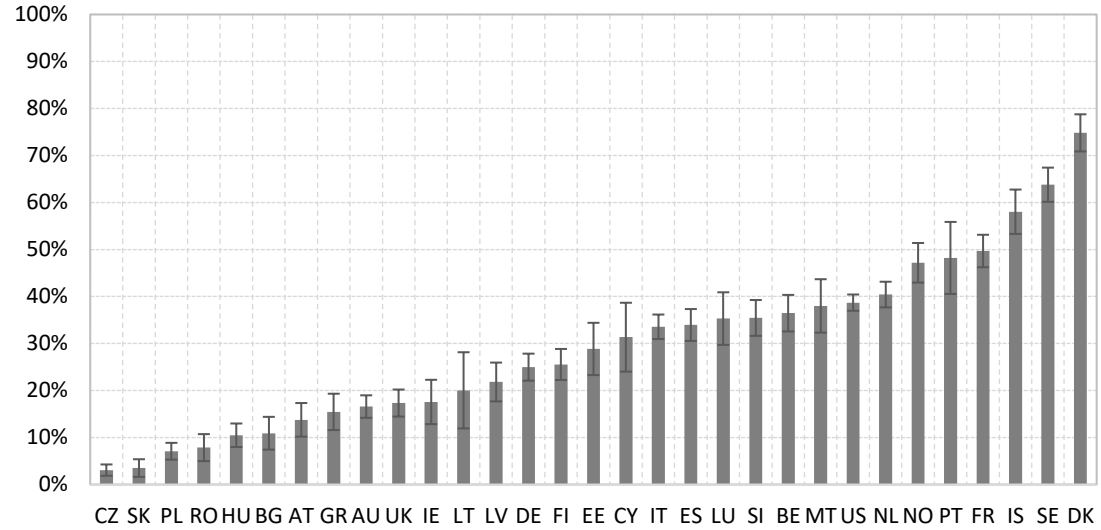
Variable	**Min**	**Mean**	**SD**	**Max**	**N**
Inequality	-.07	.40	.31	1.19	31
Universalism					
Legal entitlement to childcare (dummy)	0	.161	.374	1	31
Out-of-pocket fees	3	12.1	9.3	45	29
State-market mix					
Subsidized supply of childcare places	2	20.4	13.5	56	27
Government spending	.12	.67	.36	1.61	31
Perceived quality	5	6.45	.77	7.7	28
Defamilization					
Low skilled maternal employment	8.6	30.6	13.5	57.7	31
Length of well-paid parental leave	.2	6.9	4.5	17.1	31
Dominant motherhood norms	4.4	41.5	21.3	76.5	30
Use of informal childcare	0	13.9	11.4	45.9	31

Table 3. Correlation coefficients between childcare inequality and explanatory variables.

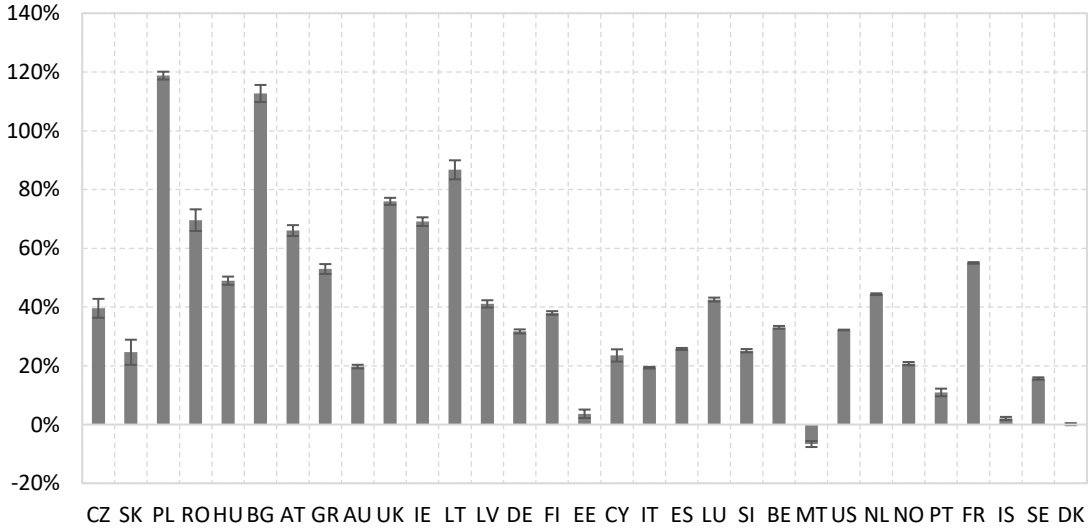
	Inequality	1	2	3	4	5	6	7	8
1. Social right	-0.36								
2. Fees	0.06	-0.07							
3. Subsidized supply	-0.49	0.60	-0.06						
4. Spending	-0.18	0.61	-0.15	0.77					
5. Perceived quality	-0.55	0.37	0.08	0.47	0.36				
6. Maternal employment	-0.29	0.14	-0.28	0.50	0.42	0.22			
7. Parental leave	0.39	-0.29	0.16	-0.26	-0.16	-0.44	-0.21		
8. Dominant norms	0.29	-0.46	-0.17	-0.71	-0.67	-0.50	-0.20	0.21	
9. Informal care	0.27	-0.42	-0.05	-0.46	-0.53	-0.57	-0.06	0.13	0.58

Figure 1.

Panel A. FTE formal childcare use amongst 0-2 year olds.



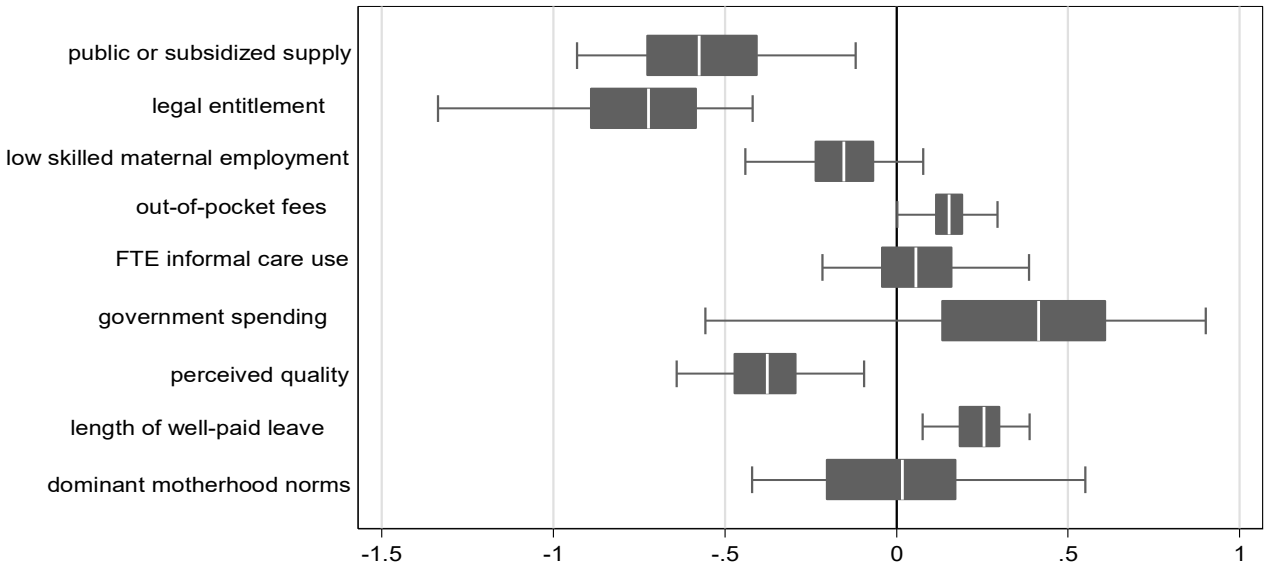
Panel B. Inequality (RII, relative inequality index) in FTE formal childcare use amongst 0-2 year olds.



Note: Countries ordered by FTE formal childcare use. Country codes: Czech Republic (CZ), Slovak Republic (SK), Poland (PL), Romania (RO), Hungary (HU), Bulgaria (BG), Austria (AT), Greece (GR), Australia (AU), Ireland (IE), United Kingdom (UK), Lithuania (LT), Latvia (LV), Germany (DE), Finland (FI), Estonia (EE), Cyprus (CY), Italy (IT), Spain (ES), Slovenia (SI), Luxemburg (LU), Belgium (BE), Malta (MT), United States (US), Netherlands (NL), Norway (NO), Portugal (PT), France (FR), Iceland (IS), Sweden (SE), Denmark (DK). Statistical tests and calculations are reported in Table A3.

Source: own calculations on EU-SILC 2009, HILDA 2010 and NHES ECPP 2012.

Figure 2. Regression results: the effect on childcare inequality of a standard deviation change in a covariate



Note: Standardized coefficients from OLS regression, using all combinations of one explanatory variable with all possible combinations of the other explanatory variables (see text). The dependent variable is childcare inequality (RII). The coefficient for the dummy variable legal entitlement to childcare is y-standardized, showing the effect on childcare inequality of having a legal childcare entitlement in place. The figure shows boxplots for each explanatory variable. The white vertical line refers to the median coefficient obtained, the edges of the box to the first and third quartile coefficients. The whiskers refer to the minimum and maximum values obtained (outliers not shown). Dataset and code are available on request or on the corresponding author's website.

Source: own calculations on EU-SILC 2009, HILDA 2010 and NHES ECPP 2012.

ANNEX

Table A1. Sources and definitions of independent variables

Variables	**Operationalization**	**Source**	**Reference year**
Universalism			
Legal entitlement to childcare	Dummy	Multilinks Database	2009
Out-of-pocket fees	Net childcare costs for a low-income couple with two children in full-time 'typical' care (% of average wage)	OECD Tax-Benefit model, see Richardson, 2012	2008
State-market nexus			
Public or subsidized supply	The number of publicly provided or subsidized childcare slots per 100 children	Multilinks Database, OECD 2009, Yamauchi 2010	Between 2000 and 2005 for EU countries, AU 2006
Government spending	Spending on childcare (% of GDP)	OECD Social Expenditure database, OECD Family Database	2009 (2012 for US, 2010 for AU)
Perceived quality	Mean score on a 10-point scale of the question "How would you rate the quality of child care services in your country?"	Eurofound Quality of Life Survey 2012	2011/2012
Defamilization			
Low skilled maternal employment	Employment rate of mothers with a low level of education and a youngest child < 3 (%)	EU-SILC, HILDA, NHES	2008, 2010, 2012
Length of well-paid leave	Length of well-paid (> 60% of average wage) leave (months), centered at 9 months and linearized ($ABS\|x\|$)	Multilinks Database, OECD Family Database (Iceland, Australia, US)	2008, 2010, 2012
Dominant motherhood norms	Share of mothers holding traditional beliefs on motherhood (%)	European Values Study 2008, International Social Survey Programme 2012 (US and AU)	2008, 2012 (US and AU)

Informal care use	FTE informal childcare use (%)	EU-SILC, HILDA, NHES	2008, 2010, 2012

Table A2. Distribution of children by maternal educational levels.

	Low	Medium	High	N
AT	14%	60%	25%	458
BE	18%	31%	51%	622
BG	37%	43%	20%	308
CY	9%	34%	57%	230
CZ	6%	69%	25%	695
DE	6%	55%	39%	725
DK	12%	38%	51%	499
EE	12%	41%	47%	403
ES	30%	27%	43%	1057
FI	8%	43%	49%	857
FR	16%	38%	47%	864
GR	15%	42%	43%	557
HU	18%	53%	30%	626
IE	8%	34%	57%	418
IS	15%	32%	53%	400
IT	31%	47%	21%	1681
LT	11%	41%	48%	207
LU	30%	25%	44%	645
LV	18%	44%	39%	461
MT	54%	18%	27%	295
NL	13%	45%	42%	909
NO	12%	33%	55%	507
PL	6%	57%	38%	1195
PT	56%	19%	25%	243
RO	35%	51%	14%	275
SE	7%	43%	49%	596
SI	8%	47%	46%	803
SK	7%	65%	29%	356
UK	11%	47%	42%	525
US	15%	50%	35%	4364
AU	17%	38%	45%	809
Total N				*22590*

Note: If no mother present in the household, educational level of the father is used instead. Calculation of educational levels: see text.

Table A3. Inequality in FTE childcare use

	SII	p-value	Mean FTE childcare use	(se)	RII	(se)	N
AT	0.091	0.001	0.138	(0.018)	66%	(0.943)	458
BE	0.121	0.000	0.365	(0.020)	33%	(0.246)	622
BG	0.123	0.000	0.109	(0.018)	113%	(1.487)	308
CY	0.074	0.147	0.313	(0.037)	24%	(1.067)	230
CZ	0.012	0.360	0.031	(0.006)	40%	(1.639)	695
DE	0.079	0.001	0.250	(0.015)	32%	(0.357)	725
DK	0.001	0.973	0.748	(0.020)	0%	(0.173)	499
EE	0.011	0.804	0.288	(0.028)	4%	(0.735)	403
ES	0.087	0.000	0.339	(0.017)	26%	(0.178)	1057
FI	0.097	0.000	0.255	(0.017)	38%	(0.319)	857
FR	0.273	0.000	0.497	(0.018)	55%	(0.139)	864
GR	0.082	0.009	0.155	(0.020)	53%	(0.854)	557
HU	0.051	0.006	0.105	(0.013)	49%	(0.716)	626
IE	0.121	0.000	0.176	(0.024)	69%	(0.752)	418
IS	0.012	0.709	0.580	(0.024)	2%	(0.277)	400
IT	0.065	0.000	0.336	(0.013)	19%	(0.135)	1681
LT	0.174	0.000	0.200	(0.041)	87%	(1.649)	207
LU	0.150	0.000	0.353	(0.029)	43%	(0.345)	645
LV	0.090	0.003	0.218	(0.021)	41%	(0.631)	461
MT	-0.025	0.458	0.380	(0.029)	-7%	(0.520)	295
NL	0.179	0.000	0.404	(0.014)	44%	(0.149)	909
NO	0.098	0.001	0.472	(0.021)	21%	(0.274)	507
PL	0.084	0.000	0.071	(0.009)	119%	(0.679)	1195
PT	0.053	0.289	0.482	(0.039)	11%	(0.660)	243
RO	0.055	0.026	0.078	(0.015)	70%	(1.878)	275
SE	0.100	0.002	0.638	(0.019)	16%	(0.203)	596
SI	0.089	0.002	0.354	(0.019)	25%	(0.291)	803
SK	0.009	0.550	0.035	(0.010)	25%	(2.180)	356
UK	0.132	0.000	0.173	(0.015)	76%	(0.614)	525
US	0.125	0.000	0.387	(0.009)	32%	(0.052)	4364
AU	0.033	0.028	0.166	(0.012)	20%	(0.316)	809
Total N							*22590*

Table A4. Values of all explanatory variables per country

	social right	*out-of-pocket fee*	*public or subsidized supply*	*public spending*	*perceived quality*	*low skilled maternal employment*	*parental leave*	*dominant motherhood norms*	*FTE informal care use*
AT	0	17	9	0.40	7.3	16	5.3	64	10
BE	0	4	34	0.70	6.8	33	5.6	26	8
BG	0	11	7	0.76	5.1	30	16.3	42	18
CY	0	16	18	0.34	7.1	29	4.9	70	39
CZ	0	11	8	0.41	6.6	16	2.6	40	13
DE	0	14	10	0.51	6.7	18	6.4	46	4
DK	1	11	56	1.43	7.2	58	3.1	4	0
EE	1	7	22	0.35	6.3	23	9.9	58	12
ES	0	8	17	0.58	6.5	39	5.3	46	12
FI	1	12	21	1.09	7.7	13	0.2	13	2
FR	0	9	43	1.30	6.3	39	5.3	23	9
GR	0	5	7	0.12	5	22	1.1	72	46
HU	0	6	6	0.66	5.7	11	15.9	54	7
IE	0	45	15	0.43	6	15	9.0	26	12
IS	0	8	n/a	0.93	7.4	44	6.0	12	3
IT	0	n/a	11	0.66	5.8	35	4.4	77	16
LT	0	12	18	0.60	6.4	37	17.1	67	11
LU	0	5	14	0.43	7.2	46	5.3	54	8
LV	0	11	16	0.63	5.9	32	4.7	67	9
MT	0	22	n/a	0.60	7.6	23	9.0	n/a	11
NL	0	6	15	0.93	7	50	5.3	25	14
NO	1	17	37	1.30	n/a	47	3.0	14	2
PL	0	7	2	0.33	5.5	19	4.9	64	24
PT	0	3	19	0.47	6.2	57	5.3	63	26
RO	0	n/a	n/a	0.76	5.1	30	17.0	53	43
SE	1	6	50	1.61	7.3	33	3.8	10	1
SI	0	9	27	0.49	6.7	49	2.9	34	21
SK	0	7	18	0.35	5.9	9	9.0	39	13
UK	0	10	26	0.80	6.3	27	7.5	30	12
US	0	38	n/a	0.36	n/a	26	9.0	29	16
AU	0	13	25	0.35	n/a	23	9.0	21	11
Av.	.16	12	20	0.67	6.5	31	6.9	42	14
SD	.37	9	14	0.36	.77	14	4.5	21	11

Table A5. Summary of standardized coefficients for each explanatory variable

	min	**q1**	**median**	**q3**	**max**
Use of informal childcare	-0.22	-0.04	0.06	0.16	0.38
Dominant motherhood norms	-0.42	-0.20	0.02	0.17	0.55
Length of well-paid parental leave	0.08	0.19	0.25	0.30	0.39
Low skilled maternal employment	-0.44	-0.23	-0.15	-0.07	0.08
Perceived quality	-0.09	-0.29	-0.38	-0.47	-0.64
Government spending	-0.80	0.13	0.41	0.61	0.90
Public or subsidized supply	-0.12	-0.41	-0.58	-0.73	-0.93
Out-of-pocket fees	-0.06	0.12	0.15	0.19	0.29
Legal entitlement to childcare	-0.03	-0.58	-0.72	-0.89	-1.34

Note: legal entitlement to childcare is y-standardized.

Figure A1. Scatterplot of childcare participation rate against intensity of use (no. of hours / week)