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HORIZONTAL AND VERTICAL EQUITY OBJECTIVES OF CHILD BENEFIT SYSTEMS: AN EMPIRICAL ASSESSMENT FOR EUROPEAN COUNTRIES

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Abstract

A large body of research has demonstrated that child benefit systems are of paramount importance in reducing child poverty, thus having an important vertical equity component. Although all child benefit systems embody in one way or the other such vertical equity objectives, the primary objective of child benefit systems is not necessarily to reduce (child) poverty; a major (and historical) justification for benefit programs that provide additional income for families with children are the costs associated with childrearing and the welfare loss relative to childless families this entails. Compensating the costs of raising children is a horizontal equity objective. Most studies are concerned with vertical equity and child poverty reduction; here we also explicitly take the dimension of horizontal equity into account. In this paper we discuss horizontal and vertical equity objectives of child benefit systems, and try to gauge how countries in the EU compare to one another on these dimensions. For vertical equity, we use traditional measures of poverty as an indicator. For horizontal equity, we compare child benefits with the cost of children, as is implicitly included in the equivalence scale. Both dimensions are combined in one synthetic indicator. We contribute to the literature by highlighting the role of characteristics of benefit systems in achieving certain objectives regarding horizontal and/or vertical equity.

Key words: child benefit systems; horizontal equity; vertical equity; cost of children; child poverty

HORIZONTAL AND VERTICAL EQUITY OBJECTIVES OF CHILD BENEFIT SYSTEMS: AN EMPIRICAL ASSESSMENT FOR EUROPEAN COUNTRIES

1 INTRODUCTION

Every developed country has crafted a mixture of benefits and tax concessions to support families with children, hereafter referred to as child benefits¹. A large body of research has demonstrated that child benefits are of paramount importance in reducing child poverty (Van Lancker and Van Mechelen, 2015; Salanauskaite and Verbist, 2013; Bradshaw, 2012; Kamerman *et al.*, 2003; Immervoll *et al.*, 2001). This means that child benefit systems have an important redistributive impact, commonly referred to as a *vertical equity* objective. Although all child benefit systems embody in one way or the other such objective, the primary objective of child benefit systems is not necessarily to reduce (child) poverty. A major and historical justification for benefit programs that provide additional income for families with children is to (at least partly) compensate for the costs associated with childrearing and to minimize the welfare loss relative to childless families (Gauthier, 1999). Hitherto, this *horizontal equity* objective is almost invariably neglected in academic evaluations of child benefit systems which are primarily focused on the impact of child benefits on (child) poverty, work incentives, and fertility.

Evaluating policy systems, *in casu* child benefit systems, is a complex and multidimensional matter. Policies often embody several objectives, and one single directly observable outcome such as the impact of child benefits on poverty does not do justice to this multidimensionality. In this paper, we propose and develop a two-dimensional framework for evaluating and classifying the outcomes of child benefit systems in terms of both vertical and horizontal equity. Treating these two objectives as analytically distinct permits the construction of a synthetic index of child benefit outcomes and allows for the explicit incorporation of a value judgement about the most important objective of child benefit systems. In doing so, we propose a novel measure for gauging horizontal equity based on the cost of children implicit in commonly used equivalence scales drawing on the public finance literature. We demonstrate the potential of our evaluative framework for policy purposes by means of an empirical application for 31 European welfare states. Finally, we assess whether our two-dimensional framework is able to capture policy changes by making an explicit distinction between policy and environmental variables as determinants of the outcomes of child benefit systems

¹ Our focus here is on child benefits (either in the form of social benefits or tax advantages), as these are explicitly linked to the presence of children. Of course, other provisions in the tax-benefit system are also important for the living standard of families with children, such as housing benefits, work-related benefits and social assistance (see e.g. Bradshaw and Huby, 2014, Van Lancker *et al.*, 2015). In principle, our analysis can be extended to these other policies. We, however, do not take this perspective in this paper, as our interest is in these benefits that follow from the presence of children.

In section 2 we discuss vertical and horizontal principles with respect to child benefit systems. Next, we explain possible determinants of the balance of these two principles, namely benefit system characteristics on the one hand and socio-economic factors on the other. Section 4 presents our proposal for the measurement of horizontal and vertical equity outcomes of child benefit systems, while section 5 provides an empirical application for 31 European countries. Section 6 concludes, thereby indicating pathways for further research.

2 ON HORIZONTAL AND VERTICAL EQUITY OBJECTIVES OF A CHILD BENEFIT SYSTEM

In the public finance literature the commands of HE and VE have been succinctly described as “equal treatment of equals” and “unequal treatment of unequals”, respectively (e.g. Musgrave, 1959; Kaplow, 1989; Lambert, 2004). These objectives are considered yardsticks of social justice and equality, and are often applied to evaluate (reforms of) tax and benefit systems (Lambert and Yitzhaki, 1995).

In this tradition, HE means that ‘equals’, *i.e.* individuals or families who are equally well off (in economists’ jargon, they have equal utility) before taxes are imposed, should be equally well off after the tax is imposed (Feldstein, 1976; Manser, 1979)². The presence of children in a household complicates this matter, however. If an individual A with 2 children and an individual B without children have the same pre-tax income, they cannot be seen as being ‘equals’ in terms of utility level because children incur substantial private costs (Wolf *et al.*, 2011). Nonparents thus derive more utility from an equal disposable income compared to parents, *e.g.* they can buy more goods or leisure time.

A whole strand of the public finance and social policy literature is devoted to the accurate measurement of children’s costs (*e.g.* Tsakloglou, 1991; Bradbury, 1994; Gray and Stanton, 2010). Summarizing this literature, Browning (1992) distinguishes four different approaches to deal with this issue:

- 1) The positive question: how do children affect the expenditure patterns of a household?
- 2) The expenditure question: how much do parents spend on their children?
- 3) The needs question: how much income does a family with children need compared to a childless family?
- 4) The iso-welfare question: how much income does a family with children require to be as well off as a family with no children?

² It should be noted that the applicability and the normative foundation of this notion of HE is a matter of ongoing debate. For instance, the issue of reranking (that is, individuals that take a different position in the income distribution after taxes are imposed) poses considerable problems for the HE command that equals should be treated equally (Aronson *et al.*, 1994; see also Kaplow, 1989; 2000).

The latter two approaches are the most relevant for our perspective. They may look similar but are nevertheless distinct. The third question relates to a normative judgement on a bundle of goods and services needed to maintain children and is often resolved empirically by developing a budget standard (with variation in terms of methodology and categories of goods included). The fourth question deals with how much money is required so that families with different numbers of children achieve the same level of utility (Gray and Stanton, 2010), and is hence the approach fitting for our purpose of studying horizontal equity issues. According to this approach an equivalence scale needs to be developed, either (1) by applying and estimating some proxy of welfare (examples are the Engel-method and the Rothbarth-method, see Engel 1895 resp. Rothbarth 1943); (2) by applying a so-called ‘complete demand system’ methods in which consumer demand theory forms the basis for estimating the costs of children directly from the cost function of the household to which they belong; or (3) by using the so-called subjective method according to which the cost of children is estimated on the basis of people’s subjective evaluations of the relationship between income, family composition and living standard (Browning, 1992; Gray and Stanton, 2010). Once established, such equivalence scale is applied to convert the income of households with differing size and composition into ‘equivalised income’ in order to account for the costs of children (Ray, 1983). A concern for HE then means that individuals or families with the same equivalent income should be treated equally by the tax and benefit system. Basically, this entails ‘horizontal’ redistribution between families of different size (Atkinson and Bourguignon, 1990), for instance from childless families to families with children and from small families to large families.

Societies may have good reasons to care for HE. Wolf *et al.* (2011) demonstrate that the rearing of children produces negative as well as positive externalities. In short, net of private costs for parents, children incur public costs but also yield public benefits. Public costs include *inter alia* public expenditures on education, childcare and healthcare. Public benefits are related to the benefits for society of children becoming adults themselves. These include *inter alia* taking up employment and paying taxes, sharing the burden of public debt and pay as you go pension systems, doing care work. Previous research suggests that for developed countries, the public benefits of child-rearing clearly outweigh the costs (Lee and Miller, 1990; Wolf *et al.*, 2011). Hence the case in favour of horizontal redistribution in order to ensure HE: rearing children entails a substantial private cost for parents³ but yield benefits for society as a whole, which has led some scholars to conclude that children are a ‘public good’ (England and Folbre, 1999). This is even more true when fertility rates are low and dependency ratios are

³ Children can also bring benefits to parents, which according to some scholars should be taken into account when comparing living standards of families with and without children. According to Pollak and Wales (1979) an equivalence scale that incorporates these benefits is called an ‘unconditional’ equivalence scale and is the one that should be used when comparing welfare levels of different family types. Other authors (*e.g.* Deaton and Muellbauer, 1986) argue that ‘conditional’ equivalence (*i.e.* not including the benefits parents derive from their children) are nevertheless appropriate for policy purposes, as the standard of living should be the relevant concept and not subjective happiness.

increasing, as is now the case in most welfare states (Vanhuyse & Goerres, 2012). Because individuals enjoying the contributions of children (as future adults) to society are not necessarily those who have paid for it, the costs of children are (at least partly) passed on to society as a whole (Folbre, 2008). In fact, this means redistribution from childless families to those with children and from smaller to larger families. We indeed observe that family size is an important element in the determination of tax liability in developed countries, which means that an equivalence scale is implicitly included in these tax systems.

The VE command prescribes that individuals or families with different utility should be treated differently by the tax and benefit system. Basically, a concern for VE entails the traditional notion of ‘vertical’ redistribution between individuals or families according to their ability-to-pay (Atkinson and Bourguignon, 1990) and implies the idea of inequality reduction (Lambert, 2001). The possibilities for families to ensure a good future for their children depend on their own living standard. Families with low incomes have far less financial, human and social capital at their disposal to invest in their children than higher income households (Bradley and Corwyn, 2002). Research for the US, for instance, shows that high-income families spend about seven times more on their children than low-income families (Kaushal *et al.*, 2011). The consequences of this inequity are far-reaching. First, 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 future productive adults (Duncan *et al.* 1998; Hackman *et al.* 2010). Second, given the inheritance of social inequality, children growing up in poverty have a great chance of becoming poor parents themselves (Corak, 2006). In short, children growing up in poverty face inferior life chances and low levels of social mobility, and one can easily assume that the externalities of childrearing in poor circumstances will be negative. The resources available to families are the strongest determinant of parental investment (Kornrich and Furstenberg, 2013), which provides societies with a clear rationale to care for VE as well⁴.

3 EXPLAINING THE BALANCE BETWEEN HE AND VE

In this paper, we propose two indicators for the measurement of the two main objectives of child benefit systems discussed in the previous section: compensating for the costs of childrearing (horizontal equity, HE) and reducing child poverty (vertical equity, VE). It has long been recognized that the issues of HE and VE are inherently interrelated (Kaplow, 1989). In the case of child benefits, for instance, horizontal and vertical equity objectives might be at odds with each other (Cremer *et al.*, 2003). A child benefit system that aims to maximise VE by allocating all available resources to poor families, for instance, will impose horizontal inequity because the costs of children are not compensated for families with higher

⁴ Of course, arguments to support concerns for VE can also be derived from egalitarian theories of justice.

incomes; and *vice versa*. In fact, a child benefit system always strikes a certain balance between HE and VE, depending on (1) its characteristics; and (2) the socio-economic composition of the eligible population.

(1) Two characteristics of child benefit systems are of particular relevance here: the design of the benefit system and the size of the budget (*e.g.* Cantillon *et al.*, 2014; Kim, 2000; Salanauskaite & Verbist, 2013). First of all, the design of benefit systems refers to how the available resources are distributed over the eligible population. Generally, distinction is made between universal and selective benefit systems. A universal system covers the whole reference population, *in casu* all families with children, irrespective of need or income while a selective system restricts benefit eligibility to a specific category of the reference population, for instance having a low income or being a single mother (Van Lancker and Van Mechelen, 2015). It is not difficult to see that a given budget distributed over all families with children will be less effective in reducing poverty than the same budget being allocated exclusively to families below the poverty line. The size of the budget is a crucial element, however. It is theoretically possible given an unlimited budget to have a strict universal system in which all children receive an equal benefit amount that is sufficiently generous to compensate for the cost of childrearing for all families and to lift all families with children above the poverty line at the same time. However, in a more realistic scenario in which government expenditures for child benefits are limited, a trade-off between HE and VE objectives can be expected. Moreover, in their influential article *The Paradox of Redistribution*, Korpi and Palme (1998) have argued that universal systems achieve higher levels of redistribution because they enjoy broader political support and legitimacy and, consequently, are more generously funded. If that inference is correct, one should expect universal child benefit systems to perform better in terms of both HE and VE, because more resources can be allocated over families with children. To complicate the matter, most countries don't have a strictly universal or strictly selective system in place. Often countries resort to selectivity within universalism: a basic amount for all families, albeit often differentiated according to family size and age of the children, and supplements for low income families or specific categories such as single parents or families with children with disabilities on top of that (see Van Mechelen and Bradshaw, 2013; OECD, 2014 for overviews). The balance between HE and VE will be dependent on such policy choices as well.

(2) Not only the system characteristics are expected to determine the HE and VE outcomes of child benefit systems, the composition of the eligible population is a crucial element as well. First of all, the distribution of parenthood interacts with the design of the system. If the number of children is distributed equally over the income distribution, a strict universal system will presumably display a trade-off between HE and VE: distributing a limited budget over all children will come at the detriment of its poverty-reducing capacity, while distributing the budget over the smaller group of poor children only will come at the expense of its cost-reducing capacity for all children. However, while it used to be the case that low income families had more children on average as high income families, in some countries

this pattern has now reversed: high income families tend have more children compared with lower income families (*e.g.* Wood *et al.*, 2014). In these countries, a strict universal system will presumably be even less effective in achieving VE because the ‘equal distribution’ of resources will be biased towards higher income families. Second, the balance between HE and VE outcomes will also be determined by the magnitude of the poverty risk. If the poverty risk is high (headcount poverty rate) or the poverty gap is large (the depth of poverty), more resources are needed to achieve VE than in countries where the poverty risk is low and the poverty gap is small. To illustrate this point, consider two countries A and B with A having a large and B a small poverty gap. In order to achieve the same level of VE with a given budget, country A will have to distribute its budget more selectively than country B, which in turn means that country A is likely to achieve lower levels of HE compared with country B.

The above considerations are important because indicators for measuring HE and VE objectives are ‘outcome indicators’. Following Mant (2001) we believe that outcome indicators at the national or regional level should not only be able to compare performance between countries but also to inform policy within countries, *i.e.* to reflect policy changes within countries. Similarly, Atkinson *et al.* argued in the context of constructing a set of recommendations for the EU-level portfolio of indicators that an output indicator “should be responsive to effective policy intervention, but not subject to manipulation” (Atkinson *et al.*, 2002: 190). In order to use outcome indicators of the sort we propose here for policy purposes it is crucial to be able to know what lies beneath the observed outcomes. It has been argued in the context of health policy evaluation that outcome indicators are determined by two kinds of variables: 1) policy variables or input variables, *i.e.* amenable to policy such as the size of the budget or the design of the benefit; and 2) control variables or environmental variables, which affect the outcome but cannot be easily manipulated by policymakers (Aday and Andersen 1974). Pestieau (2009) makes a similar distinction between ‘input variables’ and ‘environmental variables’. The magnitude of the poverty risk is both a policy variable and an environmental variable: it can be manipulated by social and economic policy measures other than child benefits, but it is also one of the determinants of the impact of child benefits. Because we are interested in the impact of the child benefit system proper, and not in the evaluation of other policy instruments that might influence the risk of poverty such as labour market policies and progressive taxation, we consider it here an environmental variable.

In the next section, we propose a method to measure HE and VE output indicators and devote some attention to the measurement of the above-mentioned policy and environmental variables. In the empirical application of our proposed evaluative framework, we tentatively explore the role of the policy variables in explaining the performance of child benefit systems in European countries.

4 THE MEASUREMENT OF HORIZONTAL AND VERTICAL EQUITY OF CHILD BENEFIT SYSTEMS

4.1 Horizontal equity

For measuring the objective of horizontal equity, finding an indicator is challenging. To our knowledge, the public finance nor the social policy literature has devoted attention to how HE should be operationalized in the context of child benefits. Consistent with the concept of HE we discussed above, our indicator should reflect how much of the childrearing costs are compensated for all families with children. We propose a measure that reflects such utilitarian logic based on the equivalence scale. As indicated *supra* (§2) it is common practice to apply an equivalence scale to measure costs of children and we assume that such equivalence scale captures the cost of children in a satisfactory way. To capture the impact of a child benefit system on cost-compensation we calculate the ratio of the aggregate amount of family transfers received and the aggregate cost of children.

In order to derive the aggregate cost of children, we calculate (1) equivalised household income using an equivalence scale that incorporates all family members; and subsequently (2) equivalized household income using an equivalence scale that includes only adults (individuals older than 18), so that (1) - (2) provides a measure of the cost of children (CC) of that household. By omitting each child separately in part (2) it is possible to calculate a measure for the cost of each child i (CC_i). Note that a feature of this approach is that the cost of children is also dependent on the household income: higher incomes will result in higher costs for children, *ceteris paribus*. This corresponds to an old postulate of equivalence scale theory, which states that poorer households have smaller economies of scale, while richer households have larger ones (Paulus *et al.*, 2010).

Formally, our indicator of HE of a child benefit system is of the following form:

$$HE = \frac{\sum_{i=1}^n \min(CB_i, CC_i)}{\sum_{i=1}^n CC_i}$$

with CB_i denoting the amount of child benefits received for i (i ranging from 1 to n number of children), and CC_i the cost of child i . A comparison of the sum of CB and the sum of CC then gives a measure for the reduction of horizontal inequities, or to what extent costs of children are compensated for by public funding for child benefits. The measure is bounded between 0 (no cost compensation) and 100% (full cost compensation). In the numerator we disregard spending that exceeds the cost of children; this is analogous to the indicator of VE, where spending that does not reduce poverty is disregarded. Our measure is thus a weighted average of the cost coverage of child benefit for different household types, which allows us to easily decompose the measure across household types, as will be done in our empirical application.

4.2 Vertical equity

For gauging the performance of child benefit systems in terms of vertical equity, we will use measures of child poverty reduction through family transfers. These are rather traditional measures that have been widely applied in the child benefits literature, and are consistent with our theoretical concept of VE (*supra*). To define poverty, we make use of the Foster *et al.* (1984) poverty index $FGT(\alpha)$ or P_α , which is of the form:

$$P_\alpha = \frac{1}{n} \sum_{i=1}^n \max \left\{ \left(\frac{z-x_i}{z} \right), 0 \right\}^\alpha$$

With z denoting the poverty threshold, x the income of the household in which person i lives, n the number of individuals, and α being a parameter reflecting the poverty measure of interest. When $\alpha=0$, P_0 gives the *poverty headcount ratio*, or the percentage of individuals living in a household with an income below the poverty threshold. The child poverty rate for a given country is thus the headcount of the number of children living in a household below the poverty line (see *e.g.* Decancq *et al.* 2014, for further reading on poverty measurement). When $\alpha = 1$, P_1 gives the *poverty gap ratio*, the average income shortfall from the poverty line amongst children living in poverty. This reflects the ‘depth’ of poverty. We present here outcomes for P_1 as this measure has some convenient similarities to our measure of HE: while our HE measure compares benefit amounts with the amount of money needed to cover child costs, our VE measure provides a comparison of benefit levels with the amount needed to lift children out of poverty. At a later stage these similarities also allow us to construct a synthetic indicator of both HE and VE.

To measure child poverty reduction through family transfers, we calculate P_1 before and after inclusion of child benefits into the household income, as is given by the following formula:

$$VE = \frac{P_{pre} - P_{post}}{P_{pre}}$$

Where P_{pre} is poverty gap ratio before transfers and P_{post} is poverty gap ratio after transfers. This VE indicator is bounded between 0 (no poverty gap reduction) and 100% (the poverty gap is closed through child benefits). Moreover, we test sensitivity of outcomes by applying an alternative poverty concept, namely the relative reduction in poverty rate that occurs through family transfers.

4.3 Operationalisation of the measures using EU-SILC data

In our empirical assessment we aim to compare European child benefit systems on their HE and VE dimensions. The most appropriate dataset for this purpose is the European Union Statistics on Income and Living Conditions (EU-SILC). Our main analysis will be performed on the data of EU-SILC 2011. The EU-SILC is a yearly survey carried out in all EU member states on the income and living conditions

of private households. Disposable income is taken from the data (variable *HY020*) and defined as the sum of all income components minus taxes and social contributions. The amount of child benefits received is recorded at the household level in the variable child-related allowances (variable *HY050*). Child-related allowances as recorded in EU-SILC not only consist of child allowances, child benefits, and child tax credits, but also include birth, adoption and maternity grants, and for some countries parental benefits as well. At this point, it is not possible to distinguish all these different components. This means that for some countries the impact of child benefits will be overstated in case parental leave benefits are an important part of the household income. However, detailed scrutiny of the content of the child-related allowances variable has shown that for the Nordic countries, who devote a large share of family policy resources to leave schemes, parental leave is not included in the variable. Therefore the bias is very limited. Moreover, we have repeated our empirical analyses with a subsample of families with a youngest child over 2 years old, so as to mitigate the impact of leave benefits, and the interpretation of the results does not change.

As the variable of child related allowances is collected at the household level, we have to derive a family transfer for each child. We do this by dividing the household family transfer amount by the number of children younger than 18 in the household. To the extent that family transfers are granted for children of 18 and older, this might entail an overestimation of the amount per child. Yet, by using EU-SILC we are assured that measures of HE and VE are consistent across countries and over time.

An important but not straightforward decision is the choice of the appropriate equivalence scale. Ideally, we would like to use an equivalence scale that fits with the iso-welfare question discussed *supra*, like for instance those based on ‘complete demand system’ methods (Gray and Stanton, 2010). We are bound here however by pragmatic considerations: no demand-system based equivalence scale is currently available for a large set of countries. Hence, we have opted to apply the commonly used modified-OECD scale which according to Devos and Zaidi (1997) turned out to present a reasonable compromise between different scales in terms of poverty outcomes, and which has been become the standard within the EU for both research and policy purposes (see also Atkinson *et al.*, 2002). This scale assigns a weight of 1 to the first adult in the household, a weight of 0.5 for other persons older than 14 years, and a weight of 0.3 for children. Returning to our example in section 2 above, individual A with two children should have an income of 1.6 times ($1 + 2 \times 0.3$) the income of individual B to obtain the same equivalent income, hence to have the same utility. Given the use of this equivalence scale, children have a value 0.3 if they are younger than 14 and 0.5 if they are older, which means that our HE is to some extent dependent on the age of the children (*i.e.* children of 14 and older entail a higher cost than younger children).

For the VE measure of poverty reduction we follow common practice in the EU: a child (under 18 years old) is defined as being poor when living in a household with an equivalised net disposable household

income below a poverty line set at 60% of the national median equivalised household income (the European headline at-risk-of-poverty indicator, see Atkinson *et al.* 2002). The net disposable household income equals the sum of the income of all members of the household, including social benefits, minus taxes and social insurance contributions.

Our measures of HE and VE can be calculated for a country as a whole (which is what we will do first in the next section), but also for other geographical demarcations, for specific population groups (*e.g.* for different family types), or over time. All measures included in this paper and their sources are available in the online appendix.

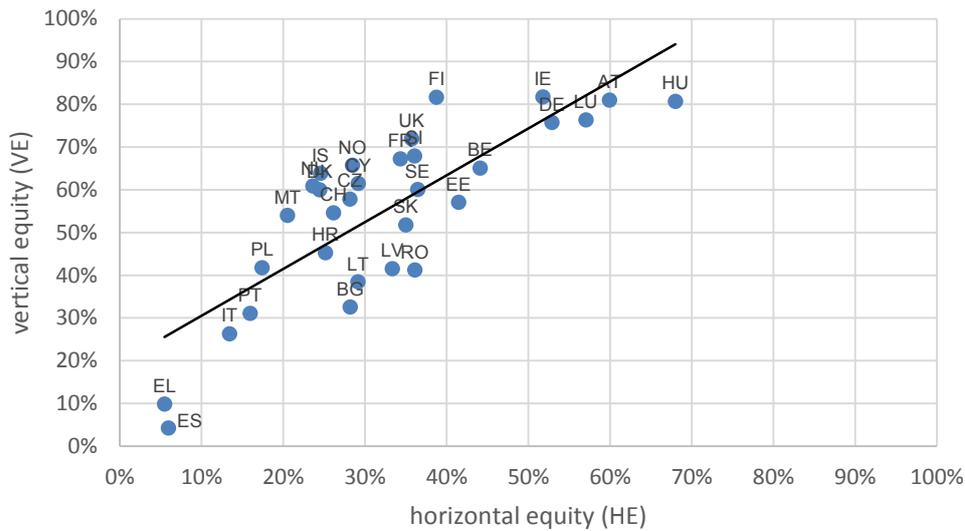
5 COMPARING THE PERFORMANCE OF COUNTRIES' CHILD BENEFIT SYSTEMS IN THE EU

Figure 1 shows country scores on the dimensions of HE (horizontal axis) and VE (vertical axis). It becomes immediately clear that there is no trade-off between achieving objectives of VE and HE: countries succeeding in compensating a high share of the costs of childrearing for all families tend to succeed in reducing the poverty gap to a large extent. The relationship is strong ($r = 0.81$) and remains strong when using other measures of VE, such as the relative poverty rate reduction ($r = 0.77$).

Our measure of VE should be interpreted as the percentage reduction of the child poverty gap; HE should be interpreted as the average share of costs compensated for all families with children. The results show that Hungary on average compensates for 68% of children's costs while reducing the child poverty gap with 81%. At the other end one finds the Southern countries Spain, Greece, Italy and Portugal. In particular the former two perform poorly on both the objectives of HE and VE. Most other countries are clustered around the middle.

Although our two-dimensional assessment of child benefits allows to conclude that Hungary, Austria, Luxemburg, Ireland and Germany are strong performers on both dimensions while the Southern countries are underachievers, it is difficult to compare country scores on HE and VE. Ultimately, it is a judgment call whether a 50% reduction of the child poverty gap is as equally important as compensating 50% of children's costs. We discuss this issue further below.

Figure 1 HE and VE outcomes of child benefit systems in Europe, 2011



Source: own calculations on EU-SILC 2011.

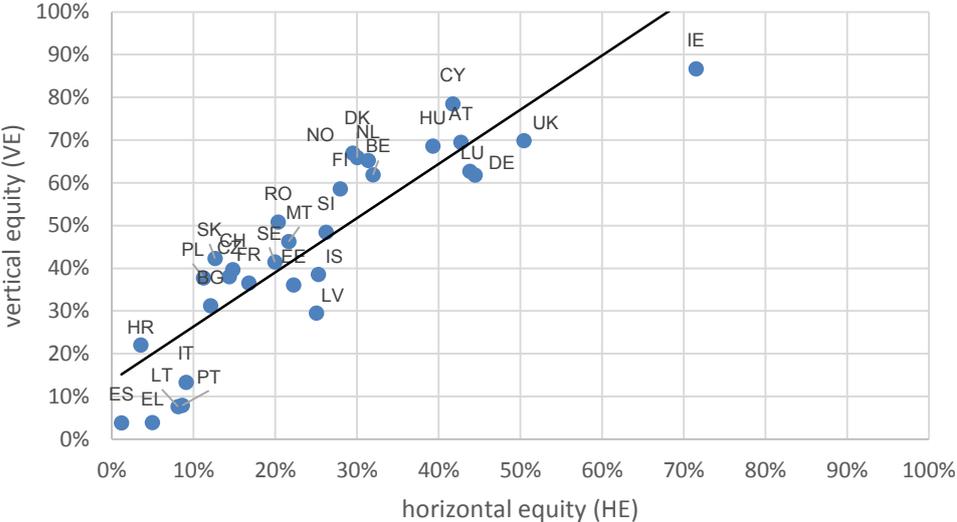
One feature of our proposed evaluative framework is that it can be disaggregated by family type. This means that our evaluative framework ought to be able to reflect policy choices with regards to child benefit system. Some countries are concerned with large families, and provide sizable cash supplements to families with three children or more; other countries focus on single parents and have implemented single parent supplements. If a country focuses on ensuring the welfare of *e.g.* single parents while being less inclined to do the same for large families, that should be reflected in the outcomes of our indicators for these family types.

In Figures 2, 3 and 4 we demonstrate such disaggregation for single parents⁵ with 1 child, couples with 1 child and couples with 3 children. Ireland, Norway and Denmark, for instance, have designed a child benefit system that includes generous supplemental benefits for single parents (Van Lancker *et al.* 2015). Figure 2 displays a strong correlation between HE and VE outcomes for small single parent families ($r = 0.89$). The results, however, demonstrate that the performance of countries in terms of HE and VE for the subgroup of single parents with 1 child differs from their overall performance. Ireland now becomes the frontrunner in terms of both HE and VE. Hungary and Austria, on the other hand, are no longer the best performers. Portugal, Spain, Italy, and Greece are underachievers, as are Lithuania and Croatia (HR).

⁵ Single parents are defined as a parent living with one or more children. This means that lone parents living in multi-unit households (e.g. three generations) are not identified here as single parents. The impact of this choice on outcomes is difficult to predict, given that little is known about the way resources are shared among multi-unit families, and hence which is the appropriate equivalence scale to apply.

The result cannot be interpreted simply as reflecting policy choices, however. Despite having supplemental benefits for single parents, Norway and Denmark do not stand out from the other countries. This might be due to the environmental variables, such as the income position of single parents in these countries, or it might be due to the supplements not being effective, or both. We will explore some tentative explanations further below.

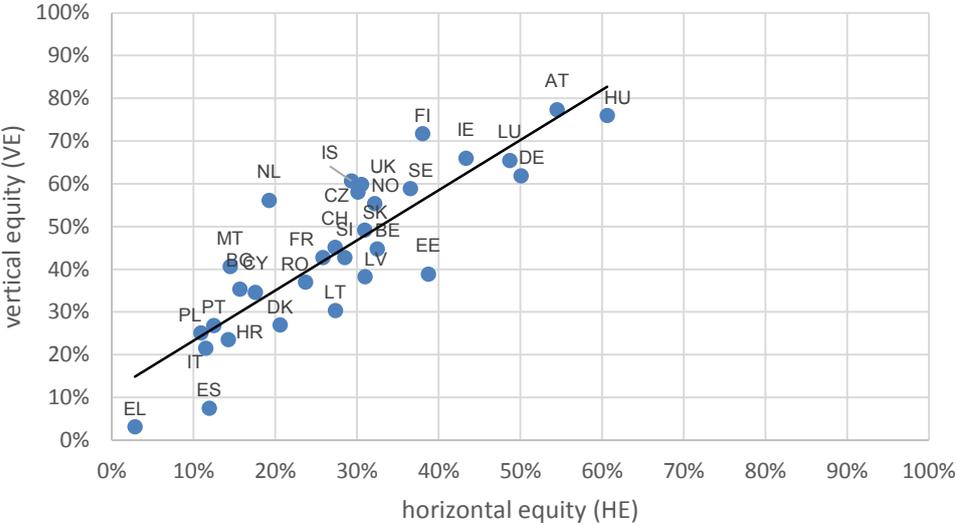
Figure 2 HE and VE outcomes of child benefit systems for single parents with one child, European countries, 2011



Source: own calculations on EU-SILC 2011.

Figure 3 shows the balance between HE and VE outcomes for couples with 1 child. Again, the correlation is very strong ($r = 0.86$). It is clear though, that countries performing well for single parents do not necessarily perform well for couples, and vice versa. Here, Hungary and Austria reclaim their place at the top of the league table. The Southern countries remain stuck at the bottom. The Netherlands do much better for small single parent families (Figure 2) in terms of cost-reduction than for small couple families (Figure 3), Estonia displays the opposite pattern.

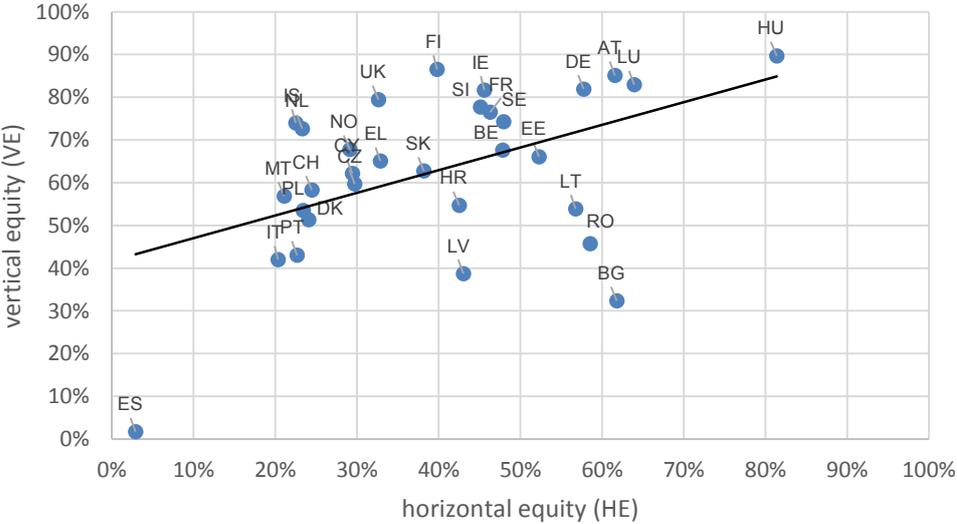
Figure 3 HE and VE outcomes of child benefit systems for couples with one child, European countries, 2011



Source: own calculations on EU-SILC 2011.

In countries such as Belgium, large families are entitled to higher child benefit amounts. We indeed see in Figure 4 that Belgium does much better in terms of HE as well as VE for couples with 3 children than for small families. More generally, the association between a country’s performance on VE and HE weakens for large families ($r = 0.48$): some countries achieve high HE scores while performing poorly on the dimension of VE (Bulgaria is a case in point). Countries do seem to care for large families, however, because many of the countries achieve higher levels of cost-reduction or poverty reduction for these families (compare Figure 3 and Figure 4). Spain is clearly an outlier here.

Figure 4 HE and VE outcomes of child benefit systems for couples with three children, European countries, 2011



Source: own calculations on EU-SILC 2011.

6 CONSTRUCTING A SYNTHETIC INDICATOR

In the previous section, we have developed two indicators for the measurement of HE and VE objectives in child benefit systems and applied them to a cross-section of European countries. However, in terms of straightforward comparison of country performance across time and space (is country A doing better than country B? How has country A evolved?) a simple numerical measure of performance, a so called composite or aggregated indicator, might be more appropriate. In our case, this means we need to aggregate the VE and HE output indicator into one measure. One of the main issues that needs to be addressed is how to weight the two indices to construct an aggregate measure. The UNDP Human Development Index (HDI), one of the most widely used composite indicators of human development, calculates the arithmetic average of its underlying indices. This is a very simple and straightforward way of aggregating multiple indices, yet often criticized. Decancq and Lugo (2013), for one, argue that assigning equal weight to the individual components is not *neutral*. Aggregating using the HDI method implicitly assumes that reducing poverty with 1 percent has the same value as compensating for the cost of children with an additional 1 percent. That is however a judgement call. Some countries might develop a child benefit system with the explicit ambition to reduce poverty, while other countries might focus on safeguarding the welfare of large families. The following formula illustrates how such sensitivity to either HE or VE can be incorporated in what we call the Child Benefit Performance Indicator (CBPI) which is of the form:

$$CBPI_{\alpha} = (VE * \alpha) + (HE * (1 - \alpha))$$

where parameter α is the HE-VE sensitivity parameter (if $\alpha = 1$, then one is only VE sensitive, if $\alpha = 0$, one only cares for HE, while $\alpha = 0.5$ yields the arithmetic average). Table 1 shows the outcomes for three different values of α .

Table 1 CBPI with different values of the HE-VE sensitivity parameter

Rank	HE sensitive ($\alpha = 0.25$)		Equal weight ($\alpha = 0.5$)		VE sensitive ($\alpha = 0.75$)	
1	HU	71%	HU	74%	HU	78%
2	AT	65%	AT	70%	AT	76%
3	LU	62%	IE	67%	IE	74%
4	IE	59%	LU	67%	LU	72%
5	DE	59%	DE	64%	FI	71%
6	FI	49%	FI	60%	DE	70%
7	BE	49%	BE	55%	UK	63%
8	EE	45%	UK	54%	SI	60%
9	UK	45%	SI	52%	BE	60%
10	SI	44%	FR	51%	FR	59%
11	FR	43%	EE	49%	NO	56%

12	SE	42%	SE	48%	SE	54%
13	SK	39%	NO	47%	IS	54%
14	NO	38%	CY	45%	CY	53%
15	RO	37%	IS	44%	EE	53%
16	CY	37%	SK	43%	NL	52%
17	CZ	36%	CZ	43%	DK	51%
18	LV	35%	NL	42%	CZ	50%
19	IS	34%	DK	42%	SK	48%
20	DK	33%	CH	40%	CH	48%
21	CH	33%	RO	39%	MT	46%
22	NL	33%	LV	37%	HR	40%
23	LT	31%	MT	37%	RO	40%
24	HR	30%	HR	35%	LV	39%
25	BG	29%	LT	34%	LT	36%
26	MT	29%	BG	30%	PL	36%
27	PL	23%	PL	30%	BG	31%
28	PT	20%	PT	24%	PT	27%
29	IT	17%	IT	20%	IT	23%
30	EL	7%	EL	8%	EL	9%
31	ES	6%	ES	5%	ES	5%

Source: own calculation using EU-SILC 2011.

We have seen *supra* that there is no trade-off in the outcomes of child benefits, which means that countries tend to perform well or poorly on both indicators of VE and HE. This is also reflected in our CBPI. Even when being more sensitive to HE ($\alpha=0.25$) or VE ($\alpha=0.75$), the ranking of the best performing countries and the worst performing countries is rather stable. Hungary, Austria, Ireland, and Luxemburg are always in the top 5 while the Southern countries are consistently at the bottom of the score table. Some countries do shift, however. The Nordics Norway, Island, and Denmark tend to perform better in terms of VE than in terms of HE (in particular Denmark is a case in point). For these countries, we find relatively more VE sensitivity; consequently the CBPI increases with increasing α . The opposite holds for countries such as Belgium, Bulgaria and Romania. Since their CBPI decreases with increasing α , they perform better in terms of HE. Let us now turn to how these country performances might be explained.

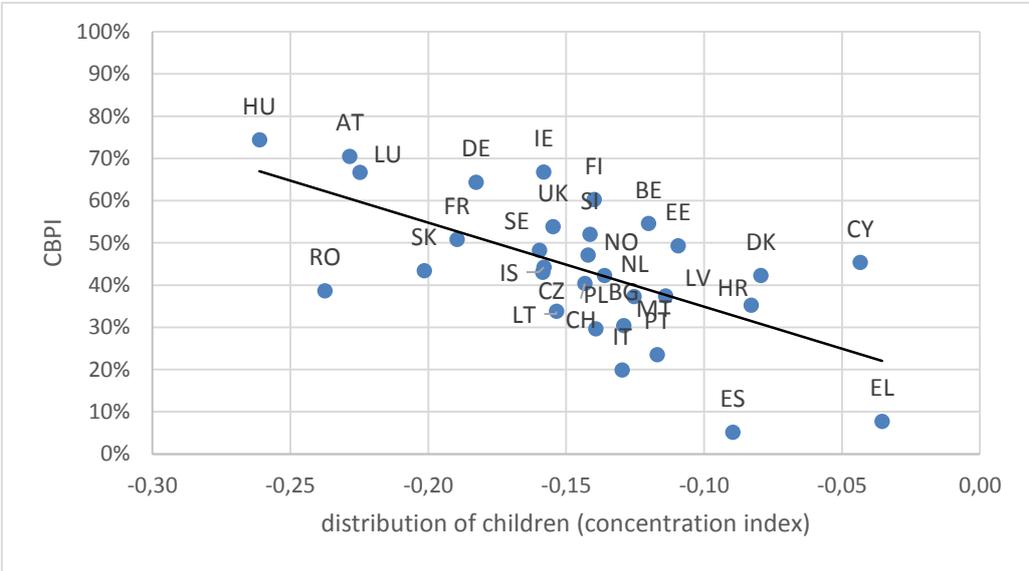
7 IN SEARCH FOR DETERMINANTS OF COUNTRY PERFORMANCE

In section 3 we explained that the outcomes in terms of HE and VE are a function of policy variables (size of spending and design of the system) and environmental variables (distribution of children and magnitude of child poverty). We explore here how these policy and environmental variables relate to our output indicator. Details of the variables and their sources are available in the online appendix.

First, we look at the environmental variables. *Supra* we have argued that the distribution of parenthood is expected to influence the outcomes of a child benefit system. If children eligible for child benefits are

concentrated in the lower strata of the income distribution, even a strictly universal system will have a vertically redistributive effect. For gauging this, we calculate a concentration coefficient of the number of children in households, ranked by the disposable incomes *before* adding child benefits (see *e.g.* Lambert, 2001 on the calculation of concentration coefficients). Basically, we gauge whether low income or high income households tend to have more children on average, or whether there is no difference between the two. A concentration coefficient of 0 indicates that children are equally distributed over income groups, a negative coefficient indicates that children are overrepresented in lower income household while a positive coefficient indicates that children are overrepresented in higher income households. Figure 5 shows that the CBPI is strongly and negatively related ($r = -0.62$) to the distribution of children. Basically, this means that the more children are concentrated in low income families, the better child benefit systems tend to perform in terms of HE and VE outcomes.

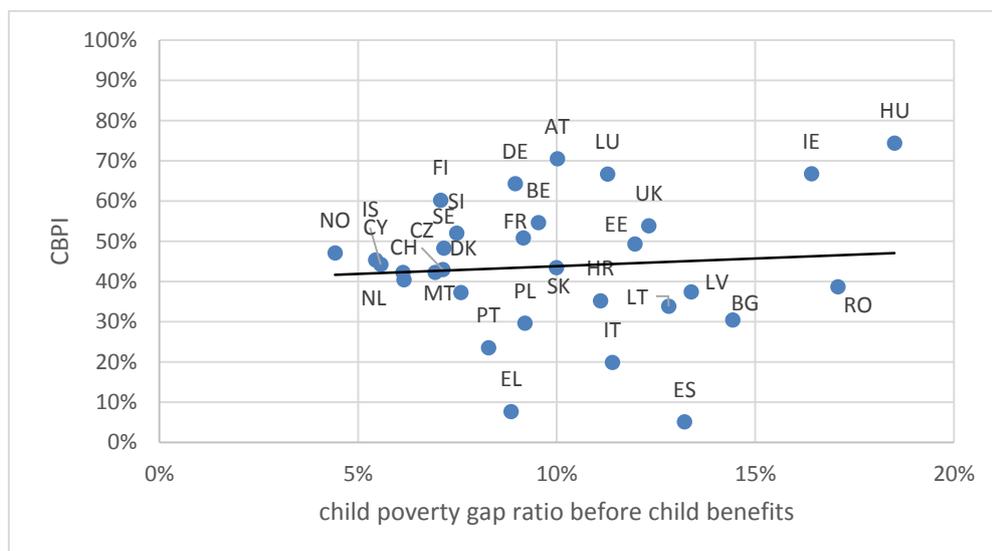
Figuur 5 Socio-economic distribution of children and CBPI ($\alpha=0.5$) outcomes, Europe, 2011



Source: own calculations on EU-SILC 2011.

In addition we consider child poverty. The poverty gap ratio (P_i) before child benefits is an indication of how severe the problem is to be ‘solved’ by child benefits. The higher the poverty gap ratio, the more resources are needed to bridge the gap. Figure 6 shows that there is no apparent relationship between the pre-child benefit poverty gap and the performance of child benefit systems ($r = 0.08$). Some countries such as Ireland and Hungary have a large poverty gap, but manage to reduce it by means of their child benefit system while simultaneously compensating children’s costs for all families with children. Others such as Bulgaria and Romania similarly display a large poverty gap before child benefits, but report a below-average performance. *Prima facie*, child benefit systems are not responsive to a high poverty gap ratio and child benefit performance cannot be explained by the severity of child poverty. We now look whether policy factors can provide an explanation, more specifically size and design.

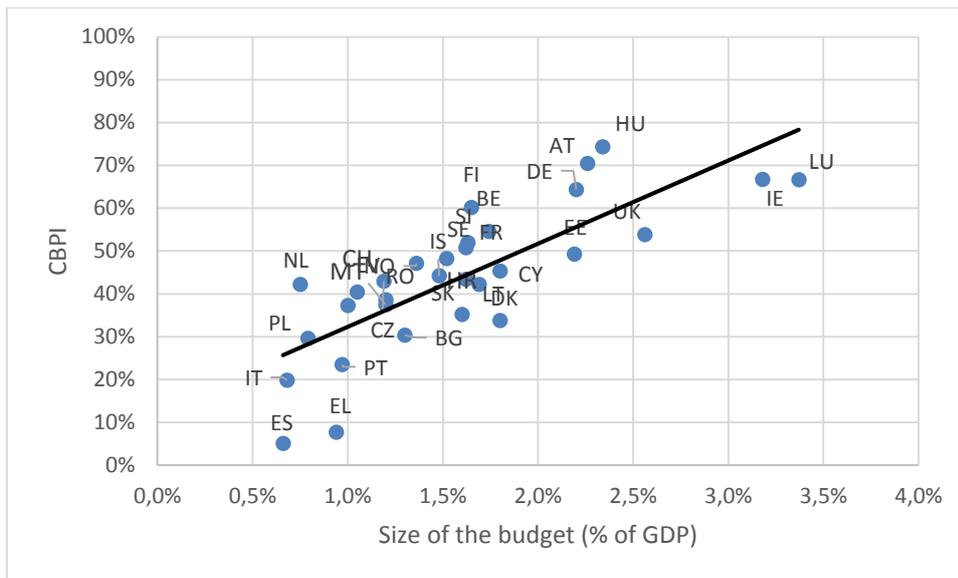
Figure 6 Poverty gap rate before child benefits and CBPI ($\alpha=0.5$) outcomes, Europe, 2011



Source: own calculations on EU-SILC 2011.

We now turn to the link between size of the child benefit system and its performance. Size is here defined as expenditures on child-related cash transfers to families with children, expressed as a percentage of GDP. The data include spending on child allowances, income support during parental leave, income support for sole parents (in some countries), and where applicable, spending on child tax credits that are paid out in cash to recipients (in particular relevant for UK and Germany). As such, the broad definition of spending adheres to the broad definition of the EU-SILC child-related allowances variable. The figures are drawn from the OECD SOCX (social expenditures) database and Eurostat for countries not included in that database. Figure 7 shows a strong and consistent relationship ($r = 0.79$): countries performing well spend more on child benefits, countries performing poorly spend less. Size is clearly an important determinant for child benefit performance on both objectives of VE and HE.

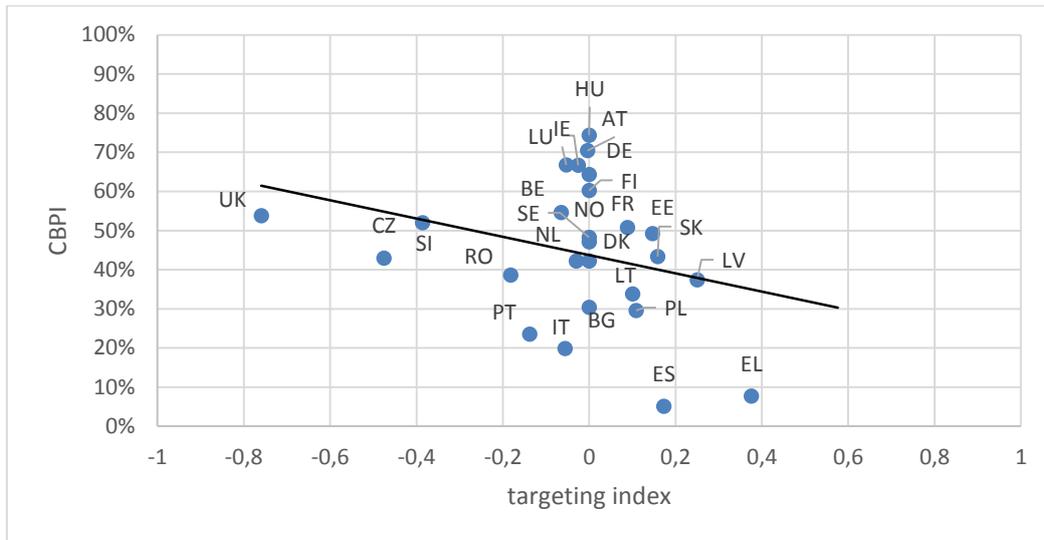
Figure 7 Size of child benefits systems and CBPI ($\alpha=0.5$) outcomes, Europe, 2011.



Source: own calculations on EU-SILC 2011, OECD SOCX database and EUROSTAT for spending on child-related cash transfers.

Finally, the design of the system, universal, selective or mixed systems is expected to determine how the budget for child benefits is allocated over families with children. In a recent paper, Van Lancker and Van Mechelen (2015) have designed a targeting index based on the institutional characteristics of child benefit systems. Their targeting index gauges the targeting intentions of child benefit systems instead of targeting outcomes, *i.e.* to what extent are child benefits meant to benefit the lowest incomes vis-à-vis middle and higher income families. Here, we apply their targeting index to our CPBI. Figure 8 shows that the more child benefits are targeted towards lower incomes, the better their CBPI tends to be, although the correlation is of medium strength ($r = -0.30$). Therefore it does seem to matter *how* the resources are allocated to families with children.

Figuur 8 Targeting and CBPI ($\alpha=0.5$) outcomes, Europe, 2011



Source: own calculations on EU-SILC 2011 and Van Lancker and Van Mechelen, 2015.

Obviously, the targeting index applied here does not capture the design of child benefit systems in a precise way. It could for instance be that countries aim to give additional child benefits to single parents, or to favour large families. In order to capture the nuts and bolts of child benefit systems, and to relate this to the outcomes in terms of HE and VE, a more sophisticated method is warranted. This will be the next step for future research by using a microsimulation model, like for instance the European tax-benefit model EUROMOD. Such a model would allow to disentangle the different design aspects of child benefit system while keeping the socio-economic variables constant, and to identify how they contribute to the performance indicators discussed in this paper.

Outcomes will not be influenced by policy changes alone, but also by changes in the composition of the population and socio-economic circumstances that we have not included in our explorative exercise here. The Great financial crisis, for instance, has caused a general decline in median income in some countries (*e.g.* the Baltic countries), which in turn led poverty rates to decline. This is a purely mechanical effect which will be reflected in the VE dimension of our evaluative framework. Also this aspect can be taken up by using EUROMOD: by keeping the population fixed (*e.g.* by using SILC 2007) and applying the child benefit system of both 2007 and 2011, or vice versa keeping the policy system fixed (*e.g.* at 2007) and changing the underlying population, one can distinguish differences in policy systems from changes in the composition of the underlying population or economic circumstances.

8 CONCLUSION

Evaluations of child benefit systems often focus on a single dimension only, notably poverty outcomes. Such a one-sided evaluation, however, does not do justice to the fact that child benefits systems are not

only there to reduce child poverty (which is a vertical equity objective), but also to compensate families for the cost of childrearing (a horizontal equity objective). The issues of horizontal and vertical equity are strongly interrelated, and might also be at odds with one another when it comes to actual implementation. For instance, a given budget distributed equally over all families with children will be less effective in combatting child poverty but more effective in compensating children's costs for all families than a system in which the budget is entirely targeted towards low-income families.

In this paper we have included this dimension of cost-compensation in the analysis by proposing and developing an indicator to assess the horizontal equity objective of child benefit systems. We have combined this with an indicator of vertical equity to construct a two-dimensional evaluative framework and subsequently applied it to child benefit systems in European countries based on recent EU-SILC data. We found a strong correlation between vertical and horizontal equity: countries succeeding in compensating a high share of the costs of childrearing for all families tend to succeed in reducing the poverty gap to a large extent as well. Contrary to what we expected, there is no trade-off between HE and VE objectives. Children are not randomly distributed over the population but tend to be overrepresented in families with lower disposable incomes. Even if a country allocates its child benefits over children irrespective of their incomes, the fact that children are to be found in the lower strata of the income distribution means that spending on child benefits will have a vertical redistributive impact *by default*.

We demonstrated how our two-dimensional evaluative framework can be disaggregated over family types, and we found that the outcomes were more varied across countries, in particular for single parents and large families. We also showed that our two dimensions can be integrated into one, synthetic indicator of child benefit performance, which allows to evaluate and to rank countries based on one single metric.

The outcomes of child benefit systems in terms of HE and VE depend on policy variables on the hand, in particular the size of the budget and the characteristics of the child benefit system, and on environmental variables such as the socio-economic composition of the underlying population on the other. We have tentatively explored some of these factors, and find that the outcomes of child benefit systems are determined by 1) the socio-economic distribution of children in the population, with more children in the lower income strata being associated with better outcomes; 2) the size of the budget with higher levels of spending being associated with better outcomes; and 3) the design of child benefit systems, with child benefit systems targeting towards lower incomes being associated with better outcomes. We did not find tentative evidence that the outcomes of child benefit systems are determined by the severity of child poverty in a particular country.

In order to properly separate the impact of policies from the impact of environmental variables on CBPI, a more comprehensive analysis is needed, though outside the scope of this paper. In future research

microsimulation techniques should be applied to disentangle the genuine impact of policy factors on the outcomes of child benefit systems. A model such as EUROMOD would allow to make a distinction between the impact of changes in the underlying population and the different elements of the design of a child benefit system.

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