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Country review on explicit formula-based policies to reallocate education resources towards educational needs

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Introduction

This paper conducts a review of different funding models in countries having explicit formula-based funding models. This paper aims to provide detail on how formula-funding systems consider the additional educational needs of disadvantaged populations and children in need.

An increasing rich literature on formula funding exists and this document does not aim to summarize the debate on formula funding. Very good introduction on the topic provide Ross and Levačić (1999) and Fazekas (2012), who gives also a good overview on the literature up to 2011.

An important source for this review were country cases studies, as by Alonso and Sánchez (2011), Levačić (2014), Levačić and Downes (2004), the work within the scope of the OECD Reviews of School Resources (OECD, 2017b and underlying national reports) and the just published series of studies by IIEP (Chimier & Emeran, 2017). Documentation by countries itself, administrative and legal documents and national discussion papers are amongst the most valuable sources of information. Unfortunately, those documents are not only hard to identify, but also is their use limited by the author's language ability. For this paper mainly documents in English, German and French were considered. The sources are provided in the country review section.

This paper does not aim to echo debates about advantages and risks of formula funding systems. Yet, it should be noted that the advantages and opportunities of such systems are not undebated and risk exist. For a recent paper see Gilead and BenDavid-Hadar (2017). The document does not comment on the success of the implementation of the reviewed systems, which is not guaranteed (Levačić, 2014). IIEP's research programme on school grants offers insights on the implementation of programmes from the perspectives of schools, see e.g. www.iiep.unesco.org/en/our-expertise/school-grants.

This paper is limited on explicit formula-based policies. It is debatable whether reallocation of funds could be looked at from a wider angle. In many countries policies exist, that would not become visible under the limited perspective of formula funding. Makarova (2016) discusses examples.

The purpose of this paper is to conduct a review of different funding models and policies used to allocate education resources using explicit formula-based policies with needs based components. It looks at definitions of different types of disadvantaged or vulnerable groups or definitions of social factors used to identify differences in educational needs. It provides examples of different approaches to allocate funding and documents details on the implementation of the formula systems. The document therefore does not aim to discuss pros and cons of indicator 4.5.3 or alternatives, as done by UNESCO Institute for Statistics (2016).

This paper is limited to look at primary and secondary levels of education even though funding of tertiary education is in the scope of *Education 2030* and some countries include an explicit equity objective also in per capita funding in tertiary education (UNESCO, 2017, p. 56). The paper covers all factors of reallocation relevant in the reviewed funding formulas. Consequently, many but not all equity dimensions mentioned in the Education 2030 Framework for Action are regarded. The paper

is relevant concerning the dimensions of race, colour, ethnicity, language, religion, national or social origin, property, disability, migration and indigenous peoples.

Countries included in the review

The review is structured around three aspects:

a.) Which educational needs are considered? Which factors are used to represent extra educational needs? This can be explicitly different types of disadvantaged or vulnerable groups that are targeted, but the factors are in many systems proxy indicators standing for a more complex school context. This section provides also details on the data used and their collection.

b.) How are resources allocated? This includes the formula used and the determination of weights for different factors.

c.) What is the nature and level of funds? This includes which funds are distributed and, since most systems use more than one allocation mechanism, which other funds are allocated following a needs-based approach?

The countries covered in this review are examples of systems that have explicit funding formulas for (some) educational resources and that allocate resources in this formula regime under explicit consideration of educational needs or students' and schools characteristics. For some countries the literature review indicates that funding formulas with needs based elements exist, but the literature review did not succeed to find sufficient detail to include the countries here. This is, for example, the case for Iceland, Spain and Sweden (OECD, 2017b, p. 153), Rwanda, Tanzania, and Zambia (International Commission on Financing Global Education Opportunity, 2016, p. 92).

A special section provides information on a sample of four countries having formula funding but without needs based components in the formulas. It should be noted that formula funding as done in those countries can be an important contribution to increase equality and equity, simply because funds are allocated in a transparent and equal way, fostering horizontal equity. Most of the formulas in those countries have elements to distinguish differences between urban and rural schools. Yet, for reporting on indicator 4.5.3 those countries would not be considered, since reallocation is not explicitly to vulnerable populations. Further examples for school funding without explicit reallocation to vulnerable populations that are not covered here include the Brazilian state of Rio Grande do Sul (Levačić & Downes, 2004), the Education Quality Inputs Scheme in Sri Lanka (Arunatilake & Jayawardena, 2013), per Capita funding in Bulgaria and Moldova (Levačić, 2014), Armenia (Alonso & Sánchez, 2011, p. 10-32). More country cases studies on examples for school grant financing are provided by IIEP's research programme on school grants.[1] This includes more countries using simple per capita school funding formulas, such as the Programme de scolarisation universelle, gratuite et obligatoire in Haiti, the Caisse école in Madagascar and the frais de fonctionnement, the PARSE

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[1] http://www.iiep.unesco.org/en/our-expertise/school-grants

programme in the Democratic Republic of the Congo (Chimier & Emeran, 2017) and school grants in Mongolia, Vanuatu (UNESCO IIEP, 2017b).

Not covered in the review are funding formulas at regional or state level, which can be important for regional equity and thus have an impact on compensation between populations of different wealth within a country. Examples would include Brazil (Walker, 2013, p. 17) or Pakistan (Alam, 2017). Legal definitions of minimum spending per pupil not associated with a funding mechanism are likewise not considered, as for Brazil (UNESCO, 2007, p. 25). Not covered are also projects using school grants to finance subsectors of the education system and not public mainstream schools, such as PRONADE in Guatemala or PROHECO in Honduras (Souto Simão, Pinkasz, & Sourrouille, 2015).

Covered in this paper are funding systems in Australia (State of Victoria), Austria, Belgium (Flemish community), Chile, Estonia, France, Germany (Hamburg, Berlin, Hesse, Bremen), Kosovo, Lithuania, Georgia, Malawi, Netherlands, Slovakia, South Africa, Switzerland (Zürich, Bern), Togo, the United Kingdom (England, Scotland) and the United States. Case studies on formula funding and school grants without needs based reallocation components include Indonesia, Kenya, Lesotho and Timor-Leste.

The country case studies included here show the potential complexity of formula funding. Yet, it must be noted that most examples are from developed countries with advanced administrative and statistical systems allowing for complex data processing and providing an adequate data base underlying the allocation procedures. It can be assumed that if more case studies on low and middle-income countries become available, it turns out that simpler formulas are more wide spread. This would mean that reporting on indicator 4.5.3 could be less demanding as suggested by looking at the complex cases here.

Conceptual remarks

Definition and Terminology

Ross and Levačić (1999) proposed the following definition for funding formulas: "A funding formula is an agreed rule for allocating resources to operational units such as schools that is universally applied to all schools of a given type within an education jurisdiction". Levačić (2008, p. 206) puts it more concrete: "formula funding for schools is a mathematical formula which contains a number of variables (items such as number of pupils in each grade, area of school, poverty [...]), each of which has attached to it a cash amount" (cited using Fazekas, 2012).

This review follows Levačić (2008, p. 206) by assuming formula funding concerns mathematical formula which contains a number of variables. Yet, it is not limited to allocation of cash amounts. Levačić also limits the definition to schools whereas in this review the borderline between school, school boards and municipalities is not strictly drawn. This would need to be done in refinement of indicator 4.5.3.

The basic idea of explicit formula-based funding is discussed in literature using different terms. The existence of different terms indicates, that the approach of formula funding is picked up in different context with different focus. The main difference is between emphasising equity or emphasising school competition and market orientation. Consequently, the literature related to formula funding is not following consistent views on the philosophy of formula funding. This needs to be considered when looking at formula funding as tool to foster equity.

The different terminology emphasises different aspects of formula funding and this reflects partially different justifications and prioritising of targets.

The following terminology is used (the literature points to examples):

- per-student funding (Levačić, 2014)

- per capita formula funding mechanisms (Makarova, 2016)

- social index based funding (Bildungsdirektion Kanton Zürich, 2016)

- school social index (Bundesministerium für Bildung und Forschung (BMBF) Referat Bildungsforschung, 2010)

- needs oriented resource allocation (Sachverständigenrat deutscher Stiftungen für Integration und Migration, 2016)

- formula-based school funding system (Bandaranayake, 2013)

- pupil equity funding (Scottish Government, 2017)

- weighted student formula (Snell, 2009)

- voucher funding system (Ministry of Education, Education Quality Assurance Agency, 2016),

The terminology reflects, what a further analysis of the literature shows: There are two general perspectives on formula funding. One puts individual students, independent of the school, in the centre. It emphasises the idea that the money follows the student.

The second perspective sees the mix of students enrolled in a school as a characteristic for a given school. The funding for a given student is not fixed but dependent on the school's overall context.[2]

When the school is in the centre, the parameter used for the needs based component of the formulas are intended as a proxy for the learning conditions and needs of the schools as unit. The parameter can be representative for disadvantages, that are not directly included in the formula, as e.g. education of parents stands for other background factors (Netherlands). Funding compensates

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[2] This becomes clear in the case of Victoria, where a student from a family with low socio-economic background receives more funding in a school with generally lower socio-economic background than in a school with a more favourable situation with respect to parents occupations and education of the peers.

differences between schools, the use of funds is only loosely constraint to serve the specific students that carry the extra weight in the formula. Or, the parameter are not drawn from actual enrolment but neighbourhoods.

Where the perspective emphasises the students and their individual characteristics the parameter should, to the best possible, characterize the individual students and be a good representation of the financial needs for adequate education for the given student.

Equity as objective of formula funding: comments on horizontal and vertical equity

The application of explicit formula-based resource allocation is linked to a number of objectives. According to Fazekas (2012, p. 14) the following received most scholarly attention: i) equity; ii) adequacy (effectiveness); iii) efficiency; iv) transparency; v) accountability; and vi) administrative costs. Alonso and Sánchez (2011, p. 281) identified seven potential objectives for the countries he studied: equity, efficiency, competition, school autonomy, accountability, transparency and quality. Ross and Levačić (1999, p. 14) identify four roles of needs-based formula funding in delivering educational policy values: equality and fraternity, liberty and choice, efficiency and economic growth. In the same document they discuss three functions: the functions of equity, of direction and of market regulation (p. 29-30).

With respect to education finance and educational quality the concepts of horizontal and vertical equity are usually mentioned (Fazekas, 2012, p. 14; Makarova, 2016, p. 5). The terms origin from the US debate on equitable school funding in districts (Jimenez-Castalanos & Martinez, 2014a, 2014b) and are fundamental concept in education funding. Yet, with respect to the more general goal of equitable education (beyond funding), the term needs more reflection. Primarily *horizontal equity* is the equal treatment of equally situated pupils within the same educational domain with respect to allocated resources. Vertical equity suggest that for students with additional educational needs additional costs are to be considered to provide adequate for equal education (Jimenez-Castalanos & Martinez, 2014b).

The International Commission on Financing Global Education Opportunity (2016, p. 92) adds a third term to discuss equity: "Funding formulas are typically based on one or more of the following principles: horizontal equity (equal amounts of money per child), vertical equity (different amounts of money per child), and equal opportunity (funding based on the principle that there should be no relation between certain socio-economic student characteristics and schooling outcomes)." This is in contrast to the lexical definition by Stiefel and Cordes (2014, p. 650), though better adapted to the needs of the debate. Stiefel defines: "Vertical equity, an alternative to horizontal equity, measures the degree to which 'differently situated' students are treated in a manner that appropriately addresses their differences. Differently situated refers to student characteristics that make learning harder or easier. [...] Such differently situated students "need" more spending to achieve equivalent performance standards or to be treated fairly. Vertical equity measures quantify the magnitude of the additional resources targeted to these students. " While (Stiefel & Cordes, 2014, p. 650) set vertical equity in funding automatically ident to achieving equivalent outcomes acknowledges the

International Commission on Financing Global Education Opportunity (2016, p. 92) the situation that is between funding more for students in needs and actually achieving vertical equity.

I think there are two in between situations: i) Higher spending for students in needs to compensate for educational settings of lower quality (less trained teachers, learning is distorted by peers not ready to learn, …). The result is (at its best) equal learning opportunities to learn in similar speed. ii) Higher spending for students in needs sufficient to actually close learning gaps, but not sufficient to fully reach equal outcomes. Why is this important? Because it falls short to assume all unequal funding compensates between students for individual disadvantages. It needs to stay in our attention, that some disadvantages in school quality needs compensation by additional financial means even before equality in learning conditions are reached.

Independent from funding, one could define horizontal equity in terms of educational process and quality. In this interpretation, horizontal equity is achieved if two students of similar individual characteristics can have the same learning progress independent of the school they are attending. Vertical equity in terms of educational quality and process would mean that students of unequal starting positions in learning and students with unequal chances to make progress are promoted to catch up with other students, to close learning gaps and reach equal outcomes. Vertical equity in processes would be reached if at the end of schooling outcomes are not dependent from the origin or characteristics of the students. Vertical equity is an concern between but also within schools.

Research shows that school quality and learning can vary for equal students substantially across schools. Bruneforth, Weber, and Bacher (2012, p. 213) compare primary education students of identical social and migrant background in schools of four different level of social disadvantage, i.e. different student compositions. The risks to fail national minimal standards triples for students from middle class non-migrant families (definitely not disadvantaged populations) when being enrolled in a school with very high social disadvantage compared to students of the same characteristics in a school with low social disadvantage. Not surprisingly the same applies to students from less favourable family backgrounds, their risk to fail minimal standards increases also substantially when being enrolled in a school with a high index of social disadvantage. In addition, students from less favourable social background face in all groups of school's higher individual risk to fail minimal standards. Since students from less favourable backgrounds are more clustered in schools with a high social index, students from disadvantaged social groups are facing a double challenge, the individually increased risk of failure and the consequences of lower school quality due to school composition effects in their schools.
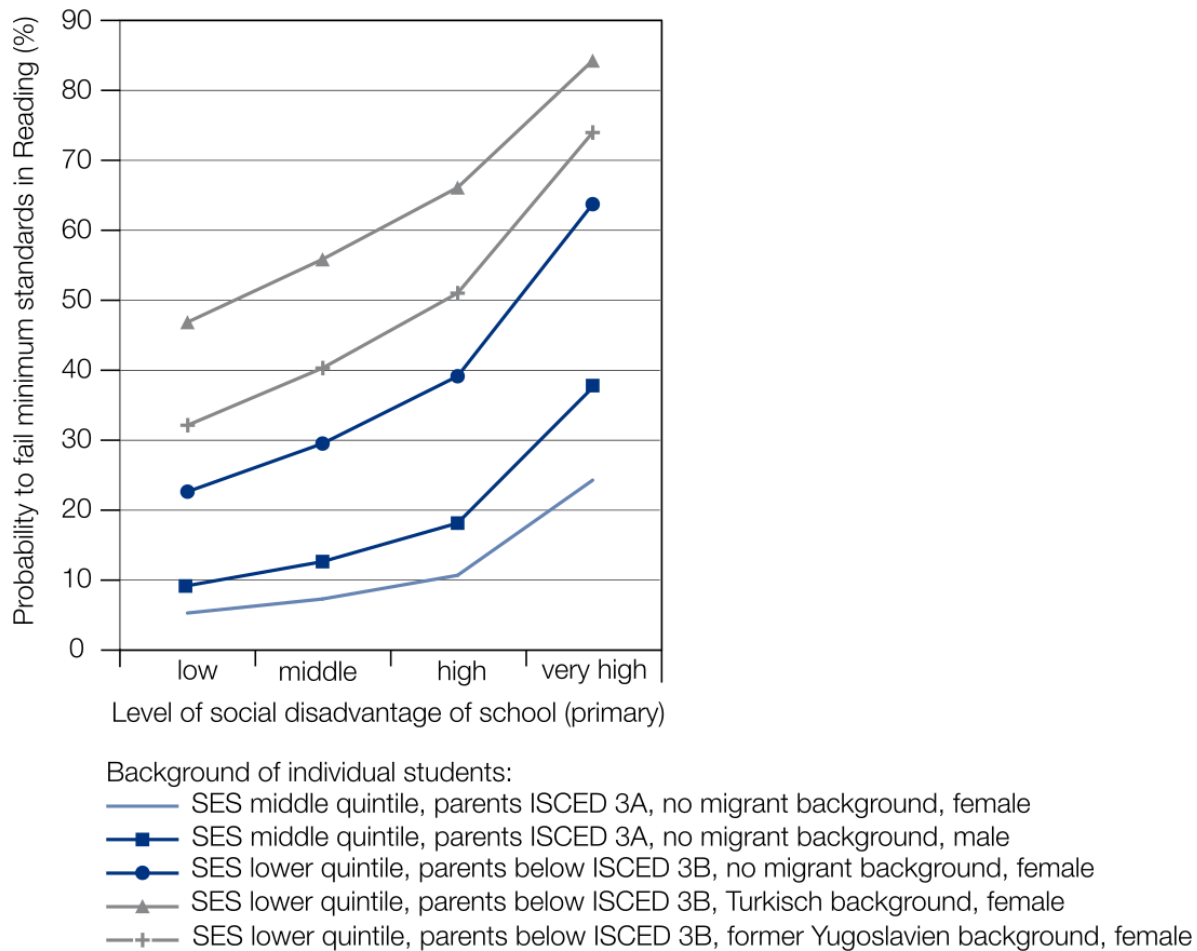
Source: Bruneforth et al. (2012, p. 213).

Figure 1: Probability to fail national standards for students of in schools with different levels of social disadvantage (Austria, 2010)

Why is this important when looking at school funding regimes? Because equal funding is not yet equal school quality. Funding differences between schools can have two components with respect to equity and equality. The first is different funding to overcome differences in school quality. Some schools need more funding to reach the same level of educational quality. The second is different funding to provide equal learning opportunities for students of different characteristics (also in the same school). With respect to the above Figure: the first component would target to reach the same low risk of failure in different schools (which would show in parallel but horizontal lines). The second would target differences between individual students within all schools (which would show by all lines for different groups falling into one).

The relation between equity and equality in funding, learning progress and outcomes could be classified as in the following figure. Only the cell C3 would combine vertical funding equity and vertical

learning equity. Cells C1, C2 and B2 would simply ensure equal learning progress for different populations but would not be sufficient to overcome existing differences in achievement.

It also must be noted, that any indicator on 4.5.3 would only capture differences between countries that fall into the second or third line. It would ignore the equally important differences between countries falling into lines 1 and 2. Reporting thus should also acknowledge the existing of formula funding without needs based component, which would address partially the difference between line 1 and 2.

Funding / Resources Learning	Achievement gap increases	Equal learning progress	Achievement gap decreases (Catch up)
Unequal funding (advantaged get more)	A1 absolute inequity	(A2) likely not existing	(A3) likely not existing
Equal funding	B1 horizontal funding equality	B2 horizontal equality (in funding and learning)	(B3) likely not existing
Unequal funding (disadvantaged get more)	C1 vertical funding equity, not sufficent	C2 vertical funding equity, sufficient for horizontal learning equality	C3 vertical funding equity, sufficient for horizontal learning equality

Figure 2: A classification of equity and equality in funding and in outcomes

When horizontal equity in educational quality should be reached by different funding, it is important to identify quality differences in education. This can be done by proxy indicators for educational quality. Maybe the most powerful would be students competencies when entering the given school or level (Dumont, Neumann, Maaz, & Trautwein, 2013). But other social indicators are quite good proxies for it as well. In this situation vertical funding equity is not targeted at specific well identified individual students but at schools. These schools are identified by their student composition and/or characteristics of neighbourhoods. The variables used to attribute funding are proxy variables for school quality. They could be exchanged by other variables reflecting school quality, as long as they are in a good relation to the learning conditions in the schools. One important consequence is, that the use of the funding in this aspect of vertical equity must not be directly related to the characteristics used to identify the educational disadvantage of that school. The additional funding serves all students in the school that would suffer from lower educational opportunities induced by differential conditions of schooling.

This is a central idea for the Dutch funding formula: Ladd and Fiske (2009, p. 6,7) "understands the main goal of weighted student funding to be the promotion of equal quality schooling across [Dutch] schools. Conceptually, equal quality schooling would mean that a student with any given ability, motivation and family background would achieve equally well in a school with a disproportionate number of educationally disadvantaged students as in a school with few if any disadvantaged students. There is no presumption here that all students should or would end up with the same level of achievement or even that average levels of achievement would be similar across schools. Even if all schools were equally effective, average outcomes would differ across schools whenever there were concentrations of high ability students from advantaged families in some schools and concentrations of low ability students from educationally disadvantaged families in other schools." She continues: "To the extent that the program does indeed promote equal school quality, it would also narrow achievement gaps between advantaged and disadvantaged students. But that outcome would reflect the improvement of overall school quality in schools serving disproportionate shares of disadvantaged students relative to other schools, not necessarily the improvement of disadvantaged students relative to advantaged students within a particular school." This need other measures.

This interpretation of Ladd and Fiske (2009, p. 6,7) should get attention when looking formula funding systems. World Bank (2012, p. 11) sees the Dutch system as example because it would "close the performance gap between disadvantaged students and their more advantaged peers"[3]. Fact is, the policy in the Netherland aims at educational equity across schools, helping all students in schools with disadvantaged conditions and thus disadvantaged populations disproportionately.

Disadvantaged or vulnerable groups that might be targeted

This section summarizes the definitions used in funding formulas to represent additional needs in the funding schemes. It discusses the perspective of disadvantaged or vulnerable groups in comparison to the concept of proxy factors.

The Education 2030 Framework for Action declares that "All people, irrespective of sex, age, race, colour, ethnicity, language, religion, political or other opinion, national or social origin, property or birth, as well as persons with disabilities, migrants, indigenous peoples, and children and youth, especially those in vulnerable situations or other status, should have access to inclusive, equitable quality education and lifelong learning opportunities" (UNESCO, 2015, p. 25). The document provides a further definition for people "in vulnerable situations or other status": "*marginalized and vulnerable groups* refers to all groups in this list. It should be noted that the list [...] is not exhaustive and that countries and regions may identify and address other status-based vulnerability, marginalization, discrimination and exclusion in education."

This statement offers in parallel two perspectives on the equity dimensions. The first is to look at the variability of factors related to differences within societies (which should not make a difference) and

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[3] The authors cite Ladd and Fiske (2009, 6,7) as source.

the second is focus on specific groups of populations. The current label for indicator 4.5.3 takes the perspective of groups rather than looking at (social) differences as continuum that can be present at all levels of the social structure of societies.

The following example illustrates the difference. Austria (Breit, Bruneforth, & Schreiner, 2016, p. 40) reports differences in educational achievement by level of parental education for reading in grade 4. Of the students, whose parents have educational attainment at ISCED levels 6 to 8 (university, …), only 5 % fail national standards. Amongst students with parents at ISCED levels 3G, 4 and 5 (higher vocational training, access to university) this rate is twice as high (10%). For the students whose parents have a vocational training at ISCED level 3V, with 45% the biggest group in the population, the rate of failure is further increase to 16%. For the 6% of all students whose parents have as highest education maximum ISCED 2 (9 years of education) the rate of failing national standards is 35%. Taking the perspective of gradual social differences, inequality is observed across the whole social structure. Taking a perspective of vulnerable groups, the focus group cannot be the 45 % of students in the middle of society (having a risk of failure three times compared to academics) but the by far most disadvantaged group, the students from families with (for Austrian parents) very low education, which faces a risk of educational failure that is seven times higher than for academics but also twice as high as for the students in the middle of the social structure. Funding systems could consider the factor parental education in two ways: Look at groups and provide additional weight to students from vulnerable groups (low education compared to national standard) or look at distribution and reflect differences in average parental education. Both approaches can be found in funding formulas. Germany (Hamburg) considers parental education by having an academic degree or not, Australia (Victoria) and Belgium (Flanders) considers different levels of parental education. Austria and the Netherlands take low education as a dichotomous criterium for weighting.

For other dimension of equity similar examples could be found that factors are either used as continuous dimension or as distinct identification of groups.

Most formula funding is based on the assumption that different groups of children have different chances of educational success and that this justifies funding according to needs. The funding systems reviewed prefer a link between additional funding and school characteristics that correlate with the presence of more children being at risk of low achievement. An explicit link to individual students within schools, that should be targeted is rare. This is obvious in cases where per capita funding is implemented together with school autonomy and decentralization. Notable exception is SEN-DDD students and language teaching for new entrants to systems.

The most common approach is that a proper selection of proxy factors helps to target as many students with educational needs as possible. The funding will increase with the density of disadvantage at the school. In some systems the targeting of specific groups (as mentioned in the Incheon declaration) is problematic, since it could violate equity laws and regulations. In the case of England the Department for Education (2017c, p. 8) prepared a *equalities impact assessment* to demonstrate that unequal funding is not impacting on equity regulations. They state "Our funding

system will target funds to those pupil groups where the evidence is clear that they need additional support. It does not seek to target funding by reference to particular […] characteristics […], but instead targets funding to those groups which the evidence demonstrates face barriers to their educational achievement." The proxy indicators should be accepted (or proven) to be related to low achievement, they should stand as representation for schools with low achieving students independent whether the proxy apply to them. E.g. if the share of students eligible for free school meals is used as a proxy, that does not mean this group is intended to receive the funding exclusively, but the high share of those students indicates schools with needs. This is evident from formulas that use variables at school level such as "number of books in the students' household" or "low housing density".

The nature of the variables in use as proxy for a broader concept of educational disadvantage becomes apparent when variables in funding systems change. The reason for change is not due to changing views on the groups to be targeted but due to the goal to better statistically capture the situation at the school, or, as in the Netherlands, explicitly to avoid stigmatisation of individuals belonging identifiable to a given group. In this context, notable that migrant's status as obvious indicator for educational needs is only used in exceptions and not with respect to the individual students.

In some systems the debate about needs is subsumed under the argument of adequacy (Picus, 2014). In the concept of adequacy, the funding for each student should be determined in a way that there is a reasonable outcome expectation all students can meet. This could be specific minimum certificates or educational standards, such as common core standards in the US. The central question related to adequacy is how to determine and justify costs and cost differences for different schools with different student compositions. The justification is related to costs of different educational processes. A number of approaches exist, though not all are in use: the professional judgement approach, the successful district approach, the cost function approach, the evidence based approach (see Picus, 2014 and the relevant articles in Brewer & Picus, 2014). The number of law suits related to adequate funding in the US highlights the problem of differential funding for different students. A number of approaches are consequently ruled as unconstitutional.

Which factors reflect educational needs in funding formulas?

Socio-economic background

All of the 18 systems reviewed include indicators to represent the socio-economic background of the students, the schools or the neighbourhood of schools. In the following table an overview of variables used is provided. A common way to reflect the socio-economic status of students is to rely on established criteria from the welfare system. If these variables are already related to education are the accessible. A second group of indicators are variables of socio-economic status obtained from students by special surveys or captured when enrolling in school: occupation, income or education of parents. The most common indicator is parents' education. England and Hamburg (Germany) use complex composite indicators to measure social disadvantage and deprivation. In the case of

Hamburg, the index is built explicitly as social index for school funding and school governance. In the case of England, the index is a general index of deprivation (IDACI) and used by different administrations to target resources in different domains. In the case of Hamburg, the index includes far more variables then here listed and combined socio-economic background with migration background.

Formal eligibility to welfare and social support systems	
Free school meals	ENG, US*
Eligible to welfare / social support systems	BEL/FL, CHL, SCO, FRA

Family attributes	
Occupation	AUS/V, DEU(HH), FRA
Family income	CHL, US*
Parental education	AUS/V, AUT, BEL/FL, DEU(HH), CHL, NLD
Student is orphan / student is in HIV treatment	MWI
Composite index	DEU(HH), ENG

Social situation at school / neighbourhood	
Social situation school	NLD, US*
School resources and building conditions	TGO
Social situation municipality/Neighbourhood	DEU(H), ZAF, CHE(Z,B)
Social situation place of residence	BEL/FL, CHL, DEU(HH), FRA

US*: a small number of some school districts.

An explicit focus on poverty and disadvantaged groups exists for the following cases:

- Formal eligibility to support systems

- France: low occupational status

- Chile, US: Low family income

- Austria, Chile, Netherlands: Very low parental education

- Malawi: Orphans and children in HIV treatment

Factors capture social differences as continuum:

- Australia, Germany (HH): Distinctions in occupations are made at middle and higher categories

- England, Germany (HH): Complex composite indices reflect on a number of variables at the same time as continuum.

Language learning / Migration / Ethnicity

Eleven of the 18 systems reviewed use variables related to the language of students. The complex of language and migration is used with different purpose. In countries in Eastern Europe and Central Asia variables on the language of instruction are included to account for increased costs for providing bi-lingual education for students with minority languages or ethnic groups. Mostly this are costs for separate schools for these groups. In a number of systems, it is explicitly the funding for language education of students who recently entered the system that is included in the formula. In other systems similar programmes are not included in the formula and paid for using different mechanism (e.g. see the Netherlands: Herweijer, 2009). Migrant background as explicit student characteristic is not a common variable in the funding systems. It is only used in two systems (Lithuania) and Hamburg (Germany) and at school level in Germany (Hesse) and Switzerland (Bern, Zürich).

Language / Minority / Migrant status	
Migrant status	DEU(HH), LIT
Home language without limitation	AUT, BEL/Fl, DEU(HH)
Home language with limitation[4]	AUS/V(5), BEL/Fl(?), ENG(3), US*
Language of instruction in school (language minorities)	EST, KSV, LIT, GEO, SVK

Social situation at school / neighbourhood	

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[4] The number in brackets indicates the number of years for which students can receive language learning support.

Percentage migrants / other language in school	DEU(H), CHE(Z,B)

US*: a small number of some school districts.

Educational success

Most systems argue that the variables used for funding are selected because of the strong relation to educational outcomes. Consequently, it would be desirable to include direct measures of educational opportunities into the formula. This is especially desirable since the student composition with respect to prior educational success is the school composition factor with the strongest impact on learning (Dumont et al., 2013). Yet, inclusion of outcome variables is problematic, since schools should not receive extra funding as consequence of their own low performance (Ross & Levačić, 1999, p. 110).[5] However, achievement differences between schools with respect to their prior education are a good proxy for educational needs. Some countries use assessment data from the early grades to determine education needs of secondary schools. France uses the share of students who repeated primary grades in the funding of secondary schools. Togo provides additional funds to schools with good performance (Chimier & Emeran, 2017, p.72). The outcomes are reflected by EMIS indicators such as drop out, repetition and graduation. The outcome indicators are further analysed with respect to gender equity and recent improvements.

Prior Learning, prior academic success	
	AUS/V, ENG, US*, FRA
Good Performance	
	TGO

US*: a small number of some school districts.

Geography / Size / Rural education

School size and location is a part of most funding formula regimes that allocates all or almost all staff resources. Typically, location is considered separately from school size. For small schools the relative high costs are either considered by higher per student weights under certain thresholds or by lump sums that ensure base funding (e.g. England). Location in terms of remoteness, rurality or location in

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[5] Ross and Levačić (1999) indicates that this argument may lose power in situations where test results are published. The negative impact of publicly known bad results in schools outweighs the perverse incentive to use low test score as argument for additional funding. However, for assessment systems without public dissemination of results this argument would not hold and use of assessment score for allocation of funds should be avoided. Schools with unexpected low outcomes, relative to the prior achievement of their students and social background, most likely have a quality problem that should be tackled before more funds should be used.

mountainous areas are accounted separately. No system accounts for rural schools without accounting in addition for small school sizes.

Formula funding systems without targeted funding for disadvantaged groups, i.e. systems not discussed in this paper, typically also account for school size or location, as in Bulgaria (Levačić, 2014, p. 345).

Yet, it seems overstating that extra funding for rural areas can be considered as a mean to target disadvantaged populations. Most systems except the substantially higher costs for very small schools and aim to reflect them but the goal for efficiency sets limits and per capita funding is in some systems explicitly linked to the goal to reduce the number of small schools (e.g. Slovak Republic). Ross and Levačić (1999, p. 34) describes this as accounting for school site cost differences and distinguishes it from additional needs of the populations.[6]

In the case of Togo the accessibility of the schools in terms of road quality and permanence of access is part of the index of difficult context. This is correlated with the aspect of rural education.

Geography / Size / Rural education	
Size only	BEL/Fl, LIT, MWI
Size and location (e.g. rural, mountains)	AUS/V, CHL, ENG , EST, GEO, KSV
None	AUT, CHE, DEU, FRA, NLD, SCO, SVK, USA, ZAF

Students with disabilities, learning difficulties and disadvantages (SEN-DDD)

Persons with disabilities are explicitly mentioned in SDG goal 4.5. It seems challenging for indicator 4.5.3 to reflect properly on this group. In this document the term students with disabilities, learning difficulties and disadvantages (SEN-DDD) is used, based on OECD (2008, p. 19). This is to differentiate from a general notion of educational needs, that is also in use for social and other disadvantages.

For developing countries, all or nearly all OECD and European countries target SEN-DDD (European Commission, EACEA, & Eurydice, 2016, p. 40; OECD, 2008, p. 19, OECD, 2017b, pp. 150–153). In some cases, formula funding is only a part of the funding, while for students with high SEN needs extra

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[6] Similar differences could apply between regions, when living costs and salary cost are substantially different Ross and Levačić (1999, p. 34). Here it could be that more wealthy regions have higher costs and increased funding for salaries. This perspective is not discussed in this review. See for example the Area Cost Adjustment (ACA) in England Department for Education (p. 23).

funding mechanism are in place. In other systems the funding for SEN-DDD is not channelled through the formula funding system. Also, the funding for special schools is a separate issue. Yet, if funding systems do not include SEN-DDD as a specific category, this does not indicate that no special funding arrangements are in place.

Some funding formulas integrate funding for SEN-DDD into the main funding regime and apply increased weights for students with special education needs and disability: Australia (Victoria), Lithuania, Slovakia. England uses proxy factors related to children in bad health and children with disability in the formula for school funding, but not for explicit targeting of individual children.

Especially in countries allocating budgets only partially by funding formula, e.g. for project funding, SEN-DDD is not reflected in the formula. The formulas are geared towards other goals and SEN-DDD is typically funded using different mechanism.

A focus on formula funding would distorts reporting on SEN-DDD, when included in indicators like 4.5.3. OECD (2017b, p. 151) presents Chile as not considering SEN-DDD in the funding formula. Yet, funding for SEN-DDD has its own programme the Student Integration Programme (Programa de Integración Escolar, PIE). Also in Belgium Flanders has the formula funding a focus on socio-economic factors, while special education follows specific rules (Flemish Department of Education and Training, 2015, p. 5).

OECD (2017b, p. 24) recommends to not cover funding for SEN-DDD exclusively in funding formulas. Countries should seek "a good balance between census-based [.ie. formula funding] and school-based indicators, one option is to use individually targeted funding for students with more severe special educational needs, complemented by a census-based funding approach for students with milder special educational needs or those linked to socio-economic disadvantage." Without understanding this mix, reporting on formula funding systems cannot provide a clear picture on targeted funds for SEN-DDD. An international indicator reporting on funding of disadvantaged groups with consideration of disability would certainly misrepresent countries targeting SEN-DDD in different forms.

A key problem is the lack of international valid definitions of the term "special educational needs". OECD (2008, p. 19) resolved the problem of definition by applying a resource based definition for SEN-DDD: "Those with special educational needs are defined by the additional public and/or private resources provided to support their education". The use of this definition in a consistent manner calls for agreement about the term additional and an appreciation of the various kinds of possible resources provided which should be considered. Approaching SEN-DDD from this angle is problematic for global indicators on funding, since it ends in a cycle. SEN-DDD defined by explicitly targeted resources cannot be looked at from the perspective of funding, since this defines the target population in the first place. For indicator 4.5.3 the issue for developed countries would simply be whether funding is channelled through the explicit formula funding system or via other mechanism. For countries not having established explicit SEN-DDD funding, the indicator 4.5.3 would face the same problems OECD's work faced in the 90th, the problem of international valid definitions.

It seems that including SEN-DDD in one indicator on funding parallel to the issue of targeted funding for disadvantaged populations would risk to fall short on adequate monitoring of issues related to SEN-DDD. Although European Commission et al. (2016) reports on SEN-DDD funding together with other disadvantaged populations. WorldBank (2013b) separates the issues for developing countries.

Summary and recommendation

Most funding formula regimes do not define explicit disadvantaged populations but use concepts of equal educational opportunities. They aim to identify proxy factors to identify schools with increased numbers of students facing additional educational needs. The factors used can be distinguished into groups:

a) Factors identifying additional educational needs on the basis of indicators on the social background of students

  o School level factors of educational disadvantage

  o Student level factors of educational disadvantage

  o (in exceptions: direct indicators of low prior achievement)

b) Additional explicit costs related to provision of certain types of education

  o Explicit resources for language education of migrant children or minority groups

  o Resources to support education in schools having minority languages as language of instruction

c) Additional needs to cater for students with SEN-DDD

d) Location (Urban/rural/...) and, related, school size

The Incheon Declaration (UNESCO, 2015, p. 25) identifies a number of equity dimensions without intending to be exhaustive: sex, age, race, colour, ethnicity, language, religion, political or other opinion, national or social origin, wealth, persons with disabilities, migrants, indigenous peoples. Of the mentioned factors, funding formulas mainly consider social factors, related to poverty, income or social origin reflected by parental education. The attributes race, colour and ethnicity are explicitly taken into account in funding formulas.[7] Migration is a factor that is rarely used. Most systems indicate that it is assumed that poverty related funding reaches disadvantaged populations without stigmatising them by attributes related to race, colour and ethnicity. Language is considered as concrete educational need and less as an attribute of distinct disadvantaged groups. Indigenous

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[7] European Commission et al. (2016, p. 39) reports on "ethnic origin" as factor for 16 systems. That does not match my review. This should be further investigated to ensure the findings presented here are correct. I assume that ethnic origin is in most cases used as category where teaching in schools for language minorities is additionally funded to cover for extra costs of teaching in another language (or in a bilingual setting).

peoples as well as language minorities are explicitly targeted with respect to additional needs for bilingual education or education in different languages.

The idea of distinct disadvantaged populations is not strongly present in the documentation of funding systems. The systems reflect rather continuous factors of increased educational needs (occupation, education of parents, density of factors at given schools) and needs differences can be represented across the social structure of the societies.

Where specific groups of individual students are identified (SEN-DDD, Language learning) this is with respect to funding issues that other systems cover mostly separately using alternative mechanism for targeting the same needs.

Recommendations:

- Emphasise in the indicator the perspective of additional educational needs rather than a perspective on discrete disadvantaged populations.

- Do not assume that explicitly mentioned populations stand for policies that target only those groups. Indicators in use are often proxies for wider concepts of need.

- Not mentioning specific groups in funding formulas does not indicate the groups are not supported.

- Explicit funding for rural and small schools cannot be interpreted as funding to close achievement gaps. This is typically the attempt to capture cost differences that existed before the funding regime. Some formula systems consider rural education and small schools but are still intended to increase pressure to close small and expensive schools.

Can the level of funding be determined?

The proposed wording for indicator 4.5.3 aims to quantify the extent to which resources are reallocated. This requires to determine the level of funding. Three components need to be considered: first geographical coverage of jurisdictions with formula funding, the budget coverage of the allocated funds and finally an estimation of the amounts targeting educational needs.

Geographical coverage of funding formulas

An important issue related to determine the level of funding is the system coverage of funding formulas with respect to levels of government. Allocation of resources to schools is in many systems a responsibility of lower levels of government, in federal systems states are often responsible for legal frameworks and regulations. Of the 18 systems included in the review here, the majority has formula funding regimes under the responsibilities of regional or local administrations. In some countries similar systems exist in parallel, in others formula funding is applied in some states and jurisdictions, but not in others. In order to report on reallocation at the country level, information from different regions need to be aggregated. With respect to qualitative descriptive information this seems feasible, even so problematic. Reporting should then distinguish whether certain factors are considered

partially or in the whole country. With respect to quantitative amounts of reallocation of resources, the effort for countries to report on this will be extensive. Expertise to understand each formula regime will be with the regions, respondents to requests by international agencies at the central level will face great difficulties to make the proper judgement and estimations.

Another issue is how to define school as receiving entities. In a number of systems, the receiving entities are school boards. In one of the most cited example of formula funding, the Netherlands, it is not single schools who receive funding, but autonomous school boards, which operate between one to dozens of schools. This is similar in Belgium (Flanders). This raises the question whether school districts in the US, with an average of 7 schools, should be considered as fund receiving entity similar to school boards. If this is the case, municipalities could be considered as well. The funding systems in Switzerland consider only municipalities, as other systems not documented here[8]. In the case of Kosovo and the US, formula funding is applied in allocation to municipalities/districts and partially from municipalities/districts to schools. In the US, only a small number applies weighted student funding, in Kosovo, all municipalities should apply the system, in reality this is an exception.

At least for some systems in Eastern Europe Alonso and Sánchez (2011, p. 294) assumes that formula funding to the level of municipalities without explicit allocation to individual schools is not sufficient to bring out the advantages of formula funding.

	Providing agency		
Level of receiving institution	Central level	Regional level	sub-regional level
School	AUT, CHL, FRA, EST, GEO, LIT, SVK	AUS/V, CHE, DEU, ENG, SCO, ZAF	KSV, US*
School holder / municipality / district	NLD	BEL/Fl, USA	

Not shown are allocation processes between higher levels of government (central to regional), such as between central and regional levels. If transfer between sub-national level and schools exist, this applies typically not to the whole country. Some of this is shown by OECD (2017b).

Budget coverage of funding formulas

The extent to which funding is reallocated depends also on the elements and proportion of the budget covered by formula funding mechanism. In fact, even the most extensive and complete formula funding systems retain some public money outside the formula to cover typically expenditures such as major capital works (Fazekas, 2012). However, most systems discussed here allocate smaller proportions of their budget using the formula funding system. A key difference is whether staffing costs are allocated using the formula funding system or whether mechanism exist in staff allocation

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[8] E.g. North Rhine Westphalia in Germany.

that follow the logic of formula funding. If expenditure for personal is not included in the formula, systems can further differ to what extend the funding formula is comprising all other current expenditure or only parts. In Austria and South Africa, the allocated funds account only for a small proportion of current funding. Sometimes the funds to be allocated are for special projects and complement the core funding. In that case the reallocation of funds towards disadvantaged populations does not indicate equity if the core funding is not equitable distributed. There is no doubt, that only very comprehensive formula funding systems can be judged on their power to increase equity. For other systems it is impossible to evaluate whether equitable spending in the transparent proportion of the budget compensates for equity issues in the proportion of not transparently spent budget.

Amongst the systems[9] reviewed here, Australia, Belgium (Flanders), Chile, England, Georgia, the Kosovo, the Netherlands, Slovakia and the US have extensive coverage including staff costs and the majority of other current expenditure.

In Austria, Scotland and South Africa only fractions of the budgets are allocated using the formula funding mechanism.

How to judge the extent funding is allocated to educational needs?

In order to quantify the "extent to which explicit formula-based policies reallocate" three steps would be necessary: i) to estimate the volume of the total formula funding programme, ii) to define which elements of the formula are considered as targeting disadvantaged populations and iii) to quantify the amount that is allocated because of those factors.

Some countries in this review provide explicit policy information on the volume of the programmes. This is the case in Belgium (Flanders) and in England (Department for Education, 2017b, p. 5), where also the high needs component is separately declared.

Other countries declare the amounts that are needs based distributed. This can be found in cases when the formula funding allocates additional funds, as in South Africa, Austria or Scotland. On the other hand, funding for French ZEPs was not explicitly declared (Bénabou, Kramarz, & Prost, 2009).

Yet, more typical is that the volume of the programme is not explicitly declared and entangled with the education budget. This is likely when the formula funding system allocates core funding.

If budget data cannot provide insight in the extend of reallocation, judgement of the reallocation could be done on the basis of the formulas. Here three approaches could be done: i) Judgement of cost differences between students with no disadvantage and students with different extends of disadvantage; ii) Comparison of real school budgets; iii) Analysis of the funding using student level

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[9] In Kosovo and the US it needs to be considered, that the formula funding is implemented only in some jurisdictions. Only here the major part of the budget is allocated, this statement does not apply to the whole country.

data. Options ii) and iii) Could be used to estimate absolute budget amounts, option i) would only allow to represent the power of reallocation from a student perspective.

The first option i) is to quantify exemplary differences in formal per capita funding for different ideal type students. For this the explicit funding formula could be applied to hypothetical students with low, middle and high weights for disadvantage. The ratio of the financial amounts would express the reallocation power of the formula. For teaching resources this could be done similar, but expressed as ratio of teaching hours. This option appears realistic for systems with simple formulas without complex interaction terms between factors and for systems that give weight explicitly to disadvantage. Systems that allocate funds along a continuum of the social structure, the approach is more difficult, since the formula expresses cost differences between situations that are very favoured and situations that are less favoured (but not yet disadvantaged). For those systems the notion of "disadvantaged population" is not operationalized in the formula and can thus not be simulated easily. Yet, option 1 has the advantage to be possible on the basis of documents on the formula funding without need for real data on school budgets. When working with ideal type students, it needs to be determined whether SEN-DDD students should be considered here. Due to the complex issue of funding for high-needs SEN-DDD students, it seems risky to give figures on ideal type SEN-DDD students, if this ignores major funding for SEN-DDD. A disadvantage of this option is that reallocation is quantified with respect to individual hypothetical students, while the unit of allocation are schools.

The second option ii) would need access to school budget data. Using mean expenditure per student (as allocated by the formula system) the ratio or cost differences between schools at certain percentiles of the funding could be set in relation. If the system allocates only part of the education budget, estimates for the core funding of schools would need to be included. This second option is data demanding and could only be undertaken by the school finance units. In federal systems or systems with sub-national funding responsibility it seems unlikely to get access to the data and expertise.

The third option would require access to school level data and the weighting used. Weights that target disadvantaged populations could be analysed and funding estimated. This is even more demanding and thus unrealistic.

Prior to quantifying amounts of reallocation could be simply a structured collection of funding formulas. This would have the advantage, that countries could learn from each other.

Summary and recommendation

Recommendations:

- The unit of reallocation should be clearly defined. This should be the lowest level of governmental allocation, i.e. allocation to schools or boards.

- It needs to be decided whether funding formulas allocating between municipalities should be included.

- It should be noted, that funding formulas allocating within regions to schools may not target important equity issues when resource distribution is unequal at higher levels.

- Reporting for federal systems and systems with variation between regions is problematic. When aggregation of indicators are needed, it must be ensured that not the existence of minor funding formula programmes in some regions or municipalities are considered as representing the whole country.

- In reporting for countries with geographical partial coverage, the proportion of the education budget in the regions with formula funding relative to the country as a whole should be indicated.

- Reporting on funding systems must indicate whether expenditure on personal are covered.

- Only systems that allocate (at least in some regions) at least the biggest proportion of the non-staff salaries using formula funding should be accounted as having explicit funding formula systems. Mixed systems should not be considered since the core funding cannot be judged with respect to equity and the risk is that small quantities of the budget would become showcases for equity while they just counterbalance unequal funding system.

- Conduct country cases studies for countries with different types of formula funding to estimate the cost differences per students shown in option i)

- Build up a collection of funding formulas in a structured documentation. This should include also countries without needs-based reallocation of funds, since formula funding without needs-based component can be a major contribution to equal and more equitable funding.

Country review

Australia (State of Victoria)

The Student Resource Package was introduced for Victorian government schools in 2005 to bring about improvement in learning outcomes for students. The Student Resource Package funding model continues for schools in 2018 (State Government of Victoria)[10]. In earlier years a simpler formula was used, based on simpler thresholds for parents occupations (Bandaranayake, 2013, p. 916). This was further developed to the current more complex system. Even though the department of education and training claims that improving the transparency of student resource allocations by reducing complexity is an objective, the System in Victoria consist out of more than 10 funding components with different funding formulas.

Which educational needs are considered?

Educational needs are considered with objectives at the student and school level: To align resourcing to individual student learning needs to achieve better outcomes for all students and to assure for

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[10] If not otherwise stated, this is the main source for the following section.

schools with the same mix of student learning needs. In summary, the following factors associated to students needs are considered in one or several components of the formulas.

Schools receive increase spending per student when

a) being small and/or

b) being rural and/or

c) when having a high student turn over (mobility) during the school year.

In addition: Schools with a high proportion of students from families with low socio-economic status (indicated by occupation) receive higher per student support for students with learning difficulties.

Funding is attributed by student's characteristics for

a) students with learning difficulties (autism, dyslexia, language or other learning disabilities),

b) students from socially disadvantaged background,

c) students entering secondary education with at risk of educational failure due to low achievement,

d) students with a disability in regular and special schools) and

e) students having English (the language of instruction) as an additional language.

The social disadvantage of students and schools is measured through the student's Student Family Occupation and Education (SFOE). The annual school census includes a collection of Nationally Consistent Student Background Information (Department of Education and Early Childhood Development, 2013), which provides several variables: indigenous status, country of birth, language other than English spoken at home; parents' occupational group; and parents' educational attainment. Indigenous status and migrant status are not used in the funding formulas.

Students having English as an additional language are those that come from a language background other than English and speak a language other than English at home as their main language and have been enrolled in an Australian school for less than five years.

The *Core Student Learning Allocation* recognises the differing costs associated with different levels of learning, different types and sizes of schools, and the additional costs imposed by rurality and isolation. It consists out of the following components with separate formulas:

- *Student per capita funding:* Providing per student funding with different amounts for different grades.

- *Enrolment Linked Base:* A base funding for schools dependent on the level of education. The base funding has a linear link to enrolment and is decreasing with an increase in size of

schools. This ensures small schools to have sufficient proper funding, while bigger schools are more dependent on per capita funds.

- *Small School Base:* In addition to the general base, small school (less than 80 in primary, less than 400 in secondary) receive an increased base funding.

- *Rural School Size Adjustment Factor:* For rural schools extra per capita funding is provided to ensure that educational provisions are the equal of urban areas. The additional amount per capita is decreasing with increasing enrolment.

- *Language and Learning Disabilities Support Program:* This funding component provides schools with resources to support the delivery of teaching and learning programs for students with autism, dyslexia, language or other learning disabilities. The amount is calculated as a fixed amount per school and additional amounts per student in the targeted group. For schools that have a mix of students with low socio-economic background, indicated by a threshold of the Australian Student Family Occupation index (SFO), base funding and per capita amount are increased. This increase is independent on whether the individual students with learning needs come from the families with low occupation index.

- A separate funding formula is applied for *special schools* enrolling students with disabilities. It includes per capita base funding and additional per capita funding dependent on the level of disability of the student. Further funding to special schools is provided for non-school-aged enrolment and early education program.

Core funding to schools is complemented by elements of the *Equity funding*, which is the main mechanism to consider socio-economic background and general risk for educational failure. This includes four components with additional formula.

- A *per capita funding for students from families with social disadvantage.* Two weight level of disadvantage are considered. High level: Parents are unemployed with below diploma level education or have lower skilled jobs with very low or low education. Middle level: parents have various combinations of medium and low skilled jobs and education levels, or are unemployed with a diploma level education. The weights are further weighted by the density of disadvantage at the school. Students with disadvantage attract more funding in schools with lower mean level of parental education or occupation. This is calculated using an index of education and occupation of all parents. Here not just disadvantage counts, but any variation between parents. Any parents not having a university degree or not being a qualified professional bring additional weight to the school index. Disadvantage is thus characterised by the overall profile of parents in the school considering even differences within the middle class. (Department of Education and Training, 2016, p. 22-26)

- A *catch up fund* is a per capita funding for students who enter secondary schools and are at risk of educational failure. Schools receive extra funding for each secondary student who did not meet the national minimum standards in the national assessment (Literacy/Numeracy) in year 5 of primary school. Funds are not affected by the school's or student's level of disadvantage. For students with disabilities the funds are lower, since they are complemented from other sources.

- Extra project funding for *Welfare Officer* is provided to schools dependent on their index of parental education and occupation. Schools with an above average density of social disadvantage receive a base funding plus a per capita funding weighted by the difference between their index of disadvantage and the mean index. Schools with a below average index receive the funding below the base funding, the lower the index the lower the funding.

What is the nature and level of funds?

The Victorian funding system allocates the main funding for non-capital expenditure. This includes funding for targeted projects and school programmes. Funds allocated in each component are nominated as either credit, for salaries paid on centrally, or cash for expenses incurred locally. The funds are allocated directly to schools.

Schools can interchange funding between credit and cash, meaning they can determine level of staffing. Most amounts, including those in the equity funds, are not earmarked. Others, like the Language and Learning Disabilities Support Program come with an indication of potential use. Fort the catch-up funds, the eligible student identified by the assessment in primary schools are not known to secondary schools. Funds are intended to support low achievers, but are not linked to individual students. The funding for Welfare Officer is earmarked for special staff serving as welfare officer.

Austria

In Austria there is an ongoing process which is assumed to lead towards formula based allocation of teacher resources to schools. First models were proposed by (Bacher, Altrichter, & Nagy, 2010) and (Bruneforth et al., 2012, 217,197). The later document also gave evidence about the relation between the proposed social index for funding and the increased risk to fall behind national educational standards (p. 213). (Bruneforth et al., 2012) proposed four variables: percentage of students speaking another language than language of instruction, percentage of students with migrant background, percentage of students with parents having maximal ISCED97 3C attainment and the percentage of students having parents from the lower quantile of the distribution of the occupational-status[11]. Austria piloted an allocation mechanism 2016/17 based on an index that used two variables: percentage of students speaking another language than language of instruction and percentage of students with parents having maximal ISCED97 3C attainment (Felder-Puig, Maier, & Teutsch, 2017). Yet, this project was concerning the allocation of special funds related to the integration of migrant students that are not ordinary budget funds but ad-hoc funds related to the integration of migrants.[12]

Austria passed 2017 a new law on the allocation of teacher resources to schools. The law makes it mandatory that regional authorities consider the following factors when allocating teacher to school: Number of students and level of education, socio-economic background of students, home language of students and regional circumstances. Yet, the current law does not provide a specific mechanism

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[11] Recorded form students responses to the national assessment and defined using the ISEI by Ganzeboom.

[12] The project was renewed in 2017/18.

for distribution of resources. The law states that a data driven mechanism can become mandatory by decree.[13]

Belgium (Flemish community)

The current funding model for operational funds in Flanders took shape in 2008. With the model all schools are funded in the same way with due regard for two objective differences, i.e. the guarantee of freedom of choice - a constitutional obligation within community education - and the onus on all schools organised by public authorities to offer various philosophy-of-life courses. In 2012 the funding model for staff cost was also revised.

Which educational needs are considered?

The core target of educational policy related to equity in Flanders is to reach equal educational opportunities. It is stressed that enforcing equal educational opportunities does not mean that investments in deprived students are at the expense of the other students: equity of opportunities means: "give every child as much opportunities as possible" (Flemish Department of Education and Training, 2015, p. 13).

In the allocation of operational budgets four student characteristics are considered because of their impact on student's school careers: Cultural (educational) background of student's family, financial capacity of the student's family, linguistic and cultural capital of the student, social capital of the pupil: Each characteristic is captured by one indicator. Flemish Department of Education and Training (2015, p. 29) explains the selection of indicators:

- Education attainment level of the mother (information provided by the parents): This indicator relates to the whole array of knowledge, skills and attitudes. It is an indicator that gives an indication on the affinity between home culture and school culture.

- Entitlement for study grant (information from the Flemish study grant administration): Study grants are distributed on means-tested basis (reserved for students from families with lower general income)

- Language spoken at home different from language of instruction (information provided by the parents): This is an indicator of communication and learning skills of the student

- Place of residence of the student (information from household administration): Sociological characteristics of the neighbourhood in which the student lives

For the allocation of personal the same socio-economic indicators as for the the operational budget are considered (Flemish Department of Education and Training, 2015, p. 30,32). In addition, some

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[13]   §5   (4)   Bildungsdirektionen-Einrichtungsgesetz   –   BD-EG https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20009982&FassungVom=2020-08-31

students carry an increased weight of 1.5. This applies to students who reside in a Centre for Child and Family Support Centre, students who stay in homes for children of which the parents don't have a fixed residence, students who have been placed outside their own family environment due to a court decision and students of which the parents have no permanent residence and homeless students.

In primary education complementary teaching hours are awarded for specific purposes. Examples with respect to student characteristics are integration of non-native speakers, equal opportunities in education for special education, integrated education for students with disabilities. Some of this follows specific rules and would not show in reporting on the funding formula.

This allocation of teaching hours to schools favours smaller schools and programmes. Schools receive a higher allocation for the first 25 students, a less augmented for students 26 to 50 and 51 to 100.

Also in Belgium Flanders the variables used for resource allocation changed. In earlier years a different model was used. Ooghe (2011, p. 3) reports on the previous funding formula based on a disadvantage index. The index was calculated for each pupil as a weighted sum— with a maximum of 1.2— of the following 5 binary pupil indicators (weights between brackets): the pupil is not living with one of the biological parents (0.8), the pupil's family belongs to a traveling population (0.8), the income of the pupil's household consists only of replacement incomes (0.4), the mother of the pupil does not have a degree of secondary education (0.6), and— only in combination with one of the former indicators— the language spoken at home is different from Dutch (0.2). The disadvantage index of a school is the sum of the indices of their pupils, multiplied by 1.1 if the percentage of pupils falling under the first four indicators is at least 80%, and multiplied by 1.5 if the school lies in the regional capital of Brussels.

How are resources allocated?

The operational budget earmarked for distribution on the basis of pupil characteristics is equally divided in four equal parts, so each of the four indicators is used to distribute one part of the budget. In secondary the proportions are 30% - 30% - 30% - 10% (this last for the living environment indicator). The resulting sub-budget per indicator divided by the number of pupils meeting the indicator to establish the amount given per student in the category. Finally, for each school the number of students identified by each indicator is multiplied by the per student amount attributed to the indicator to calculate the budget. (Flemish Department of Education and Training, 2015, p. 29).

The staff of schools in regular elementary education is funded according to i) the teaching hours needed, under consideration of the funding scales based on the characteristics of the school, of socio-economic indicators (as the operational budget), and complementary and additional teaching hours; ii) working hours for childcare staff, iii) Administration and educational support o ICT and Incentives for school associations, and iv) needs of special elementary education.

What is the nature and level of funds?

In primary education the share of the pre-set operational budget based on pupil characteristics amounts to 14% (2012). From 2011/12 it was planned to increase annually by 0.1875% until 2020/21

when it will amount to 15,5%. In secondary education share will amount 11% in 2020/21. The remaining and largest part of the operational resources (about 80%) will be distributed amongst the schools on the basis of school characteristics (level, type, study programme and field).

For staff costs the principle of free utilisation is guaranteed. The school board will decide on the size of the class groups, the repartition between teaching hours and other working hours for teachers (such as participation in class councils, class direction, additional courses, participation in professional training, special pedagogical tasks…) or repartition of hours between schools governed by the same school board. Nevertheless, for all these decisions the local governing board of the school should be duly consulted. There are, however, a few restrictions to the utilisation of hours, e.g. maximum 3% of the teacher hours can be used for special pedagogical tasks.

Chile

A system of per capita funding, known as voucher system, was introduced in Chile with the goal to stimulate quality in schools by competition. The current system was introduced by law in 1996 and 2008 complemented by needs based component. Municipal schools and subsidised private schools are financed following the same mechanism: subsidy according to demand (voucher system), which triggers competition among schools to get more students enrolled. Thus, schools receiving public resources must develop strategies to get more students enrolled and receive more financing (Ministry of Education, Education Quality Assurance Agency, 2016, p. 50). The funding according to enrolment is complemented with additional subsidies and allocations associated to the different characteristics of students and their educational context, especially the compensatory financing for socially disadvantaged students (Preferential School Subsidy, SEP) (Ministry of Education, Education Quality Assurance Agency, 2016, p. 90,17). Expanding resources allocated by SEP is key aspect of current reform to improve inclusiveness (OECD, 2017a, p. 70).

Which educational needs are considered?

The SEP is based on established criteria to evaluate the socio-economic status of the families.[14] The main source of information on households are used also for other purposes than financing education. The entitlement for funding is linked to individual, explicitly identified students. Households have to obtain a certification of their status from the Ministry of Education. One of the four following criteria must be met for households to bring the extra funding to schools.

The first criterium draws on established welfare programmes. Students are eligible when the families are already identified for the major programmes: Sistema de Protección Social Chile Solidario; Programa de Ingreso Ético Familiar; Sistema Seguridades y Oportunidades.

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[14] Ayuda Estatal a la Educación; Subvención Escolar; Ley no. 20.248. The following information is based on the legal text: https://www.leychile.cl/Navegar?idNorma=269001

The second criterium relies on the newly established Social Household Registry. This registry is the system with which the Government identifies families living in a vulnerable or poverty situation, determines tax benefits such as housing subsidies, Basic Solidarity Pension, Youth Employment Subsidy, Women's Work Bonus, Technical-professional practical scholarship, among others. [15] Students are identified for the SEP if the families score falls within lowest the 33.3% with respect to vulnerability.

The third criterium is whether families are classified in Section A of the National Health Fund (FONASA). Finally, families can be entitled for SEP according demographic information they provide themselves to schools: household income, the schooling of the mother (or of the parent or guardian), the condition of rurality of their home and the degree of poverty of the commune where resides. Families that declare their status according to the last two criteria will be evaluated with the Social Register of Homes within a year to keep the status.

In addition, funding is provided for students' having individual learning difficulties (SEN) by the Student Integration Project (PIE) carried out by the Special Education Unit of Ministry of Education (Ministry of Education, Education Quality Assurance Agency, 2016, p. 61).

The funding system has a number of further grants that complement the per capita funding. Amongst them are three grants that target rural and small schools: An increment for remoteness, an increment for rural schools, defined by size (less than 90 students) and a second increment for very small schools (less than 17 students). The first two grants are weighting factors increasing the per capita amounts received (Santiago, Radinger, Fiszbein, & García Jaramillo, 2017, p. 85).

How are resources allocated?

School funding is a centralised and highly regulated mechanism. Three elements make up the Basic Subsidy: (i) Average monthly attendance; (ii) A base value for funding (Educational Subsidy Unit, ESU, $22,321 in 2015), and (iii) a factor by education level and teaching modality (Ministry of Education, Education Quality Assurance Agency, 2016, p. 90).

The formula is
Basic Subsidy = Average Monthly Attendance * USE * Factor by Level

The needs based component of the funding, from the SEP is also allocated using per capita funding for the eligible students. Yet, before being entitled for funds, schools must apply for the scheme and funding is conditional on certain requirements that schools have to comply with. To receive resources, the school administrator must sign an Agreement for Equal Opportunities and Educational Excellence where she/he commits to assign additional resources allowing compliance with the Educational Improvement Plan (Ministry of Education, Education Quality Assurance Agency, 2016, p. 61).

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[15] http://www.eldinamo.cl/nacional/2016/01/02/nuevo-registro-social-de-hogares/

In addition, schools that abolish co-payments will be eligible to receive further subsidies amounting to half of the SEP rate for students from the third and fourth quintile of the income distribution according to the Social Household Registry.

What is the nature and level of funds?

Subsidies from the SEP are ring-fenced, schools should exempt eligible students from certain charges and accept and keep students up to the 6th grade regardless of past or potential performance and should not require parents to submit their socio-economic information prior to admission. Schools have to use the subsidy to implement actions contained in the Educational Improvement Plan, with special emphasis on priority students, encouraging special technical-pedagogical assistance to improve the performance of students with low academic achievement (Ministry of Education, Education Quality Assurance Agency, 2016, p. 61).

The SEP Law resources represent 16% of the total subsidies transferred to schools, resources allocated for SEN students (PIE) represented 6% (Ministry of Education, Education Quality Assurance Agency, 2016, p. 91, 87). The SEP assigns additional resources to schools serving the most vulnerable 40% of students. In addition, schools that abolish co-payments will be eligible to receive a grant amounting to 50% of the SEP for students from the third and fourth quintile of the income distribution.

Economic resources granted for SEN students under the PIE programme are to be used in the hiring of human resources, staff training, the provision of material means and resources, and the development of spaces of collaboration to attend these types of student needs (Ministry of Education, Education Quality Assurance Agency, 2016, p. 91, 61). The programmes reach 41% of schools.

Estonia

Estonia established per capita funding in 1998 and reviewed its scheme in 2008. The system has a quite strong element that gives students in rural areas and small schools an increased weight. This element was even strengthened when the formula was revised in 2008. Besides of school size and municipality the per capita funding considers special factors in funding. This includes provision of education (Distance learning and evening courses have lower weight), special SEN classes with different categories, students in regular classes with various types of special provision (SEN) and language integration. Language of instruction is implicitly reflected in the funding due to complex mechanism that are not directly reflected in weights. The requirement to provide teaching in minority languages (mainly Russian) leads to smaller school and classes and hence higher per pupil costs than if only a single language of instruction were used. (Alonso & Sánchez, 2011, p. 33-98). Socio-economic characteristics are not considered.

France

Maybe one of the best-known programmes to channel additional resources to schools with a high share of disadvantaged students was the French programme of *zones d'éducation prioritaire* (ZEP),

which is replaced by the programme of *Réseau d'éducation prioritaire* (REP, Priority Education Network) with a reform in 2015.

According to Bénabou et al. (2009, p. 345), the amount and nature of the extra resources given to ZEPs (prior to the reform) were never specified, nor was the actual procedure by which priority status of schools was determined. Unfortunately, also for current programme REP, I could not identify much literature.

The basis of the REP programme is a classification of schools in three categories of a social index: not classified, disadvantaged school (REP) and strongly disadvantaged school (REP+). The *indice social* (social index) consists out of four variables. Three of them are proxy for poverty, impacting on academic success, the fourth is a measure of prior academic failure[16]:

i)   the share of students in socially disadvantaged households, captured by occupation categories (skilled and unskilled workers, farm workers, retired employees or workers, and persons without a professional activity, *Professions et Catégories Socio-professionnelles*),

ii)   the share of student receiving scholarships,

iii)   the share of students living in an urban area classified by the government as sensible and in need for policy intervention (*Zones urbaines sensibles,* ZUS)

iv)   The share of pupils having repeated a class before the sixth grade

The allocation of funds seems not strictly following a funding formula but mechanism integrated with the REP project. The additional resources are allocated for smaller class sizes, individual remedial teaching, special school projects, extra bonuses for teacher and further measures to improve school climate. In 2018 additional 3881 teaching post were allocated to the REP programme.[17]

The inclusion of France in this review is debateable, since the funding mechanism seems neither transparently documented nor following a fixed formula. Yet, the programme is linked to budgeted resources with a allocation mechanism. Further investigation into legal documents would be needed to better document the French system.

Germany

In the federal system of Germany education funding is provided by the 16 federal states according to state policies. The states of Berlin, Bremen, Hamburg, Hesse and North Rhine-Westphalia allocate education funding partially using funding formulas with a social index, other states used also data driven approaches, but les explicit (Sachverständigenrat deutscher Stiftungen für Integration und

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[16]   www.reseau-canope.fr/education-prioritaire/comprendre/orientations-actuelles/une-carte-de-leducation-prioritaire-revisee-a-la-rentree-2015.html; European Commission et al. (2016, p. 40)

[17]   http://www.education.gouv.fr/cid187/l-education-prioritaire.html#Les_principes_de_la_refondation_de_l_education_prioritaire

Migration, 2016, p. 14). Here the example of Hamburg is presented with more detail because it is an example for very data demanding approaches. It illustrates that social indexes do not identify individual children but capture social spaces (see also Bundesministerium für Bildung und Forschung (BMBF) Referat Bildungsforschung, 2010)

Hamburg

The German state of Hamburg calculates since the mid-90th a so called social index as basis for the distribution of resources and increasingly other administrative actions. (Schulte, Hartig, & Pietsch, 2014). It is perceived as the most elaborate system in the German speaking systems (Weishaupt, 2016, p. 19).

Which educational needs are considered?

The index in Hamburg is based on a sample survey of pupils and parents[18] of about 35,000 pupils covering each school. The data are merged with data on the neighbourhood of the pupils collected by the statistical office. The index does not reflect directly individual characteristics of students, but is based on a quite complex design. Maybe it is the example for the most complex approach amongst funding formulas. The index should mirror four different aspects of school composition with respect to social disadvantages: social capital, cultural capital, economic capital and migration background. The first three aspects are selected with reference to Bordieu's work on family resource as basis for reproduction of inequality. (Schulte et al., 2014)

The assumption behind the index is, that the differences in the composition of pupils with respect to social factors has impact on the working conditions of schools and thus differential learning environments. According to the authors, an index to reflect learning environments should cover multiple characteristic of the pupils, since it is the combination of social factors that supports or hinders students learning and school processes. (Bundesministerium für Bildung und Forschung (BMBF) Referat Bildungsforschung, 2010, p. 15,16)

How are resources allocated?

The index value for each school is calculated using a factor analysis at school level. The analysis is based on 82 variables (Diedrich, 2016; Schulte et al., 2014, p. 75), including

- number of books at the pupil's homes

- parental education

- Income

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[18] In the first years the index was build based on data from regional student achievement surveys. Due to the importance of the index for governance, the survey was separated from other assessments and conducted for the sole purpose to collect social information to support governance.

- parental occupation

- whether the pupil has its own room

- unemployment and welfare recipients in neighbourhood

- activities of child in family

- participation in election in neighbourhood

- migrant background of parents

- frequency of speaking German with mother, father and siblings.

In order to allocate extra funds and resources the schools are classified into six groups. The categories are following a social norm, meaning the index values are cut into six groups using equidistant thresholds.

What is the nature and level of funds?

The two groups with the highest level of social disadvantage receive additional teaching staff to reduce class sizes. Also, resources for all-day-schooling[19] are allocated according to the index classes.

Other German states (Berlin, Hesse, Bremen)

Which educational needs are considered?

The State of Hesse allocates some education funds using a formula based on a social index since 2013 (Kultusministerium Hessen, 2013; Sachverständigenrat deutscher Stiftungen für Integration und Migration, 2016). The index describes the educational context of schools using three demographic indicators of the municipality and one indicator at school level. It is, compared to Hamburg, of parsimonious use of data. The municipality indicators i) unemployment rate, ii) welfare rate and iii) share population living in single houses. For each school the percentage of children with migrant background are considered. The funding by the index reflecting school conditions is complemented by further funding mechanism for migrant students (Weiler, 2017, p. 10).

Berlin uses social data since the 1990 to allocate teacher resources to schools. Two variables are used for allocation. Migration background operationalised by the home language of students and socio-economic status operationalised by the share of students being exempted from payments for learning materials. This exemption is only given to families with welfare status and has the advantage that the data are accessible to the education administration. (Sachverständigenrat deutscher Stiftungen für Integration und Migration, 2016, p. 14)

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[19] In Germany half-day-schooling is still very common and transition to full-day-schooling is currently a specific funding issue.

Bremen established a social index that is not only used by the education administration but for different government activities. The index was initiated by the unit for environment, traffic and construction. Thus, the index is built to describe the environment of schools as social space, not the actual students of the school. Six indicator groups are used: Education (share of pre-primary students with need for language support, share of students leaving school entitled to enter university "Abitur"), crime (Incidents of violence in families/homes, violent offenders per 1,000 inhabitants) and poverty (child poverty, share of welfare recipients). (Sachverständigenrat deutscher Stiftungen für Integration und Migration, 2016, p. 17)

How are resources allocated?

In Hesse the relationship to achievement is emphasized in allocation of resources. The weights associated with the four indicators are not equal but are set according to the school level correlation the indicators have with assessment results. The stronger the impact on learning at school level the higher the weight associated with the factor. The percentage of migrants has the highest weight (28%) and the local unemployment rate the lowest (22%). The index is calculated separately for different school types (general schools and academic advanced schools) and adjusted to inner municipality movements to better link municipality level information to the real situation at the school. (Weiler, 2017, p. 3).

What is the nature and level of funds?

In Bremen and Hesse the resources distributed using an index are limited to additional resources to close achievement gaps due to social disadvantage and migration. In Berlin core funding is allocated using the data. The two indicators (language, SES) are only considered for a school when more than 40% of student in a school fall in the target group. Then a per student increase in teaching hours is granted. If more than 40% of students are identified by both indicators, the additional weight is counted twice.

In Bremen schools are classified into six groups according to their social index. Additional resources for language teaching and other increase in staff is allocated according to the group level of the schools. The language teaching resources account for about 6% of the budget.

In Hesse, the funds distributed by the index account for 5% of the teaching volume. The additional resources come from a fund originally created to support education for migrants. Schools are free to decide about the use of the resources.

Kosovo

In Kosovo funding formulas exits at two levels. They are designed for transfer from the central level to municipalities and from municipalities to schools. A brief overview is provided by Levačić (2014). Allocation from the central level to municipalities follows a simple per student funding formula determining the amount of the specific education grant (SEG). A more complex funding formula regime was designed beginning in 2008 for the level of municipalities. The intend was that each

municipality can design its own appropriate formula. The formulas should mirror quite detailed cost differences between schools, school types and geographical settings (size and mountainous area). School specific costs factors also play a role, such as type of heating. In this context schools with a second language of instruction can receive extra funding.

The example of Kosovo is another example that specific characteristics of students reflected in formulas, like language, must not be an indication of special support to vulnerable groups, but a reflexion of cost differences that existed (and were considered) before the introduction of per student funding.

The funding formula in Kosovo is centrally designed and supported by a software solution. Execution of the formula and setting of school budgets is handled at the local level of government. Levačić (2014, p. 354) reports that the majority of municipalities, though making the calculations, submitted different school budgets worked out in the 'traditional way'. The example of Kosovo shows that implementation of funding formulas, especially in decentralized systems, depends on a complex interaction of local factors.

Lithuania

Lithuanian has a per student funding system for general primary and secondary education, the *Student Basket*. The system was implemented during the education finance reform from 2002 to 2007. The following information is based on Alonso and Sánchez (2011).

Which educational needs are considered?

Fairness in funding between schools of different sizes and thus between rural and urban settings is an important target of the funding system. Very small school that have to cater for small classes receive substantial higher per capita funding per student as large schools. In addition, the formula considers different needs for different types of schools (not students), mainly minority schools and mixed language schools. At the student level extra weight is given for integrated SEN students, migrant students, and students receiving instruction in additional languages (Alonso & Sánchez, 2011, p. 150).

How are resources allocated?

The school funding formula is based on a set of weights for different students in different settings. For details see Alonso and Sánchez (2011, p. 150,190). For each student a weight can be determined. Regular students in grades 1 to 4 of primary education in schools with less than 200 students and a norm class size of 22 to 25 have a weight of 1. Students in bigger school have a reduced weight, students in higher grades have a higher weight etc. Migrant students and students receiving instruction in different languages have a 35% increased weight. The weight is applied to the base amounts of per capita funding for the different cost factors: teacher salaries, school management, other educational functions. The base amounts are adjusted every year through a decision of the Cabinet of Ministers.

What is the nature and level of funds?

The per capita funding from the central level covers the teaching process, meaning teacher salaries, school management, education support staff such as psychologists, textbooks, and some specific education functions. School founders cover salaries of maintenance staff, energy and transportation costs. School founders are for general education typically municipalities and for VET-schools, which are not part of the system, the ministry of education.

In principle, the grant for the Student Basket is calculated for each school, and transferred to the municipalities with detailed information on amounts to be received by each school. In other words, the methodology of the Student Basket defines the teaching process part of the budget of every school in the country. In this respect, the Student Basket is close to a voucher system. However, the municipality has the right to reallocate among the schools up to five percent of the Student Basket amount it receives for all its schools.

Georgia

Georgia introduced school funding by student voucher system first 2005. Originally the system had no additional criteria on students' characteristics but only different funding for city schools, rural schools and schools in mountain areas. Between 2010 and 2014 the funding criteria were revised several times and additional criteria introduced. A base funding was introduced dependent on school size (and not single vouchers) to better serve small schools. Extra funding is provided for linguistic needs of minority students. Non-Georgian schools received increased amounts per student voucher, other schools with non-Georgian sectors receive coefficient funding only for students with linguistic needs. (Tabatadze & Gorgadze, 2014; see also Makarova, 2016, p. 22).

Malawi

Malawi instituted Free Primary Education (FPE) in 1994. Nampota and Chiwaula (2014) report on two grant programmes that were introduced as a result of FPE: the 'direct support to schools' grants (DSS) introduced in 2006 and 'school improvement grants' (SIG) introduced in 2010. Nampota and Chiwaula (2014) evaluated the grant programmes. The DSS is cofunded by the World Bank and the (UK) Department for International Development (DfID). It covers all schools in Malawi. It is intended to enable schools to purchase basic teaching and learning materials and to fund the maintenance and repair of schools. The DSS started as simple per capita grant only based on enrolment figures. In the second year the grant has been allocated based on school size categories. Five 'enrolment bands' were identified 10-500 students, 501-1500, 1,501-3,000, 3,001-4,500 and above 4,501. The fixed grant amounts range from $216 for schools with less than 500 students to $337 for the biggest schools. Consequently, smaller schools receive substantially higher grants per student than bigger schools. A school with 500 students receives $0.5 per student while this is $0.2 for schools with 1501 students. The DSS enabled schools to purchase teaching/learning resources – such as flip charts, exercise books, pens – as well as basic maintenance materials, such as cement, timber, and paint. The DSS grant is

not transferred to schools as cash, but through a cheque that is made payable to the supplier of purchased materials.

The SIG is allocated with a needs-based component and is contingent on the existence of a school improvement plan. The grant is given based on school enrolment and on the numbers of identified orphans and vulnerable children (OVS) and care, treatment, and support children (CTS, HIV-positive learners). The numbers are submitted by head teachers to the district education managers offices. Yet, Nampota and Chiwaula (2014, p. 25) finds that the criteria for disbursement were unclear to many. Unfortunately, Nampota and Chiwaula (2014) do not provide a further definition on how vulnerable children are identified besides orphans, but it seems to depend on judgement at the school level (Nampota & Chiwaula, 2014, p. 28). Schools must have submitted a school improvement plan, attuned with the National Education Sector Plans in order to be entitled to the grant. Based on USAID information standard rates had been determined: $12.9 per OVC student in primary schools and $20 for CTS students (HIV positive learners), whereas some schools reported receiving different, sometimes slightly higher amounts (Nampota and Chiwaula, 2014, p. 25). The SIG funds are mainly spent to support the children. With the OVC funding, schools purchased materials for vulnerable learners, including uniforms, umbrellas, and school bags. The CTS funds were spent on anti-retroviral drugs, hospital transport, blankets, and nutritious food. Although not the case in all schools, some of these funds were also put towards waiving parents' contributions to schools and the examination fees of higher classes. The SIG is transferred to the schools' bank accounts.

Netherlands

Weighted student funding has a long tradition in the Netherlands in 1985. It was adopted for all primary schools in 1985 (Fiske & Ladd, 2010). The system uses a small number of variables and evolved over the years with a tendency to simplify the variables.

Which educational needs are considered?

The main goal of the Dutch approach is to compensate differences between schools in the quality of education provision. Ladd and Fiske (2009, p. 6) emphasises that weighted student funding in the Netherlands aims at the promotion of equal quality schooling across schools of different mix of students. Indicators used are proxy for quality differences related to the socioeconomic situation of schools as a whole.

The student characteristics considered as proxy for school quality changed several times. Between 1985 and 2006 additional weight was given to i) native Dutch students whose parents have little education, ii) first or second generation immigrants whose parents have low education or work in low-skilled jobs, iii), children of caravan dwellers and iv) children not able to live with parents who work on ships (Fiske & Ladd, 2010, p. 5).

In 2006 the formula was modified to eliminate immigrant status from the formula and to rely entirely on the education level of parents. Additional weight is given to students who's parents have both low

education. This was to take pressure away due political debates around migrant numbers (Fiske & Ladd, 2010, p. 5). In order to understand the tendency to reduce the variables it must be noted, that idea is not to use the variables to assign funding to specific children with specific attributes, but to find a proxy for social composition of schools and the resulting learning conditions. The assumption is that the aggregation of fewer, but meaningful, indicators allows to characterize the funding needs at schools as good as a more detailed system of variables.

The formula funding is not the tool for compensatory education. "Weighted student funding is one part of a larger strategy to combat disadvantage in the Netherlands. Even with a generous program of additional funding, the Dutch do not expect schools by themselves to be able to close achievement gaps or to meet other needs of disadvantaged children"(Fiske & Ladd, 2010, p. 5). Language development and intercultural education of migrant children is thus not covered by the funding formula but addressed by other mechanism targeting individual students (while formula funding targets autonomous schools). Funding for special needs students follows extra funding policies.

Specific measures to support migrant education exists as well. This includes funding to secondary schools for newly arrived immigrants and induction classes in primary offering intensive Dutch lessons to newly arrived immigrant students (Shewbridge, Kim, Wurzburg, & Hostens, 2010).

The Netherlands also applied in 2000 some formula funding aside to its main funding system. Two projects provided extra funding for schools with more than 70% migrants, one of them with per capita amounts (Leuven, Lindahl, Oosterbeek, & Webbink, 2007). The two projects show, that projects involving formula funding with needs based components can be temporary. It should be avoided to reflect funding mechanism in indicators if they are not mainstreamed and sustained, i.e. permanent.

How are resources allocated?

Schools collect from the parents/guardians information on their highest level education. The information is collected when a student enrols for the first time at the given school. The system assigns all students a weight for extra funding of 1. Students from parents with low education get additional weights: an additional weight of 1.2 if both parents have as highest education primary education or one has primary education and the other has a maximum of two years of lower secondary education, an additional 0.3 if both parents have a maximum two years of lower secondary education (Ministerie van Onderwijs, Cultuur en Wetenschap, 2015). Schools do not receive any additional funding unless the proportion of disadvantaged students enrolled meets a minimum threshold of 9 % of total enrolment. The additional funding applies only to the number of students above this threshold (Fiske & Ladd, 2010, p. 5).

What is the nature and level of funds?

The system applies to all base funding for current expenditure. The funds are allocated to school boards, which operate between one to dozens of schools. Boards can distribute funds among their various schools (Fiske & Ladd, 2010, p. 5). Even targeted funding for language needs of migrant

students can be used by schools and school boards to their discretion (Shewbridge et al., 2010). The funds disseminated by the funding formula do not include funding explicitly earmarked for special programmes for individual target groups of students. Those are funded by different mechanism and from different budgets (Herweijer, 2009, p. 84,85).

Slovakia

The Slovak school funding formula is based on a set of 31 categories of students for which additional funds are allocated in addition to the base funding. Even though European Commission/EACEA/Eurydice (2014, p. 37) classifies the funding as accounting for pupils' socio-economic and linguistic or ethnic background, it is difficult to derive from the weights of the funding formula a characterisation of children in additional need. The weights are mainly driven by a classification of programmes. Examples for the weighting categories are "Students learning in non-Slovak language of instruction" (0.08) but also "Students in custody" (2.0) or "Dormitories" (4.0) (Santiago, Levačić, Halász, & Shewbridge, 2016, p. 122).

South Africa

In South Africa provinces are responsible for funding schools using funds which are transferred from the central level to provinces as equitable-share allocations. This earmarked allocation for education accounts for about 90% of the education spending of provinces. Within each province about 10 to 20 % of funds are spend on non-personnel costs. The Education Laws Amendment Act (Act No 24 of 2005) set up process to establish norms and standards for school funding. Schools are categorised in quintiles according to poverty rankings based on income and wealth of the communities surrounding schools. The uneven distribution of non-personnel costs should partially compensate for the uneven ability of schools to charge fees to students' families. Schools in lower quintile groups received more funding. In 2009 all schools in the lower three quintiles were obliged to not charge fees. Thus, the reasoning behind uneven distribution of funds disappeared. Since 2014, schools in quintiles 1 to 3 are entitled to minimum per student funding of 1175 Rand, schools in quintiles 4 are entitles to 588 Rand, and quintile 5 schools to 203 Rand. Yet, the amounts seem to set minimum amounts and can be topped up by municipalities. (McLaren, 2017). It is debatable whether systems ensuring minimum funding can be considered under the label of reallocation of funds. Certainly, it is impossible to quantify reallocation.

Switzerland (Zürich, Bern)

School funding is a responsibility of the member states of the Swiss Confederation, the cantons. As in Germany, no central funding system exists. The canton of Zürich uses a social index for school funding. The canton of Bern uses formulas for the allocation of special funds to support students from disadvantaged backgrounds. Here the canton as a whole and the city of Bern use different formula, showing the variation funding mechanism can take in decentralised systems (Tillmann & Weishaupt, 2015).

Which educational needs are considered?

Die Swiss Kanton of Zürich considers three variables to capture the socio-economic situation of schools within their municipalities. The variables are analysed at the level of the municipality. The variables are the share of students having foreign parents, the share of children living in households eligible to welfare, and the share of households with children with low income (Bildungsdirektion Kanton Zürich, 2016). The same variables are used in the city of Bern (Tillmann & Weishaupt, 2015, p. 8). Zürich used up to 2011 a different set of variables, only the share of students having foreign parents was already considered, the other variables were different: unemployment rate in the municipality, the share of buildings in the municipality with low housing density[20] and the share of households that have not moved housed within the last five years (Weishaupt, 2016, p. 19).

In the canton of Bern only one variable was in use until 2011, the share of pupils with a non-citizen status ("Ausländerstatus"). Since 2012 three factors are considered: te share of students with a non-German mother tongue, the share of children living in households eligible to welfare and the taxable income of parents. The new indicator is deemed to better reflect the situation at school. Variable selection is also motivated by the fact that the data are publicly available.

How are resources allocated?

In Zürich teaching post are allocated to municipalities based on the index. Within municipalities the local administration assigns teachers to schools. The enrolment in the municipality is weighted by the social index value of the given municipality and multiplied by a standard pupil teacher ratio (base factor) (Bildungsdirektion Kanton Zürich, 2016, p. 5). The base pupil teacher ratio in 2017 was 18.4 for primary education. The index can range from 1 to 1.2, meaning the pupil teacher ratio in municipalities with the highest social challenges can be 20% more favourable: 15.3. To avoid that in sum more teacher are allocated then planed for in total a adjustment factor is applied. In Bern only additional resources for educational needs are allocated to schools.

Togo

Togo has two formula based mechanisms to allocate funds to schools. Since 2008 a government grant is allocated to all public pre-primary and primary schools. In addition, funds are distributed to primary schools in the context of *Projet éducation et reinforcement institutionnel* (Education and Institutional Reinforcement Project, PERI). PERI, implemented in 2011 to 2013, has two grant elements, one for current non-staff expenditure and one for investments. For details see UNESCO IIEP (2016) and Chimier and Emeran (2017).

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[20] An statistical indication of families living in their own houses vs. families living in apartments. Within cities this is a good indicator for the wealth of a neighbourhood. Yet, across larger regional entities it is simply a rural urban indicator Weishaupt (2016, p. 19).

The government grant allocates funds equally to schools using a simple formula based on the number of class rooms (not enrolment). It does not distinguish between different school context or locations. Yet, being based on number of classes, schools with smaller class sizes receive larger per student amounts. The grant is $25 per class per year plus a fixed amount of $51 per school intended for the director's travel expenses.

The PERI grant uses a complex formula for allocation of funds including needs based and outcomes based components. The allocation is, as for the government grant, according to the number of classes but considers the context and the performance of the school. The amount of the grant for each school is calculated annually by the Statistical Division of the Education and Evaluation Planning Directorate and validated by the Financial Affairs Department and the PERI Project Coordination Unit. Schools are classified in four groups: difficult context and good outcome, difficult context but lower outcome, no difficult context and good outcome and no difficult context but no good outcome. Schools not having good performance and not being in a difficult context receive no school grant. Schools having good performance and are in difficult context receive twice the grant amount. The other two groups of schools receive the standard grant (Chimier & Emeran, 2017, Table 4.1). Thus, the formula is used to identify groups of schools, but not the exact value of the grant.

In order to identify schools having difficult contexts and schools with good performance, two indices are calculated on the basis of data collected as part of EMIS. The performance index draws on dropout rate, success rate at the undergraduate certificate and the proportion of repeaters. In addition, the gender parity index of the indicators is considered and a measure of historic trend for the indicators based on the previous 2 years. The context index is based on: location (urban / rural), accessibility (paved road, tracks, etc.), sanitary situation at school (toilets, water), availability of electricity, available chairs and desks as a percentage of students; type of construction of class rooms; pupil / teacher ratio and pupil / classroom ratio; percentage of volunteer teachers and pupil / textbook ratio. (Chimier & Emeran, 2017, Box 4.1).

The use of funds is formally decided by the local actors at the schools in reality school inspectors play a major role (UNESCO IIEP, 2016).

With the simple allocation mechanism, the extent to which reallocation takes place could be easily judged for Togo's PERI. Assuming the four groups of schools are of similar size, three quarters of the grant total go to schools with difficult contexts, one quarter go to schools with other context and good performance. Yet, to put it relative to the total spending would require a more complete picture of funds available at schools, given that schools in good context with low performance receive no PERI funds.

The United Kingdom

Currently England and Scotland implement or revise per student funding systems. Both systems are rolled out to the field in 2017.

England

England is in the process to implement a national funding formula that will take effect in 2018-19 and 2019-20 (Department for Education, 2017b; Department for Education, 2017a). The formula is intended to cover the whole school system.

Which educational needs are considered?

Reallocation of resources to disadvantaged populations is a sensitive approach in societies committed public sector equality. In England the Equality Act 2010 is intended to advance equality of opportunity and to ensure public sector equality. This uneven funding is a potential contradiction to the mandate for public equality. The Funding reform 2017 is accompanied by the Equalities Impact Assessment (Department for Education, 2017c, p. 12) clarifying that uneven funding is not of concern for equity. This document shows, that the explicit goal of uneven funding is less compensation of chances but creation of equal educational conditions. There is an explicit argument to not consider ethnicity in the formula. In the creation of the funding formula it was assumed "that there is a significant overlap between areas of high deprivation and the proportion of pupils from an ethnic minority background. It follows, therefore, that the impact on schools with a high proportion of ethnic minority pupils will be similar to that of schools in deprived areas. We have chosen to increase deprivation funding to reflect the funding currently channelled to deprived areas through the per-pupil basic and lump sum factors by some local authorities" (Department for Education, 2017c, p. 12).

The funding formula has four building blocks and factors, one of them being additional needs funding. Funding for additional needs addresses four aspects with independent elements in the formula: deprivation, low prior attainment, English as an additional language and mobility.

The national funding formulas draws on two established measures of deprivation. This is the number of pupils eligible for free school meals and the Income Deprivation Affecting Children Index (IDACI). This is a standard index not calculated for the purpose of formula funding. The IDACI measures the proportion of all children aged 0-15 living in income deprived families and is based on the English Indices of Deprivation. The latter established since 2000 and further developed until 2015 (Department for Communities and Local Government, p. 29-54). The index considers seven domains of deprivation with together over 35 indicators (the number for each domain is shown in brackets):

- Income Deprivation (6 indicators)

- Employment Deprivation (5 indicators)

- Education, Skills and Training Deprivation (7 indicators)

- Health Deprivation and Disability (4 indicators)

- Crime (4 indicators)

- Barriers to Housing and Services (7 indicators)

- Living Environment Deprivation (4 indicators).

A detailed list of indicators is provided at Department for Communities and Local Government (p. 18).

Low prior attainment as factor for funding is reflected by national curriculum assessments. The funding takes into account the number of pupils' resident in the local authority area who did not attain a certain reading level at key stage 2 tests. Also considered is the number of pupils' resident in the local authority area who did not attain a certain level in examinations at the end of secondary (GCSEs).

The funding formula has a per student component for pupils who speak English as an additional language and have entered the state education system during the last three years (Department for Education, 2017a, p. 16). Schools that have a high proportion of pupils joining the school mid- way through the year receive extra funding under the title mobility.

Funding related to *Health Deprivation and Disability* is not linked to individual SEN-DDD students or otherwise identified individuals but a cost factor expressed by census data. The proxy is the number of children aged 0-16 resident in the local authority area who are in receipt of disability living allowance. A similar proxy is used for children in bad health (Department for Education, p. 28). From the studied documents remains unclear how funding for SEN-DDD of individual children is regulated.

Sufficient funding for small schools is ensured by a lump sum component in the formula, which is independent of a school's size. A further factor reflects additional needs of very small and remote schools (sparsity funding). This funding component depends on the distance the pupils of a school would have to travel to their next nearest school and the average number of pupils per year group.

How are resources allocated?

It is the long-term intention that schools' budgets should be set on the basis of a single, national formula (a 'hard' national funding formula). But in a transition period, local authorities have some discretion in the use of their funds. Funds are transferred to local authorities based on the per capita funding formula with information about funding level according to the formula for each school. For the period 2018-19 and 2019-20 local authorities will continue to set a local formula to distribute their schools block funding. Each local area will therefore be funded on a fair and equitable basis, according to the national funding formula. (Department for Education, 2017a, p. 7,8)

What is the nature and level of funds?

The funding formula covers all funds for schools. The basic per student funding, irrespective of needs, amounts to 73% of funding, the needs based component accounts for 18% of funding. A further 9% of funding depends on school characteristics. Of the funding allocated to the needs based component, 51% is allocated to deprivation, 42% to factors representing prior achievement, 7% to English as an additional language and a small amount to mobility (Department for Education, 2017a, p. 22).

Scotland

In Scotland education funding is a responsibility of local government. The Scottish Government provides around 75 per cent of all local government revenue. The transfer to the local government are independent of purpose, local governments determine the level of funding for education (Scottish Government, 2015). The recently introduced needs based funding for schools, The Scottish Pupil Equity Funding, from the central government is thus an additional channel for school funding and targeted at closing the poverty related attainment gap.

Which educational needs are considered?

Funding will be allocated to schools on the basis of the estimated number of children and young people in P1-S3 registered for free school meals. The criteria are thus linked to the Scottish welfare system. Free school meals can be claimed if the parents receive: i) income support, ii) income-based job seeker's allowance, iii) any income related element of employment and support allowance, iv) child tax credit and income is less than £16,105, v) both, maximum child tax credit and maximum working tax credit and income is under £6,420, vi) support under the immigration and asylum act 1999, or vii) universal credit, where take home pay is less than £610 per month.[21]

How are resources allocated?

The funding is provided to school on a per capita basis. Funding will be paid by the Government to local authorities by means of ring - fenced grant with indication of the amounts for each school.

What is the nature and level of funds?

Publicly funded primary, secondary and special schools will receive 2017/18 for each child £1,200 in addition to the core funding. The additional funds amount to an additional £100 million per annum (Scottish Government, 2016).

Head teachers have discretion to make decisions about which children and young people would benefit most from any particular intervention, whilst keeping a clear focus on delivering equity. Funding should not be used in ways that stigmatises children and young people or their parents.

United States

In the US, allocation of resources to schools is a responsibility of the school districts and most funds for education are generated at the district/municipality level. However, states play a role in supplementing education funds by state aid to ensure in all district adequate funding.

Most states apply some form of financing formula, the majority of them, 37 states, provides a uniform state guarantee per pupil in form of the Foundation Program (Verstegen, 2014, p. 2). In this program

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[21] http://www.gov.scot/Topics/Education/Schools/HLivi/schoolmeals/FreeSchoolMeals.

the state sets a target revenue level for each school district and pays state aid as the difference between the target amount and locally generated revenues (Augenblick, 2014).

A basic problem in per student school funding is the issue of adequacy, meaning how much funding is required to achieve educational goals set by authorities. In the US this issue draws a lot of attention, since redistribution of tax money by states between jurisdictions must be well justified. Adequacy can be defined as funding needed for a given level of inputs, but adequacy must also ensure appropriate adjustments for students with different needs to reach state set targets. These groups include special education needs students but also students from low income families and children who need to learn the language of instruction. Different school characteristics, such as size and cost level in a region, need to be considered. In order to determine adequate funding different approaches are in use: the professional judgement approach, the successful district approach, the cost function approach and the evidence based approach. (Picus, 2014). Consequently, most states consider special needs as cost factor in their allocation. Verstegen, 2014 provides an overview of approaches for allocation of educational state aid for public primary and secondary education.

Funding special education needs students (SEN-DDD) is an important aspect of the funding approaches in use. Mostly weighted student funding is in use, using different weights for different categories of educational needs. Beyond funding of SEN-DDD also educational needs of low-income students, students at risk (of low achievement) and students who are English learners are considered. Some of the state aid is supplemented by federal funding from the no child left behind act. Currently 37 states supplement funding for low income students. The most common way to determine the number of low-income students is to rely on the count of students eligible for the federal free and reduced price lunch (FRPL). Some states provide funding in relation to the density of low-income students at schools, meaning the per student weight increases with a greater share of low-income students. Some states provide extra per student funding for students at risk of dropping out from school or not meeting learning standards. The variables used are based on assessment or participation in assistance programmes. Finally, additional funding is provided to assist English Language Learners, i.e. students in need to learn the language of instruction. These funds are distributed using a variety of approaches, in many cases per student approaches.

The above shown widespread use of funding formulas at the state level effects the funding of the ca. 13,500 school districts in the US, which have on average about 7 schools to administer, with much higher averages in some states (60 school in Maryland and Florida) and Hawaii and Washington/DC having only one district in the jurisdiction. The allocation mechanism of funding varies between school districts. Some districts use weighted student funding. Snell (2009, p. 1) reports this for 14 districts and the state of Hawaii, the only state with a state wide policy. With weighted student funding the principal is, that funding follows the child and funding should vary according to the child's needs and other relevant circumstances. The idea behind weighted student funding put much emphasis on the individual identified student and not or very little schools characteristics (Roza, 2014;Snell, 2009, p. 1). Snell (2009) provides an overview of district policies, which differ in the weight used. The following operationalization of identifying students with extra needs can be found. The examples present only

a small fraction of enrolment in the US, but serve as examples on how educational needs can be operationalized. The following list does not cover funding for SEN-students.

- Baltimore: low family income indicated by qualifying for the free or reduced school meal programme. Academic needs: based on test scores at beginning of the level. Funding is attributed to students with very low and with very high scores to address both, basic needs and advanced needs.

- Cincinnati: disabilities, English language learners, gifted students, poorer students and students in career path participation.

- Denver: Low family income indicated by qualifying for the free or reduced school meal programme.

- Hartford: Past achievement (below standards as well as gifted/talented). Only for lower grades there is no achievement data, poverty is used as proxy for low achievement (based on free or reduced lunch)

- Hawaii: Economic disadvantage, English language learners, Geographic isolation.

- Huston: Mobility (students not enrolled full year), poverty (free lunch) and at-risk of drop out (test scores and drop out factors), gifted and talented, English language learners.

Country case studies on school grants without needs based component

This section provides a brief overview on countries that have implemented formula funding systems without explicit needs based components.

Even though they would not fall under the current definition of indicator 4.5.3, it should be noted that formula funding as done in those countries can be an important contribution to increase equality and equity, simply because funds are allocated in a transparent and equal way, fostering horizontal equity.

Most of the formulas in those countries have elements to distinguish differences between urban and rural schools.

Kenya

Kenya implemented in 2003 free primary education (FPE). Njihia and Nderitu (2014) provide an overview on the policy and an evaluation. One element of this policy was the introduction of two school grant policies: the School Instructional Materials Account grant (SIMBA) and the General Purpose Account grant (GPA). SIMBA covered school materials such as exercise books and pencils, GPA covered wages and transport. The grant is a simple per capita allocation of funds without any other variables. Thus, per capita amounts are identical for all regions and schools without adjustments for small or rural schools. The allocation is according to enrolment with the grant per student officially set at KES 1,020 ($11.20) per annum, but research with school heads indicate received grants were actually declining since (Njihia & Nderitu, 2014, p. 22). Grant funds are transferred from the central

Ministry of Education directly to the school, that has its own bank account. The use of the grants is decided at the school level by local committees which consist of teachers and some parent representatives.

Lesotho

Lesotho introduced its Free Primary Education (FPE) policy in 2000. Lefoka and Deffous (2014) provide an overview on the policy and an evaluation. In this context, the Ministry of Education and Training provided three new sources of resources to schools. Schools received support in kind in the form of teaching and learning materials, financial aid for school feeding programmes and a 'utility grant'. The utility grant is allocated on a per student basis with enrolment as the only variable. The grant is set at about $0.8 per pupil per year, which in the evaluation is considered as not sufficient by several actors. In order to receive the grant, schools complete a school census form indicating their enrolment. The form is supervised by the district education officers. In addition, schools must send a quarterly financial report to the district education officers with receipts. Grant funds are transferred from the central Ministry of Education and Training directly to the school, that has its own bank account. The utility grant is not the only source of income for schools, and even though there are no statistics on other income, it is assumed that the grant is not the major source of income.

Indonesia

Indonesia introduced the school operational assistance grant (bantuan operasional sekolah, BOS) in 2005. Next to the General Allocation Fund covering teacher salaries and allowances, the BOS is the most significant income for schools (OECD & Asian Development Bank, 2015, p. 116). The BOS was introduced as a measure to relieve the financial burden on parents in light of the government's free basic education policy.

The grant is allocated to schools based on enrolments with an identical per student amount for all schools, independent of location or student composition. Only small schools, with less than 60 students are exempted from that rule. Such small schools receive the funds for 60 students (UNESCO IIEP, 2017a). In 2015, primary schools received annually about $60 per student per year, junior secondary schools about $75. Grant funds are transferred to schools on a quarterly basis or semester basis in two stages: first, funds are transferred from the central level to the regional general treasury single account then funds are distributed directly into school savings accounts. The grant is contingent the preparation of a school activity and budget plan and submission of accountability reports on previous spending. Grant guidelines provide schools with a list of authorized and prohibited areas of expenditure. The grant is meant to cover 'non-personnel operational' costs. The funds are directly channelled to the schools, which empowers school managers by allowing them to choose how to best allocate the BOS grants. The BOS grant is intended to cover non-salary development costs of a child in school but according to OECD and Asian Development Bank (2015, p. 116) it is reported as insufficient.

According to Lugaz and Grauwe (2016, p. 14) the grant also aims to provide specific assistance to poor students. This function is not embedded in the allocation formula. UNESCO IIEP (2017a) shows that the reallocation to poorer students is at the school level: as outlined in the grant objectives, BOS funds can be used to provide poor students with school supplies or equipment (e.g. uniforms, shoes, notebooks). This would not fall under the definition of indicator 4.5.3, since it makes no differences in needs between schools. Yet, OECD and Asian Development Bank (2015, p. 122) list the introduction of BOS as one important factor in Indonesia that contributed to improving the access, availability and affordability of basic education. This is despite not having an explicit needs-based component.

Timor-Leste

Timor-Leste's school grants policy was introduced in 2004/2005 as part of the country's fee-free education initiative. UNESCO IIEP (2017b) and Lugaz and Grauwe (2016) provide an overview on the policy.

In Timor-Leste schools are mostly organized in clusters are made up of one large central school and several surrounding satellite schools. Central schools serve as the administrative and managerial hubs for their respective clusters and receive the grants from the Ministry of Finance. Central schools further distribute the funds to each of their satellite schools. (UNESCO IIEP, 2017b)

Grant funds are allocated to schools on a per-pupil basis, i.e. the only variable in the formula is enrolment. UNESCO IIEP (2017b) reports the amount per pupil per month for 2013 as $1 in basic schools and at the technical/professional level, and $0.50 at the secondary level. In order to receive grant funds, central schools must create a bank account, provide data on enrolment, prepare a school budget and plan, submit accountability reports on previous spending, and have a school safety box.

Potential data gathering for indicator 4.5.3

Currently reporting on funding formulas and needs based funding is in two streams: Cross country data collection and country cases studies.

OECD and the EU launched first standard reporting on needs based funding. European Commission et al. (2016, p. 39) presents an indicator on "Additional support for schools enrolling large numbers of disadvantaged students". The underlying questionnaire was not available for this review but should be considered as basis for development of indicator 4.5.3.

For the OECD Review of Policies to Improve the Effectiveness of Resource Use in Schools (School Resources Review) some standardized information was collected on criteria used for allocation of current expenditure (OECD, 2017b, p. 150). The OECD/NESLI network prepared and piloted a questionnaire for that purpose.[22]

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[22] NESLI will likely continue the work after the completion of the School Resources Review (Personal communication). The draft questionnaire was not available for this review but should be included in further developmental work.

The WorldBank SABER project implemented its "School Finance Data Collection" in four countries (WorldBank, 2013a, WorldBank, 2013b). The questionnaire aims to collect information on "Policies to provide support to disadvantaged students" It considers equally policies or programs and is thus wider in scope than indicator 4.5.3. The completion of the questionnaire requires a substantial amount of judgement and is so far undertaken in the frame of external expert reviews and interviews and consultation with country experts. Makarova (2016) applied a similar framework, but without much country involvement. Both approaches are not specifically geared toward formula funding and thus more open and diagnostically designed. The rating of policies is subject to expert judgement, which is acceptable if the number of experts is small and they work on many countries to be able to overlook differences and communalities. For a wider application definitions would need to be far more specific, adding to the complexity of the approach and likely limiting the usefulness for the diagnostic purpose.

The second source for international information are case study publications. A good basis for such studies are structured guidelines, as used by Levačić and Downes (2004). Levačić and Downes (2004, p. 164) applied standardized guidelines for data gathering with countries. Since they are more geared towards formula funding, they could be a further basis for developmental work on indicator 4.5.3.

Based on my experiences from the country review in this document and in consideration of the above mentions data gathering approaches, I see the following recommendations concerning indicator 4.5.3.

a) Only formula funding systems should be considered that are sustained and thus implemented for a longer use (i.e. many years) in most of the country. Thus the system will not change to much and data collection for indicator 4.5.3 should not be done annually but rather in longer cycles (3 to 5 years). Not all countries need to be targeted for the same reference year.

b) As consequence from a), longer cycles would allow to conduct data gathering when opportunities for collaboration with expert are open, e.g. when workshops with countries education finance experts take place.

c) Due to the complexity of a potential questionnaire on formula funding, national statisticians working in systems without formula funding will have difficulties to work with a questionnaire that simply does not apply to them. This is currently the case for most of the worlds countries. Therefore, consider a small initial data collection just aiming to identify which countries have formula funding.[23] This could become part of a regular data collection.

d) For countries applying formula based funding (in a major scope) the more detailed data collection (every 5 years) should collect further details to understand allocation of funds considering educational needs.

e) In order to make this questionnaire as simple, try to establish a categorization of funding formula families. I assume there are not more than 3 to 6 widely used generic formula systems. Build the questionnaire to first identify which formula family is in use and then collect

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[23] Before this, literature research could identify countries with formula funding.

details using a data collection sheet geared towards that family. This could be piloted with countries for which the funding system is already well documented.

f) It might be necessary to cope with countries that have more than one formula system, either for different purpose or for different jurisdictions.

g) Develop the indicator methodology to bring together the data from the different formula families.

h) Cover SEN-DDD in the questionnaire, but take great caution on reporting. Alternatively assume more specific questions SEN-DDD funding besides the formula funding system.

i) Consider to limit the initiative to ISCED 1 and 2. Understanding funding of vocational education would add further complexity and should be avoided in the first steps.

The above recommendations are concerning the indicator 4.5.3 in its current form. It should be reminded here, that such indicators would inform about policies, but existing inequality and inequity in education finance would not be standardized reported. While it is a desirable to look for equity beyond equality we should be conscious that inequality is likely still the norm in resource allocation, including in the developed world.

Disadvantaged populations are not only dependent on reallocation in their favour[24], they also still receive fewer resources and are enrolled in schools with worse conditions than other populations. Attempts to monitor inequalities to have a clear picture as background for policy debate should not be skipped in the move towards monitoring potentially desirable policies for equity.

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[24] Which 4.5.3 would look at.

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