Chapter 3

School funding
in the Czech Republic

This chapter presents an overview of how the school system in the Czech Republic is funded, including a detailed presentation of the central funding formula used to allocate funding for direct costs (primarily staff salaries, but also professional development, textbooks). It also presents analysis of selected regional funding formulas used to allocate this central funding to schools (both managed by regions and municipalities). It considers the strengths and challenges inherent in the current system and makes policy recommendations designed to build on and strengthen the approach to school funding, including a greater focus on equity.

Context and features

Education in the Czech Republic is decentralised. Two levels of local governments are responsible for various levels of education. Municipalities (*obec*) manage and finance basic schools, while regions (*kraj*) manage and finance secondary schools. The two levels of local governments are very different.

There are 14 regions in the Czech Republic, including the capital city Prague. With total national population equal to 10.54 million inhabitants and Prague accounting for 1.15 million (11.9%), the average population of the remaining regions is 714 thousand, ranging from 300 thousand in the Karlovy Vary region to 1.32 million in the Central Bohemian region (the region surrounding the capital city, with its offices located in Prague). Thus regions are very large local governments, and their networks of secondary schools are similarly extended, both general academic and vocational. There is ample room for co-ordination work of school profiles and for improving school efficiency (such as maintaining large class sizes). Education responsibilities of regions are complex and require serious strategic planning and oversight of many quite different institutions. Apart from financing secondary schools, regions are also responsible for the distribution of education grants for basic schools in all municipalities located on their territory.

In contrast, there are 6 253 municipalities, of which Prague is one. The average size of a Czech municipality (not including Prague) is 1 484 inhabitants, and about 70% of municipalities have less than a thousand inhabitants. As a result, there are many municipalities which do not manage a single basic school at all, and most have just one school. The result is that in many cases considerations of efficiency are less important to the municipality than the survival of the school, and efforts are made to keep it open despite small classes. Education responsibilities of municipalities are thus typically reduced to managing and financing a single school, with the main ambition of ensuring its continued operation.

Prague is, of course, a special case, as are capital cities across central Europe. It manages and finances both basic and vocational schools. Moreover, it is divided into a number of quite independent city districts with their own education responsibilities.

Main funding sources for Czech schools

Education finance in the Czech Republic includes both central (state) and local funding.

Recurrent (non-investment) education expenditures

All recurrent (non-investment) education expenditures of schools and education institutions in the Czech Republic are divided into two categories: the "direct costs" (central component) and the "operational costs" (local component). Direct costs come from the central (state) budget, and operational costs are covered from the local budgets.

A central grant covers the direct costs which are regulated by the state. These include primarily salaries for teachers and other staff, textbooks, teaching aids, further professional development of teachers and other expenditures resulting from labour laws. Funds for the

central component are put into per student normative amounts (see below) and allocated to regions through education grants. In this way the State takes responsibility for the financing of those educational functions, such as teaching and textbooks, which are centrally regulated. Thus, for example, if the State decides to increase teacher salaries or to strengthen curriculum, it will adequately raise the national normative amounts to compensate local governments for the increased expenditures.

The operational costs of schools are included in the second, local component. These are education expenditures which cannot be clearly regulated in financial terms because they depend on many diverse factors and on local prices of inputs. This component includes maintenance of schools, energy expenditures (heating, electricity, gas), communal services (provision of water, utilisation of garbage), and small repairs. Operational costs of schools are financed from regional and municipal general revenues, including shared taxes, local fees and charges, or equalization grants. It is assumed that these revenues will rise together with inflation, which is the major factor contributing to the increase of operational costs.

Investment expenditures

A separate financial stream concerns investments in schools. This is the responsibility of school founders, that is, municipalities for basic schools and regions for secondary schools. Similar to school operational costs, investment funds are not included in national or regional normatives.

The grants for direct costs and alignment with the governance structure

The uneven decentralisation of basic and secondary schools in the Czech Republic, described above, requires quite different approaches to how these two levels of education should be financed. Two features of the grants for direct costs within the Czech education finance system are designed to achieve this purpose.

A national funding formula (the national normative amounts)

The first feature is that the education grant from the central budget to regional budgets uses a very simple allocation formula based on five normative amounts: four normative amounts for groups of students of different ages and a separate normative amount for KZÚV (*Krajská zařízení ústavní výchovy* - Regional institutional care facilities), that is for students in correctional facilities (these facilities include boarding, so the normative is much higher). The four age groups correspond to pre-school education, basic education (ISCED [International Standard Classification of Education] 1 and 2), secondary education (ISCED 3) and higher vocational education (ISCED 5B). Table 3.1 provides the values of the national normative amounts in recent years (in CZK) and Figure 3.1 shows how these have evolved.

The use of a simple allocation formula is justified by the fact that these grants are calculated for very large groups of schools, each of which includes many urban schools, many rural schools, and many schools teaching different vocational profiles. Thus average class sizes across the regions are rather uniform, and this allows for using a very simple formulaic approach. As we show below, this is to some extent, though not entirely, justified in the Czech context.

Regional funding formulas (regional normative amounts)

The second specific feature of the grants for direct costs within the Czech education finance system concerns the allocation of grants from regional budgets to individual basic

Table 3.1. **National normative amounts per student in CZK, 2005-15**

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
3 to 5 years	33 284	34 478	36 183	37 096	37 496	39 858	36 136	38 833	38 833	39 235	39 235
6 to 14 years	35 641	37 907	41 542	43 199	44 126	46 747	46 110	49 825	49 825	50 423	50 423
15 to 18 years	46 650	48 414	50 775	52 512	52 131	54 495	53 538	57 718	57 718	58 313	58 313
19 to 21 years	39 880	41 848	43 905	44 954	45 435	47 651	45 919	49 245	49 245	49 755	49 755
KZÚV	177 592	177 592	186 905	210 262	212 526	222 527	221 809	236 720	236 720	239 179	239 179

Note: KZÚV (*Krajská zařízení ústavní výchovy* - Regional institutional care facilities) comprises students in correctional facilities.
Source: MŠMT (forthcoming), *OECD Review of Policies to Improve the Effectiveness of Resource Use in Schools National Background Report: Czech Republic*, Czech Ministry of Education, Youth and Sports, Prague.

schools (managed by local governments) and to individual secondary schools (managed by the regions). As most local governments finance only one basic school (if any), and as these grants are conditional (can be used only for education), one can say that in fact there is no difference between allocating the grant to the basic school or to the municipality which manages it (the difference becomes relevant only if a municipality manages at least two schools). In order to achieve this, the regional allocation formulas are very complicated, requiring complex formulas for basic schools and over 200 different normative amounts for secondary schools. All these normatives need to be adjusted every year by the regional education authorities.

Regarding the funding of basic schools, we thus see that there is a multitude of sources: normative allocation for direct costs from the regional budget, additional funding for direct costs (as negotiated between municipality and the region), add-ons to direct costs from the municipal budget (allowed under the law, and used in cases when the regional allocation falls short of the needs of the school, as assessed by the municipality), and finally operational costs, fully financed from the municipal budget. In contrast, secondary schools receive their all funding from one source, namely the regional budget (part of it through normatives for direct costs, part through budget allocation for operational costs).

The dual role for regions is a specific feature of the Czech education financing system

As mentioned above, the Czech regions have two separate roles in the education financing system. The first is receiving an education grant from the central budget to finance the schools under its managerial control (secondary schools), and allocating these funds to individual schools. In this respect, the Czech regions are just like any local governments among the post-communist countries. The second role is receiving education grant from the central budget for schools managed by the municipalities (basic schools), and then redistributing these funds among the municipal schools according to an allocation formula set by each region. In this regard, the Czech regions act like extensions of the national government and have much power over the municipal budgeting process. In part this is the result of a slow process of decentralisation of the Czech education system: the ministry used to have offices located in each region that had administrative responsibilities and these gradually gave up powers to the Czech regions. Regional self-governing authorities have "inherited" the responsibility to allocate funds to municipalities from the former ministry offices in each region, presumably with their staff and with their accumulated capacity and knowledge about basic education on their territory.

This double role of regions in the financing of the Czech education system is quite unusual among the post-communist countries. It creates a dependency of municipalities

on regions, thus making the first tier of local government (municipalities) partially subordinate to the second tier (regions). Although this is allowed under the European Charter of Local Self-Government (which does not mention different tiers and their relationship), most countries in the region treat local government of different levels in a similar manner, ensure their budgetary autonomy from each other, and create direct grants from the central budget to the local budgets, without intermediaries.

The evolution of the central grant for each age group (the normative amounts)

Since 2005, the normative amount in the central grant for direct costs has increased for each of the five groups (Table 3.A1.1). Figure 3.1 presents the evolution of the four normative amounts by age group (it excludes the normative amount for students in correctional facilities as this is much higher). This shows a steady increase in the normative amount for each age group until 2010. However, the normative for each age group grew at a different rate, with the biggest increases for the age groups 6 to 14 years (31%) and 3 to 5 years (20%) (Table 3.A1.1). In 2011, there was a marked decrease in each of the normative amounts, especially for the normative for the age group 3 to 5 years, which has not since recovered to its 2010 level. In 2012, each normative was increased between 8% to 10% and since then (2012-15), the normative amounts have been held constant for a two-year period (Table 3.1 and Table 3.A1.1). Cumulatively, over the period 2005 to 2015, the normative amount for the age group 3 to 5 years grew by 18%, while the normative amount for the age group 6 to 14 years grew by over 41% (Table 3.A1.1).

Figure 3.1. **Evolution of the central normative amount for each age group, 2005-15**
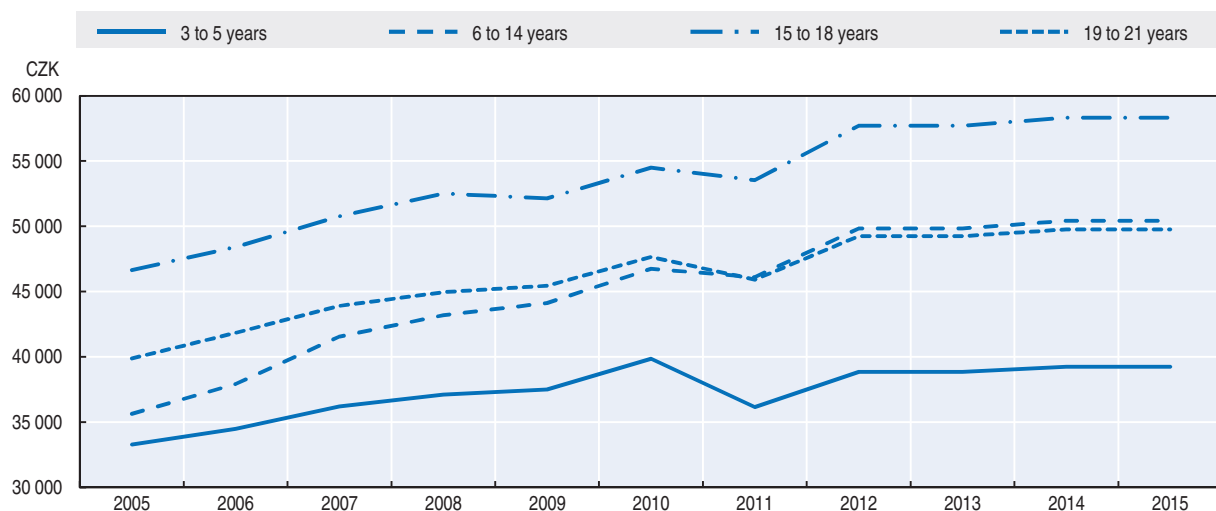
Source: MŠMT (forthcoming), *OECD Review of Policies to Improve the Effectiveness of Resource Use in Schools National Background Report: Czech Republic*, Czech Ministry of Education, Youth and Sports, Prague.

As a result of this uneven growth, the relative allocation of the central grant to each age group changed over the period 2005 to 2011 (Table 3.A1.2). Since 2012 an annual rate of change has been applied uniformly to the normative amounts and the relative amount of the central grant allocated to each age group has been held constant. Relative to the age group 3 to 5 years, the normative is equal to: 129% for the age group 6 to 14 years, 149% for the age group 15 to 18 years, 127% for the age group 19 to 21 years and 610% for students in correctional facilities (Table 3.A1.2).

Strengths

Stable and publicly known system to allocate public funding to schools

The allocation of central funds for direct costs in education is designed through a system of per student normative amounts. This system is in operation since 2001 and covers both the central level, namely the distribution of funds from the national to regional budgets, and the regional level, namely the distribution of funds to local governments (for basic schools) and to secondary schools managed by the region itself. Since the majority of local governments in the Czech Republic own just one school, the regional allocation is in fact an allocation to individual schools, except for the cities and for districts in the capital. There is common knowledge of this system and in general Czech education officials at all levels of governance accept the current system as fair and objective.

The value of a publicly known and strictly adhered to allocation system in education is significant for the stable functioning of schools. The most important benefit is the stability and predictability of financing, which allows all schools to plan their development in the coming years. In particular, since 2012 there has been greater stability in the principles and technical details of the national normative amounts, namely the relative amount of the central grant for direct costs allocated to each age group has been held constant (Table 3.A1.2). Further, parents can monitor education spending and in this way exercise social control over the functioning of the education system.

It is worth adding that the allocation system based on per student normative amounts is extremely simple at the national level, with just five age-based normative amounts, and extremely complex at the regional level. This reflects the fact that allocation to regions allows the use of averaging effects of large jurisdictions (containing a huge variety of municipalities and schools), while allocation at the regional level is mostly to individual schools and therefore needs to reflect their specific conditions.

Transparent division of education finance into national and local components

Responsibilities for financing of education are clearly divided between different levels of government. The direct costs are financed through grants from the state budget to regional budgets. The operational costs are financed from the school owner's own revenues, that is, from municipalities for basic schools and from regional authorities for secondary schools. This transparent division of education finance into direct and operational costs creates clarity of who is responsible for what function in the sector. In particular, it ensures that the main costs of the school, namely teacher salaries, will be adequately adjusted whenever the State decides to increase them, and it allows municipal and regional authorities to plan the operational component of school budgets in a relatively simple manner. This transparent division may, however, carry risks of inflexibility, which is discussed below.

In-built mechanisms allowing for some local flexibility in funding allocation for direct education costs

Importantly, the funding allocation for direct costs includes in-built mechanisms allowing for local flexibility in the application of the per student normative amounts. These consist of negotiations between schools and municipal authorities, and negotiations between municipalities and the regional authorities. These provisions for negotiations are legally set. This means that some degree of deviation from the strict allocation according to per student normative amounts is allowed in the system. These in-built mechanisms are

particularly important as they recognise the risk that comes from the allocation of budget funds for direct costs (notably for teacher salaries) to individual schools on a pure per student basis. This voucher-type allocation is made for almost all schools; the only exceptions are the few municipalities which operate more than one school. Such a system creates a risk of inflexibility, when even a small decrease in number of students may result in a corresponding decrease of funds for salaries, which may make funds insufficient for teacher salaries which remain fixed.

An additional in-built mechanism, aiming to counteract possible inefficiencies due to the mechanical application of national and regional normative amounts, is the right of municipalities to provide additional funds for direct costs above the received allocation from the regional budget (operational costs are not covered by this as they are fully borne by the school owner). This is typically negotiated between the municipalities and the schools. In small municipalities with just one school this may be necessary to ensure the stable operation of the school.

School budgets can accommodate small fluctuations in allocated funds for direct education costs

There is also a degree of flexibility at the school level to accommodate small fluctuations in funding for direct education costs. As noted, the Czech system of financing schools is essentially a voucher system, with its inherent fluctuation of allocation as student numbers change. It is therefore important to ensure that there is a sort of "cushion" at the school level, to absorb the impact of inevitable small changes in student numbers (especially decreases, of course). The cushion comes from the fact that teacher salaries consist of two components. The fixed component, stated in the national teacher salary scale, is nationally negotiated each year, and sets the minimum which must be paid to teachers according to their employment contract. The personal component, in contrast, is decided each year by the school principal, and reflects, among other things, changing teacher responsibilities within the school. This adjustable second component of the salary gives flexibility at the school level. It may be used – and in fact the OECD review team learned that it is being used – to adjust the total pool of salaries to the funds for direct costs available through normative financing of schools. This provides yet another mechanism for flexibility in the Czech system of education funding, by allowing schools to accommodate small fluctuations of allocated budget for direct education costs as student numbers fluctuate.

Functioning additional financial instruments to support students with special educational needs

The Czech Republic recognises the need for specific regulation and additional funding for the teaching of students with special educational needs. This is currently provided through the allocation of additional teaching assistance on the basis of recognised and certified needs, and through the provision of specific funds for this assistance, above and beyond the funding for direct education costs. The need for this teaching assistance, in the form of allowed additional teacher positions, is negotiated between the school and the school owner, and then submitted for consideration by the regional education authorities, who take the final decision whether to fund these assistant teacher positions.

The funds for additional teaching assistance are assumed to come from the regional reserve of education per student normative funds, legally set to be equal to at least 2.5% of the total sum of normative funds.

Proposed new approach to finance education for children with special educational needs

Financing of additional education services for students with special educational needs is not considered as very successful in the Czech education community. In particular, it has not led towards an increased integration of students with special educational needs in mainstream schools. This may be due to the fact that this financing is limited to the additional positions of teaching assistants.

In response to this criticism, the ministry is preparing a radical reform, aiming at a complete overhaul of today's system of financing special needs education. The new approach will be based on a catalogue of certified pedagogical measures, which must be undertaken by schools whenever a student is certified as in need of such a measure, irrespective of in which school she or he is enrolled. The catalogue includes also the specific established costs (prices) for each item on the catalogue. This allows, on the basis of available statistics regarding students with special educational needs, to make prognosis of the future necessary additional allocation of the required budget funds.

The introduction of such a catalogue with a list of measures and associated prices is an innovative procedure, without much precedent in other OECD countries. It may break the current unwillingness of mainstream schools to accept students with special educational needs. During the OECD review, the ministry was still in the process of reflecting on ways to operationalise this catalogue, so that it becomes an efficient administrative tool supporting more effective targeted funding. This is an extremely important exercise. There will need to be adequate mechanisms to ensure that the associated costs do not unduly accelerate and grow as a result of growth in the number of students being certified (see below).

New education strategy plans for more effective use of EU funding

In recognition of some difficulties in relation to the use of structural funds from the EU in the previous financial period, the Czech Republic, supported by the European Commission, has taken this into account in the design and implementation of the new generation of European Structural and Investment Funds programmes in education (i.e. Operational Programmes [OP] Research, Development and Education; OP Prague Pole of Growth; Integrated Regional OP). Several measures are expected to contribute to better targeting and improved absorption of the available funds. Notably, there are safeguards for the implementation of a smaller number of systemic projects that will be more policy relevant. Also, the implementation structure has been simplified. The OP will continue to use simplified cost options which have proved to support a better administration of EU funding. These programmes are based on the 2014 EU Country Specific Recommendations (CSR) for education – 80% of the OP Research, Development and Education is directly related to these CSRs, that is, inclusive education with a focus on the Roma minority, support to early childhood education and care, support to teachers, and increasing the quality and labour market relevance of higher education (European Commission, 2014). These points are mirrored in the Strategy for Education Policy of the Czech Republic until 2020 (MŠMT, n.d.).

National government uses specific education grants for development programmes in Czech education

In addition to the basic financing of recurrent direct costs of providing education through a system of national per student normative funding, the Czech Republic uses a number of specific education grants. The aim of these targeted grants is to fund development programmes, that is, specific experimental or piloting programmes and new educational

initiatives. These initiatives are often developed or proposed by some groups of teachers or by locally active and not well resourced non-governmental organisations, so require financial support from the state to be really tested. It is assumed that these development programmes either show their usefulness and documented positive outcomes, in which case they may be expanded and eventually integrated into mainstream financing scheme, or they will prove to be less effective than initially hoped, and accordingly will be discontinued. In this way, the use of targeted funding supports policy experimentation and by supporting localised, innovative projects can be a fruitful way to test out different approaches to address identified challenges in the education system.

As one of the key challenges facing the Czech education system is the integration of Roma children into schools and maintaining them there (see Chapters 1 and 2), it is not surprising that presently most of the specific education grants discussed here are directed towards addressing this challenge. Due to cultural differences and in particular to lower parental expectations those students are at a higher risk of dropping out of school. For this vulnerable group of students in secondary schools and higher vocational schools a specific national programme has been introduced through Government Resolutions No. 386/2000 and No. 607/2004. The grants for these students are capped, differentially for consecutive years of the secondary school; on a per student basis in each of two periods of the school year (January to June; September to December) they can be no more than CZK 4 000 (1st year of secondary school), CZK 5 000 (2nd year), CZK 6 000 (3rd year), and CZK 7 000 (4th year). However, the number of students enrolled in these programmes is extremely small, as shown in Table 3.2.

Table 3.2. **Additional funding to support socially disadvantaged Roma student at secondary schools**

	Total expenditure (CZK)	No. of students (ISCED 2 and 3)	No. of students (ISCED 4)	Additional funds per student (CZK)
2012 (Jan-June)	3 282 000	692	7	4 695
2012 (Sep-Dec)	4 695 300	1 040	12	4 463
2013 (Jan-June)	2 447 000	532	8	4 531
2013 (Sep-Dec)	3 160 000	740	11	4 208
2014 (Jan-June)	2 538 800	546	15	4 525

Source: MŠMT (forthcoming), *OECD Review of Policies to Improve the Effectiveness of Resource Use in Schools National Background Report: Czech Republic*, Czech Ministry of Education, Youth and Sports, Prague.

Challenges

National allocation system for direct costs does not support equity

The national allocation system for direct costs is rigid, with an excessively simplified formula (only five different normative amounts) and it does not take into account regional differentiation of the Czech education system. With one per student normative for basic education (6 to 14 years age group), for example, relatively more funds are transferred to urbanised regions and Prague than to more rural regions with smaller average class sizes. In this way, the national allocation system does not include the instruments to support the equity of education finance. Here, the OECD review team examines the extent of regional variation on some basic indicators for basic education, suggests that this underlines the need for a more in-depth review and exposes the weakness of an over-simplified national allocation system.

Regional variations in average class size and student to teacher ratios

Allocative inequity can be reviewed in two different ways, under the assumption that teacher salaries are broadly uniform across the country. The first approach is to assess average class sizes in basic education. Indeed, certainly the first stage of basic education (Years 1 to 5) is the most uniform stage of education, with a broadly similar teaching programme and curriculum load across the Czech Republic. Thus, we can assume that direct cost expenditures per class should be also rather uniform. Since the allocation for direct costs from the national to regional budgets is based only on the number of students, regions with on average larger classes would receive a relatively higher per class allocation than regions with smaller classes. The second is to assess the number of students per full-time equivalent (FTE) teacher in each region (an indicator related to the first one, but reflecting possible deviations in teaching load). As teacher salaries comprise the major part of school expenditures (of direct costs), differences in the number of students per FTE teacher will indicate allocative inequity. Table 3.3 provides the average values of both indicators for basic education in all the Czech regions, separately for the first (Years 1 to 5) and second stage (Years 6 to 9) of basic education and overall.

Table 3.3. **Class sizes and students per full-time equivalent teacher in basic education in the Czech regions**

Region	Class sizes			Students per FTE teacher		
	1st stage (Years 1 to 5)	2nd stage (Years 6 to 9)	Total (Years 1 to 9)	1st stage (Years 1 to 5)	2nd stage (Years 6 to 9)	Total (Years 1 to 9)
Czech Republic	19.64	19.41	19.55	17.72	11.10	14.45
Prague	20.73	20.31	20.58	18.85	10.77	15.03
Central Bohemia	20.29	19.45	19.97	18.27	11.47	15.06
South Bohemia	20.05	19.16	19.69	18.18	11.02	14.54
Pilsen	19.40	19.14	19.30	17.58	11.26	14.50
Karlovy Vary	19.97	18.76	19.47	18.34	11.23	14.74
Usti	20.07	18.77	19.53	18.43	10.83	14.46
Liberec	18.88	19.19	19.00	17.47	11.10	14.25
Hradec Kralove	18.91	19.07	18.98	16.88	10.92	13.94
Pardubice	19.44	19.36	19.41	17.35	11.19	14.29
Vysocina	19.47	19.06	19.31	17.18	10.92	14.00
South Moravia	19.26	19.77	19.45	17.46	11.09	14.34
Olomouc	19.12	18.99	19.07	17.01	10.89	13.99
Zlin	18.45	19.55	18.89	16.53	11.34	13.95
Moravia-Silesia	19.53	19.89	19.67	17.41	11.26	14.31

Source: Provided to the review team by the Ministry of Education, Youth and Sports.

Table 3.3 provides some useful information regarding regional variation of basic education in the Czech Republic. First, it is useful to note some basic facts. While there is relatively little difference in class sizes between the first and second stages in basic education, in all regions there is a considerably lower student-teacher ratio at the second stage of basic education. This reflects the increased number of subjects taught in the second stage and a corresponding increase in number of teachers teaching them (per class).

The importance of the average class size is related to the strict per student allocation at the national level, namely larger classes imply higher per class allocation. Prague is exceptional, as it is the only entity in Table 3.3 consisting entirely of urban schools. The per class allocation in Prague is 5.6% and 4.6% higher than the national average at the first and

second stages of basic education respectively. Among the other Czech regions, with a mixture of rural and urban areas, the per class allocation varies from 2.1% higher than the national average in the Central Bohemian region to 3.4% lower than the national average in the Zlin region. This is not a very large variation, due to the large scale of regions, but it does show that more rural regions are at a disadvantage. However, there is markedly higher variation in class sizes at the first stage of basic education, with a difference of 9.4% of the national average between the regions with largest and smallest classes, than in the second stage (difference of 5.8%). The higher variation of class sizes in the first stage of basic education may indicate that across the regions there is a non-uniform distribution of small rural schools providing only initial education.

A different picture emerges when we review the number of students per FTE teacher. Again, Prague is the exception, but in a different way: it has the highest number of students per FTE teacher among all the regions in the first stage and the lowest in the second stage (recall that its class size is highest in both stages). The high value of this parameter for the first stage is simply due to large classes. However, the extremely low value of the student-teacher ratio for the second stage indicates a clear policy preference of the Prague authorities to provide significantly more teaching to students of higher years. It seems education officials in Prague consider that investment in higher years of basic schools is best for their students. This is borne out by Table 3.5 below, which shows that FTE teachers per class in the second stage of basic schools in Prague is 7% higher than the national average. Among the other regions the coefficient of variation (equal to standard deviation divided by the mean value) of students per FTE teacher is 0.034 for first stage and 0.018 for second stage. This shows that overall variation is small, but for the first stage it is almost double that of the second stage. Variation of number of students per FTE teacher in the first year is almost entirely due to class size (coefficient of correlation of these variables R=0.91). Education policies for the first stage of education are therefore quite similar across the regions. However, variation of students per FTE teacher in the second stage of education is only partially explained by class sizes (R=0.53), which means that different regions provide quite different amount of teaching to their students.

Regional variations in the use of special classes in mainstream schools

No less important than class size, the national allocation for direct costs should reflect student characteristics which strongly influence the costs of providing education. The key of these is related to students with special educational needs. In the Czech Republic, in all regions there are special classes in mainstream basic education. These have to be distinguished from inclusive education, where students with special educational needs attend regular classes together with other students. Special classes in mainstream schools are quite small compared to mainstream classes, and their prevalence across regions varies (see Table 3.4).

The share of special classes in mainstream basic education varies across the regions between 7% and 13%, while the share of students with special educational needs in those classes varies between 4% and 10% (Table 3.4). Since the share of students with special educational needs in the student population is probably quite uniform, this variation almost certainly reflects the different availability of special schools maintained by the regions in different areas of the country, and by differentiated access to and operations of school advisory facilities (inclusive education is not widespread in the Czech Republic and correspondingly the special school sector is quite large, see Chapter 2). To the extent that

Table 3.4. **Proportion of special classes in mainstream schools and average size of special classes, by region**

Region	Share (%) in mainstream schools of:		Class size (no. of students) in mainstream schools of:	
	Special classes	Students of special classes	Mainstream classes	Special classes
Czech Republic	9.2	6.2	20.72	8.03
Prague	10.4	6.4	22.01	8.25
Central Bohemia	7.8	4.8	21.00	7.82
South Bohemia	7.0	4.3	20.61	7.38
Pilsen	9.9	6.5	20.56	7.79
Karlovy Vary	11.0	8.2	20.80	8.76
Usti	13.1	10.1	21.11	9.08
Liberec	11.7	8.2	20.46	7.98
Hradec Kralove	10.5	7.1	20.29	7.73
Pardubice	8.2	5.3	20.47	7.51
Vysocina	7.4	4.9	20.23	7.72
South Moravia	7.7	5.2	20.40	8.13
Olomouc	10.0	6.9	20.31	7.93
Zlin	7.7	4.9	19.89	6.98
Moravia-Silesia	9.0	6.1	20.82	8.03

Source: Provided to the review team by the Ministry of Education, Youth and Sports.

special classes also cater for students from socio-economically disadvantaged groups, this variation may be the result of economic disparities between the regions. Thus we see that average class sizes in basic education are driven not only by the relative degree of rurality, but also by differentiated use of special classes in mainstream schools. In some cases these two factors may influence basic education in opposite directions (for example, with special classes more prevalent in urban schools).

The very simple allocation process used at the national level does not reflect the number of students in special classes, so the documented variation shows that Usti and Karlovy Vary regions are at a distinct disadvantage, compared for example with South Bohemian and Central Bohemian regions. In order to provide support to their SEN students enrolled in special classes in mainstream schools, these regions have to mobilise additional resources.

Regional variations in the number of full-time equivalent teachers per class

We now move to review the impact of the financing system on the volume of education offered to students. This is measured by the number of FTE teachers per class (obtained as the simple division of two indicators analysed above, namely average class size divided by the number of students per FTE teacher). This indicator is quite flexible, because it includes additional teaching time for some groups of students or division of classes into smaller groups for some subjects (such as foreign languages or sports). The value of the indicator comes from the fact that the curriculum is uniform for all basic schools. Table 3.5 provides this indicator, together with its value expressed as the percentage of the national average, again for the first and second stages of basic education.

We note first that the number of full-time equivalent teachers in the first stage of basic education is quite uniform across regions (as noted above, these are aggregated data, so this uniformity does not preclude greater variation at the municipal level). However, variation at the second stage of basic education is much more pronounced, with the difference between Prague and the Karlovy Vary region equal to more than 12% of the national average. Table 3.5

Table 3.5. **Full-time equivalent teachers per class in basic education, by region**

Region	FTE teachers per class			Percentage of the national average		
	1st stage (Years 1 to 5)	2nd stage (Years 6 to 9)	Total (Years 1 to 9)	1st stage (Years 1 to 5)	2nd stage (Years 6 to 9)	Total (Years 1 to 9)
Czech Republic	1.108	1.749	1.353	100.0	100.0	100.0
Prague	1.100	1.886	1.370	99.2	107.8	101.2
Central Bohemia	1.111	1.697	1.326	100.2	97.0	98.0
South Bohemia	1.103	1.739	1.354	99.5	99.4	100.0
Pilsen	1.104	1.700	1.331	99.6	97.2	98.3
Karlovy Vary	1.089	1.671	1.321	98.2	95.5	97.6
Usti	1.089	1.734	1.351	98.2	99.1	99.8
Liberec	1.080	1.729	1.333	97.5	98.8	98.5
Hradec Kralove	1.120	1.747	1.362	101.1	99.9	100.6
Pardubice	1.120	1.730	1.358	101.1	98.9	100.4
Vysocina	1.133	1.745	1.379	102.3	99.8	101.9
South Moravia	1.103	1.783	1.357	99.5	102.0	100.2
Olomouc	1.124	1.743	1.363	101.4	99.7	100.7
Zlin	1.116	1.724	1.354	100.7	98.6	100.0
Moravia-Silesia	1.121	1.765	1.374	101.2	100.9	101.6

Source: Provided to the review team by the Ministry of Education, Youth and Sports.

suggests that schools providing basic education in Prague offer, on average, significantly more teaching than other schools in the country, while Karlovy Vary offers less, which is worrying. If average teaching load of a teacher is equal to 18 lessons per week, we can assess that second stage students in Prague schools receive on average about 3.8 hours of teaching per week more than students of the same age in Karlovy Vary.

On the other hand, if the relative wealth of the region does influence the average number of FTE teachers per class, these indicators for the first and second stages of basic education should be positively correlated (because a richer jurisdiction will tend to provide more funds for Years 1 to 9 of basic education, that is, for both stages). However, they are not correlated with each other, which indicates that there are other causes for this variation. Indeed, in some regions, such as Prague and the South Moravian region, FTE teacher per class for the first stage of basic education is below the national average and for the second stage is above the national average, while in others, such as the Central Bohemian or Pardubice regions, this is the other way round. Therefore, we conclude that more in-depth analysis is required to confirm whether this represents real educational inequities between regions. Such analysis should also include teaching outcomes.

Our final remark regarding Table 3.5 concerns its relation to class sizes and number of students per FTE teacher (Table 3.3). We have already noted that in the first stage of education, class size and students per FTE teacher are very closely correlated, while this correlation decreases markedly for the second stage. In Table 3.5, the coefficient of variation of number of FTE teachers per class is equal to 0.014 in the first stage and to 0.029 – or more than double – in the second stage. This can be interpreted in the following way. While the amount of teaching provided to basic schools is quite uniform across the country (very low coefficient of variation), it is much less uniform in the second stage than in the first stage. Different regions have somewhat different education policies, including the exceptional case of Prague that heavily invests in the second stage of basic education.

Conflict of interest inherent in regional allocation to municipalities

As discussed above, the Czech regions perform a double function in the education finance system. As owners of the secondary schools and special schools, they receive funds for those schools and allocate them to individual schools, although legal regulations heavily constrain their freedom in this process. At the same time, the regions are responsible for the reallocation of the received funds for basic education to municipal basic schools located on their territory, which are managed by the municipality.

This creates a systemic conflict of interests, in that the regions may have the tendency to provide preferential treatment to supporting secondary and special education. Of special interest in this respect are the eight-year and six-year long programmes in *gymnasia*, because the initial four years of the first, and the initial two years of the second, provide teaching to the age groups which typically would attend municipal schools offering basic education.

To clarify this better, recall that the national allocation system for direct costs includes the normative for students aged 6-14, who typically attend municipal schools to follow basic education, and for students aged 15-18, who typically attend secondary schools run by the regions (although there is a higher percentage of private providers at this level – see Chapter 2). The first years of long *gymnasium* programmes are students who are in the age group 6-14 and attend secondary schools: students would leave basic school at the end of Year 5 to join an eight-year programme (i.e. the second stage of basic education) and at the end of Year 7 to join a six-year programme (i.e. ages 13 and 14). Note that the biggest proportion leaving basic schools follow the full second stage of basic education in a *gymnasium* (see Chapter 2). Thus, even if the regions are obliged to maintain strict division of the use of grants received according to different normatives, which does not seem to be the case, they have to split the funds received under the 6-14 normatives between their own and municipal schools. This division of funds is the source of conflict of interests. Moreover, since secondary schools are generally more expensive than basic schools, the regional normative amounts for *gymnasia* are higher than those for basic schools for this age group. In this way *gymnasia* take funds away from municipal schools offering basic education, and this effect is stronger whenever longer programmes in *gymnasia* are opened. It is important to note that the decision to open these long programmes rests with the region.

In Table 3.6, for two Czech regions, we provide comparisons of the regional normative amounts for basic schools, for standard (four-year) *gymnasia*, and for upper and lower age groups for long *gymnasium* programmes. Because for basic schools the per student normative amount depends on the number of students in the schools, we calculate an average normative for students of second stage of basic schools (Years 5 to 8), when there are between 100 and 200 students in the second stage. For verification we also provide the national normative amounts for the relevant age groups.

We note that indeed, both in the Moravian-Silesian region and in the Pilsen region, the regional normative amounts for the first stage of long programmes in *gymnasia* are higher than the average normative amounts for basic schools (average for schools between 100 and 200 students, normative amounts for schools with more students are smaller). The differences in the two regions are quite similar (between 6% and 9%). Although higher allocation for long programmes in *gymnasia* may be based on extended curricula in those schools, and thus may be due to objectively higher per student expenditures, it nevertheless shows that in their allocation procedures the regions need to take into account the differentiated needs of both their own schools and of the schools managed by municipalities. In this respect, at the very

Table 3.6. **Regional normative amounts by school type in the Moravian-Silesian and Pilsen regions**

Region and age group	National normative amount (CZK)	Regional normative amount (CZK)			
		Basic school	*Gymnasium* (4 years)	*Gymnasium* (6 years)	*Gymnasium* (8 years)
Moravia-Silesia					
6 to 14 years	50 423	35 219	x	38 713	37 322
15 to 18 years	58 313	x	41 883	40 910	43 309
Pilsen					
6 to 14 years	50 423	34 745	x	36 894	36 894
15 to 18 years	58 313	x	43 840	42 545	42 545

x: not applicable.

Source: Odbor školství, mládeže a sportu Moravskoslezského kraje (2015), *Krajská metodika rozpisu přímých výdajů právnických osob vykonávajících činnost škol a školských zařízení zřizovaných obcemi a krajem na rok 2015* [*Regional Methodology for Direct Expenditures of Legal Persons Carrying Out Activities of Schools and School Facilities Established by Municipalities and Regions for 2015*], www.msk.cz/-44772.

least annual conversations between the regions and the municipalities about the relative allocation of education funds would be necessary to soften this situation. During the OECD review, no such discussions were mentioned to the review team.

Interestingly, regional normative amounts are significantly smaller than the national normative amounts for respective age groups. The reasons are certainly different for the age groups 6 to 14 and 15 to 18. For the first of these, the saved amounts are used for small schools, in which per student normative is much higher, and for special classes in mainstream schools (additional positions in basic schools, allocated by regions in response to specific requests from the schools themselves). For the second age group, the saved amounts are used for various normative amounts for professional and special education, again higher. In both cases, funds have to be found also for additional education services provided by the region, and for regional reserve.

Excessively complicated regional allocation formulas

The regional allocation systems are excessively complicated, in stark contrast to the national allocation formula. There are two dimensions of this complexity, one related to pre-schools and basic schools, the other to secondary schools.

Pre-schools and basic schools

With respect to pre-schools and basic schools, some regional allocation formulas are based strictly on the number of students in the municipality. Since in most cases there is one basic school there, this really means that the allocation formula is based only on the number of students in that school. In other words, the per student regional normative amount is the result of a specific formula applied to the number of students, using some supporting parameters (such as average salaries of teachers and non-teachers working in pre-schools and in basic schools).

The formulas used to calculate the per student normative amount include quite complicated mathematical functions of the number of students (see Annex 3.2 for two examples). Among these functions are logarithms, fractional powers, and polynomials of third degree of the number of students. These are not advanced calculus functions for mathematicians or statisticians, of course, but it is likely that they cannot be readily

understood by the majority of people without a specialised background, including, it could be argued, the staff of regional or municipal education departments.

The OECD review team notes that the use of such functions for allocation of education funding is quite unique. Whatever the original intention was behind the design of these functions, they have introduced a level of obscurity that effectively prevents those who use them from fully understanding and applying them. In recognition of this fact, the regional ordinances specifying the allocation formulas for pre-schools and for basic schools actually provide very large Excel tables with the calculated values of the relevant regional normative amounts for consecutive natural numbers, for example from 10 to over 600 (the larger the number of students, the smaller the normative per student amount). The provision of these Excel tables, typically containing only the values of the regional normative amounts and not the actual functions used to calculate them, suggests to the OECD review team that the experts who originally proposed the formulas did not expect people to understand or be able to use them. The application of the formula is thus reduced to entering the additional parameters mentioned above (salaries). The OECD review team argues that in this mechanical process, there is no place to assess and respond to the differentiated needs of pre-schools and basic schools, or to take into account such crucial factors as the existence of a special class in mainstream basic schools.

Secondary schools

For secondary education, the complexity is of a quite different nature. Instead of providing very complex formulas based on the number of students, there are simple regional normative amounts for every educational programme provided in the region's schools (see Annex 3.2 for two examples). These include:

- normative amounts for *gymnasia*, separately for regular programme (four years) and for upper and lower years in long programmes (six and eight years)
- normative amounts for various artistic and sport schools
- normative amounts for all professional and vocational profiles offered in the region's schools.

Altogether, the number of normative amounts maintained and used by each region ranges between 300 and 400, depending mainly on the range of professional and vocational profiles offered in the region's schools. Moreover, the regions cannot simply decide on the values of these normative amounts. Instead, national regulation provides a strict and unambiguous methodology to calculate them from year to year, leaving regions very little room for manoeuvre in this respect (see Annex 3.2 for details).

Each school managed by the region will then receive the allocation based on the number of education programmes offered in the school and on the number of students in each programme. For example, a typical *gymnasium* would receive the allocation taking into account the number of students in each of the following six programmes: regular *gymnasium* students, upper and lower stages of six-year long and eight-year long programmes, and sports programme, each number multiplied by the respective normative amount and all summed up. For vocational schools, the number of programmes, of course, may be much larger. Thus, although the actual formula may be quite simple, the complexity arises from the sheer number of educational profiles and corresponding normative amounts.

The OECD review team underlines the need to recognise that using a large number of different normative amounts makes the regional allocation process rather difficult. It is

almost certain that nobody, either in regional offices or in the schools, can remember all these normative amounts, correctly calculate them and then apply them to individual schools. In order to allow regions to perform their duties, the ministry provides regions with software that supports the calculation of the normative amounts (from year to year), and to actually allocate funds to individual schools. This software requires the entry of only basic parameters, such as student numbers for each education programme and the average teacher and non-teacher salary for these programmes (see Annex 3.2). The OECD review team contends that the use of a computer programme reduces further any interest the regional education officials may have in understanding the formula and using it strategically to address differentiated needs of schools.

In both cases, a mechanical application of allocation formulas impedes dialogue about priorities

Thus we see that regional allocation formulas, both for basic and secondary education, are designed in a way which makes their understanding very difficult. Both are very rigid, albeit in quite different ways, and both promote a mechanical application through the use of some computer programmes with the manual entry of some simple parameters.

The main problem with such over complicated formulas is that they prevent discussion and dialogue and do not allow analysis of specific school needs, to prioritise these needs, to discuss these priorities with all education stakeholders and in this way to formulate and implement a regional education strategy. The tough political decisions to prioritise the allocation of limited funds to very different schools facing their unique challenges is replaced with, the OECD review team would argue, the illusion of an objective, impartial methodology. In a fundamental way, this approach makes it very difficult for regions to take real long-term responsibility for the evolution of their school networks.

Furthermore, this approach makes policy discussions with the municipalities (for basic education) and with the school principals (for secondary education) very difficult if not impossible. Instead, all the decisions are taken by a small number of staff, characterised not so much by the deep knowledge of the allocation formula as by the technical capacity to use the appropriate computer tools. In particular, this double system of regional normative amounts, each complex in its own way, makes it almost impossible to assess whether the relative financial treatment of schools managed by regions and schools run by municipalities is fair (see section above).

Of course, it must be recognised that the current approach to regional allocation formulas, with all its consequences, is underpinned by national regulations.

Regional allocation system supports the perpetuation of historical spending patterns

The OECD review team has argued above that the complexity of regional allocation formulas, underpinned in large measure by national regulation, prohibits discussion between education stakeholders and makes adjustments to the evolving needs of schools very difficult. There is, however, one further technical issue with the current regional allocation formulas, which needs to be discussed in detail: they support the perpetuation of historical spending patterns and inhibit changes. In particular, they make it quite difficult to phase out old education programmes, no longer in tune with the expectations of parents and the demands of the labour market, and to phase in new ones, that are more in demand and relevant.

This technical issue concerns how the regional normative amounts for secondary education have to be formulated. These are based on the four main parameters, which need to be assessed for each education programme (for details see Annex 3.A2), namely average salaries of teaching and non-teaching staff and average number of students per FTE teaching and non-teaching staff (for the purposes of this discussion the two other parameters, namely social security and employment contributions and other non-investment expenditure, see Annex 3.A2, are not relevant).

Suppose that from one academic year to another there is no change in either the salaries or the number of staff (teaching and non-teaching) associated with a given education programme (for example, in a vocational programme), but the number of students decreases by a certain percentage. All the parameters remain constant, with the exception of the number of students per FTE staff, which decreases by the same percentage. Since the average number of students per FTE staff in the formula to calculate the normative amount enters in the denominator, and then the resulting amount (the new normative amount) is multiplied by the number of students (enters in the numerator), the two effects of this change in student numbers cancel out and the allocation amount for this education programme remains constant from year to year. In the opposite case, when the number of students increases, the same cancelling out effect ensures the same result – no change in the allocation for that education programme (the calculations supporting this analysis are provided in Annex 3.A2).

This perpetuation effect has a number of consequences. One is that the allocation is not decreased despite the decrease of the student numbers, so the funds for the salaries are maintained and the school has no need to adjust its operations and planning. This provides welcome stability, but reduces any incentive to respond to decreased student numbers. If the decrease is continuing in successive academic years and the school does not want to lay off its staff, the funding becomes much less efficient.

A very opposite effect arises if over time there is a repeated increase in the number of students in a given education programme from year to year. Since the allocation for that programme does not change, the schools will find it ever more difficult to adjust.

Suppose now that the region decides to phase out an outdated vocational programme and replace it with some more in line with the labour market. Typically such a change is done through closure of new enrolment in first year in the old education programme, allowing all students already enrolled to continue and complete their education, and instead enrolling first year students in the new profile. Now unless the school changes the number of staff working for the old education programme, the allocation for that will not be decreased, of course, so that the funds for the new programme will have to be provided over and in addition to the funds for the old programme. The only way to adjust funding is to make employment decisions within the school, that is, to assign some teachers to the new programme and relieve some teachers from the working obligation for the old programme. Thus, somewhat strangely, we deduce that the system of regional normative amounts is as much a per student system as a per teacher system.

Another way of seeing the effects of this very specific regulation of regional normative amounts is to assume that a particular education programme, for example a vocational profile, is offered in only one school in the region, and with the student numbers remaining constant that school decides to employ a new teacher for that programme. This would lead to the decrease of the number of students per teaching staff and a corresponding increase of

the appropriate normative amount. Hence in effect by employing additional staff the school automatically receives additional funding to cover the new salary, even if the number of students does not change. Again, this provides some stability whenever a new teaching or non-teaching position is required in the school, which is helpful, but at the same time the OECD review team notes that the automated nature of the regional calculation of the regional normative amounts means that school employment has to be very strictly controlled by the region. Indeed, if schools were allowed to employ as many teachers as they wanted to, within the available funds for direct costs, simply by employing more staff they would receive an increased allocation form the regional budget, a clearly perverse situation.

Finally, let us assume that a specific education programme is being offered in a few schools, and one of them is allowed to increase the FTE teaching staff for that programme, due for example to the increase of student numbers enrolled. The effect is to increase the regional normative amount for this education programme, which would, therefore, apply to all schools offering that programme. In this way, the decision to employ additional staff in one school leads to an increase in all schools offering that programme, even if in the other schools there is no need for new teachers. Such a flat increase in the regional allocation for all schools offering a given education programme is inefficient.

The discussion above indicates that the Czech education allocation system at the local level is not a truly per student approach, because changes in student numbers or staff numbers in one school can unpredictably affect the allocation for another school. This conclusion is supported by an evaluation of the mathematical form of the formula presented in Annex 3.A2, where we show that in fact student numbers cancel out (except for the other non-investment expenditure parameter).

For non-teaching staff, mismatch between funding allocation responsibility and national regulation

The current division of education finance into direct education costs (state component) and operational costs (local component) does not distinguish between human resources responsible for education services, such as teachers, school leadership, teaching assistants, psychologists, librarians and similar, and technical and operational staff, such as clerical and accounting employees, kitchen staff, cleaners and similar. This has significant consequences, because it may prevent various trade-offs, potentially of great benefit to increase efficiency.

For example, modern heating systems typically require less staff, and more technical maintenance and material input. Investment in the heating system will typically be the role of the municipality (for basic schools) or region (for secondary schools). This means that if the school owner invests in a modern heating system, not only will it incur the investment costs, but it will not be able to use the associated savings (a reduction in labour costs) to cover increased operational costs. Instead, the savings will have to be spent on other salaries, for example of additional teachers.

Complexity of sources of school funds makes it difficult to monitor equity of school finance

In the Czech Republic, there is a large number of different sources of funds for school budgets, especially for basic schools. These include the state budget (coming through the regional budget), additional funding from the regional budget, additional funding from the municipality budget, funds earned by the school, donations and parental contributions.

This makes it very hard to assess the relative role of all these sources of funds in the financing of schools, and thus in particular to assess the overall equity of school finance. A good budget reporting system should clearly identify these different sources of funds.

One specific difficulty concerns the use of the central education grant received by the region. This grant is calculated through the composition of five different national normative amounts and its beneficiaries include all municipalities located within the region as well as all secondary and special schools managed by the region (through quite different formulas). This makes it extremely difficult to account for how the funds are being used and to compare the use of these funds from year to year and between different regions. As shown above, many regional normative amounts are smaller than the national normative amounts. It is difficult to monitor how the funding is allocated, for example, how the remaining funds are used.

A very important variable to assess the equity and efficiency of education finance in the Czech Republic would be how much regional or municipal authorities add to received funds. First, do regions add to received national normative amounts from their own resources, how much, how uniformly across the regions, and if there are variations, which regions add more than others? Or maybe they spend less than they receive on direct costs of their own schools and on transfers to municipalities, and in that case, what do they do with the savings? Of similar interest are any contributions that municipalities make to direct costs of basic schools above the transfers from the regions. Are these contributions dependent on local conditions, such as rurality, prevalence of special classes in mainstream schools, or particular conditions in schools, or are they the result of regional policies? Overall, the present lack of clarity of education finance makes it hard to objectively assess how committed and consistent the municipalities and regions are in their support for education, and to assess the true costs of education. Thus, the system is rather opaque, without comprehensible, accessible information of who contributed and how much to the schools. This lack of clear knowledge of how funds for education are in fact used makes it also difficult to plan any corrections to the current system.

Cautions on the proposed new funding model for students with special educational needs

The new system of financing the needs of students with SEN, presently under discussion in the Czech Republic, is based on a catalogue of specific intervention measures, each associated with a price (fixed assessed costs, to be covered through the new system and spent by the school). The new system is based on the principle of rights of students, with a focus on students with special educational needs, to receive adequate and timely professional support as deemed necessary by pedagogical and psychological professionals. However, it does not include any limitations on the potential claims by the schools for financial support to provide these services. Unfortunately, this rights-based system creates in this way an open liability for the central government, because it places complete trust in the individual decisions to be taken by pedagogical counselling services across the country.

The OECD review team notes that there are perverse incentives inherent in a system with fixed prices. The system divorces the professional responsibility for assessing the needs of students, performed in pedagogical services, from the financial responsibility to provide assistance for their needs. In all cases, the persons providing the services for SEN students will be professional colleagues and collaborators of the specialists assessing students' needs. In some cases, they may even be the same people in both roles. The

system promotes a liberal approach to assessment criteria, because those who assess will not bear the financial consequences of their decisions. Moreover, a fixed price system reduces the incentives to provide joint services to a group of students even in cases where it would make sense (for example, providing teaching to hearing impaired students put together in the same class or school).

One cannot rule out different strategies among counselling services in different regions and cities, in other words that they will apply the nationally mandated criteria more or less strictly. In all pedagogical counselling services, such flexibility to tailor the criteria to the needs of the specific child, and also to the capacities of the parents to help her/him, are very important. Indeed, sometimes also the capacity of the school (such as availability of trained teachers) should be taken into account. However, this flexibility may be beneficial for the child in the therapeutic setting, but at the same time may have significant unintended budgetary consequences.

It is also important to point out that the current estimates of how much the new system will cost are of necessity based on the current numbers of students diagnosed as having special educational needs. However, as mentioned above, the new system will change the incentives inherent in the assessment process, and therefore the numbers may increase very quickly. In recent years this has happened, for example, with the number of students with dyslexia in many countries. This incentive structure is especially relevant because by design the system lacks any instruments for the central authorities to limit diagnosis. Thus, the ministry will be rather helpless in the face of increasing number of assessments, other than the politically and socially difficult path of actually strengthening the assessment criteria, or the even more difficult prospect of decreasing the available treatment. Thus, the current estimates of the number of assessment – and of the associated expenditures – may become completely unrealistic in two to three years. It is especially worrying that the new system is being discussed and implemented purely with pedagogical experts, without any limited practical pilots.

Although the issue of labelling goes beyond the questions of use of resources, it is an important issue whether the new system will increase tendency to label students in schools, especially if they are assessed to need a number of different intervention measures from the catalogue. Indeed, in pedagogical practice labelling a child has both advantages (focusing the education system on the individual needs) and disadvantages (making the child stand out in her/his peer group). So the consequences of the new system should be reviewed also from this perspective.

Absence of public funding to support transportation costs to basic schools

In the Czech Republic there is no legal obligation for schools or local governments to organise and finance transport for students to and from basic schools. In particular, there is no legally defined maximal distance from a student's home to school, for example three or four kilometres, above which appropriate transportation with adequate (and monitored) conditions should be provided. It is most likely justified by a dense network of existing basic schools, providing universal access without the need for transportation. It is simply assumed that the basic schools are – and will remain – located closely enough to where students live.

Nevertheless, it is clear that students live at differing distances from their schools, and that as student numbers decrease and the school network is adjusted, these distances may grow above tolerance levels. With no legal requirement for free student transportation to

schools, there is likewise no need to collect and analyse corresponding statistics, so that the issue is largely hidden from local or national authorities.

At the same time, the unstated but factual assumption that a dense network of basic schools provides universal access to education has far reaching consequences. First, it means that school network optimisation is not considered as a potential solution to problems of small schools. The options for maintaining school efficiency are thus reduced. Second, it may reduce the willingness to monitor education quality and to act on potentially negative findings. Indeed, relative costs of implementing rigorous school improvement plans in a fragmented school network may be prohibitively high, and for small schools such plans may be abandoned. An earlier OECD review (Santiago et al., 2012) had noted, for example, that the follow-up after school inspection needed strengthening, as there was little incentive to improve for even schools identified as "underperforming".

Policy recommendations

Transfer the grants for financing pre-schools and basic schools directly to municipal budgets (not via regions)

The current system of education finance, in which the regions have allocation responsibilities for pre-schools and basic schools, managed by municipalities, is not functioning well. It creates an additional layer of decision making between the state and the municipality, making the proper assessment of the equity and effectiveness of Czech education finance very difficult. It is also highly non-transparent to Czech citizens and Czech authorities at different levels. Therefore, the OECD review team recommends introducing direct transfers for education of every level to those local authorities who are directly responsible for managing and financing that education level.

For pre-schools, this means removing the regions from the financing of pre-school education and introducing grants for direct costs of pre-schools from the national budget to the municipal budgets. The national allocation formula for these grants will most likely be more complicated than the current one, based on one pre-school normative, but hopefully will be infinitely simpler and more transparent than the current formulas for pre-school education adopted and used by the regions.

For basic schools, this means removing the regions from the financing of basic education and introducing grants for direct costs of basic schools from the national budget to municipal budgets. The main difficulty confronting this approach is the extremely small size of the Czech municipalities and the fact that most of them have one school, if any at all. If it is considered that municipalities are too small to manage and finance basic schools, they should be entrusted only to municipalities with extended powers, as is already the case with the number of locally delivered public services in the Czech Republic. In this way not all municipalities will be the recipients of the grant. Again, this will require more complicated formulas than the current one, simply based on one national normative amount, to reflect the variation actually found across the Czech municipalities. Recall, indeed, that the main reason why the present national allocation system may be so simple is that funds are allocated to very large units, the regions, where the mixture of cities and villages allows for a large degree of averaging. Transfers for example to municipalities with extended powers, completely bypassing the regions, will have to use more complex and flexible formulas. Nevertheless, there is no doubt that they can be designed to be far more simple and comprehensible than the current formulas for basic education used by the regions.

However, the main benefit of implementing this recommendation is not just a simplification of allocation formulas to municipalities (or municipalities with extended powers), but clarification of the overall education finance system and providing direct links between the ministry and the municipalities. The ministry needs these direct links, and the necessary policy dialogue they will promote, to better understand the problems of the Czech education system and to better plan its development.

Make the national normative system more flexible

As we have noted, the national allocation system, based on five national normative amounts, is very rigid and does not reflect the complexity and the variation of the Czech education system. Indeed, as we have seen even at the large level of aggregation, namely the regions, many important education indicators exhibit noticeable variation. It is therefore very important to make it more flexible, by increasing the number of parameters for example, to reflect different factors which have impact on class sizes and on per student costs of providing education. Whether these factors should include for example rurality, population density or presence of special classes in mainstream schools, to give just a few examples, is a matter of research and analysis. The OECD review team recommends, nevertheless, to go beyond the pure number of students and to consider other relevant factors in the allocation process.

This will become even more important if the first recommendation formulated above is adopted, namely to provide direct grants for education from the national government to municipal budgets (budgets of municipalities with extended powers) for pre-school and basic education. Indeed, due to the significant variation of class sizes and of costs of many education inputs, the simple voucher-like national formula certainly will not be a workable solution. Thus, some additional flexibility will be required.

In deciding which factors to adopt in the more flexible allocation formula, at least for pre-schools and for basic schools, two considerations must be borne in mind. The first is that these factors need to be objective, that is, they cannot be changed or manipulated by decisions of local governments. For example, the average class size or school size are not objective factors, because they depend on institutional decisions. On the other hand, elevation above the sea level or population density are objective factors, as are whether or not students belong to a national minority, are assessed as having special educational needs, attend a specific vocational profiles and similar. The range of available objective factors which can be used is quite large.

The second important consideration is that the factors used should have real impact on the class size and on the unit costs of providing education. This can only be ascertained through analysis (typically, one uses econometric analysis, especially various forms of regressions, to perform this work). The value of basing the allocation process on results of econometric regressions is that they provide also some initial suggestions regarding the possible values of the parameters.

Nevertheless, parameters cannot be determined solely by econometric analysis, because allocation formulas should always reflect the education priorities and education policies of the governance level which adopts them. Here lies one of the key deficiencies of the current Czech approach to allocation formulas: by making them seem almost automatic, the ministry effectively gives up its responsibility for using financial flows to steer the development of Czech education. Similarly, by hiding the allocation formulas

behind incomprehensible and complicated functions, the regions abandon the goal of actually using the allocation system to satisfy the very differentiated needs of schools. Instead, they mechanically apply the formulas which, arguably, they do not fully understand, and make no attempt to review the consequences of their decisions. The difficult and strategic responsibility for managing very substantial flows of funds for a very important social function – education – is replaced with entering a number of parameters into a computer programme.

In order to adopt proper values for parameters used in the allocation formulas, it is necessary to engage in dialogue with all interested and relevant education stakeholders. For the national level of allocation process, this includes primarily representatives of local governments, of trade unions, and of school principals. Their experience and their expectations should be the mirror in which the ministry views the different allocation scenarios (meaning a proposed formula with a determined set of parameters) and analyses their consequences. For the stakeholders to meaningfully participate in these discussions, it is necessary that for each allocation scenario they are able to review the impact on each region, municipality and if needs be – on each school. In other words, each allocation scenario should come with nation-wide simulations.

By reviewing the results of the simulations, stakeholders together with the ministry experts may decide to use parameters that are different – or even very different – from the initial values suggested through econometric regressions. Indeed, the impact of the formula on the functioning of the whole national education system is a far more important issue than econometric models. Here we see the key to the most constructive use of national allocation formulas: subjecting them to rigorous review, through simulations, to ensure that their impact is consistent with national education policies.

Give regions more flexibility in the allocation formula

Presently, the regions are legally obliged to define and implement a very large number of normative amounts for secondary schools according to a very detailed methodology (see Annex 3.A2 for clarification). In particular, since the methodology for defining regional normative amounts uses historical values (that is values assessed on the basis of data from previous school year) of the number of students per one FTE teaching and non-teaching staff as well as their average salaries, this effectively locks regional schools into maintaining historical, inherited spending patterns. The OECD review team recommends that this legal obligation be either altogether removed or significantly weakened, because it leaves very little room for a flexible budgeting process at the regional level.

By a flexible budgeting process we mean a process of establishing budgets of all secondary and special schools managed by the region, to try to satisfy their different needs within the context of limited available budget funds. In other words, a flexible budgeting process assumes: i) comparative review of the needs of all schools managed by the region; ii) comparison of characteristics of their students (including students with special educational needs, academically outstanding and academically non-motivated students, students engaged in sport and arts activities, immigrant students); iii) comparison of characteristics of their teachers (including new or experienced teachers, needs for in-service training, need for additional positions of pedagogues or psychologists); together with iv) their current and historical budget allocation; v) plans for future development; vi) historical and forecast demographic trends; as well as vii) changing requirements of the regional labour market. Such a review allows regional authorities to determine how their

local school system should develop and what should be the corresponding recurrent allocation for a number of consecutive budget years. The same review, it is worth adding, is necessary to adequately assess the investment needs of schools.

This may sound like a very complex exercise, but it really concerns important management decisions. To give a simple example, given the changing expectations of students, the region must plan which new education programmes to introduce in its schools, and which education programmes to phase out. At an even more fundamental level, which schools should be closed and which should be maintained. Clearly, these strategic long-term plans should influence decisions on recurrent allocations in no lesser way than the present number of students per FTE staff.

Another way to highlight the inflexibility inherent in the current allocative system at the regional level, and to point out possible ways of improving it, is to note that in a typical region the task of the budgeting process is to define budgets of between 30 and 50 secondary schools maintained by that region. Instead of defining the number of budget limits for each school for direct costs, the region is forced to define hundreds of separate normative amounts for each education profile and programme. Even more importantly, the budget of each school is an easily understood amount, comparable to historical costs of the school or to its staffing levels for all categories of school staff. Thus they can be analysed, discussed, and adjusted on the basis of common understanding of key education officials in the region.

In contrast, among the hundreds of regional per student normative amounts many will apply to very small groups of students, so their significance for regional school finance will be relatively small, while a few of the normative amounts, applying to large groups of students, will be the ones which really determine (in statistically significant way) overall allocation. However, few among the region's school administration or school principal would be able to assess which normative falls into which category; instead, they will all be seen as a part of a complex, forbidding machinery, inhibiting any meaningful discussion of the needs of schools. To oversimplify this point, we can say that it is much easier to discuss 50 budget limits of individual schools than 400 separate normatives for individual education programmes.

As a separate degree of inflexibility inherent in the current system, it is important to note that it distinguishes two categories of school staff, teaching staff and non-teaching staff. For both of these categories, actual number of students per FTE staff and average salaries need to be assessed for each education programme in region's schools. This is a lot of administrative effort, requiring collection and review of a lot of data. In fact, in many cases it may be very difficult or even impossible to do, since many teachers and other school staff contribute to the teaching in many education programmes, so there is no sound methodology to allocate parts of FTE staff to different programme. At the same time, this approach dramatically oversimplifies actual employment situation in schools, because there are more than just two distinct categories of school staff. We can mention, apart from teacher conducting classes or conducting practical workshops (these are already quite different groups of school staff), the following: school leadership (principals and deputy principals), school administration (office staff, accountants and similar), support pedagogical staff (psychologists, pedagogues, librarians, curriculum advisors), technical staff (maintenance of equipment and machinery, gardeners, drivers), cleaning staff. Of course, all these categories of staff work in Czech schools, fulfilling their different roles. However, from the point of view of school finance, they are also quite different, in terms of employment

levels or salaries. A flexible budgeting process should recognise this variety and not lump them all into two inflexible categories.

This book is no place to propose specific rules and procedures for a more flexible budgeting process, since it should be developed in close co-operation of education stakeholders in the Czech Republic, taking into account many specific features of overall public budget system (such as budget classification and accounting procedures). But the key recommendation is that the object of the budgeting process should be shifted from an educational programme to the school itself as an institution. At a minimum, this would mean serious reduction of the number of regional normatives (for example, using only one normative for *gymnasia*).

Finally, we note that we started with a strong recommendation to remove the regions from the financing of pre-school and basic education. This will by itself simplify the regional normatives, because this part of the regional allocation formula will not be needed any more.

Introduce a measure to limit liabilities over new SEN funding approach

As we have discussed above, the proposed new system of supporting and financing special needs students is based strongly on human rights approach, but at the same time creates serious risks of unlimited liability of the central budget. It seems very important for the Czech Republic to protect and promote the strong positive elements of the new system while at the same time safeguarding the budget and limiting the future liabilities.

The first simple recommendation in this area is to start implementation very slowly, through a limited, well designed pilot project. A two-year long pilot, for example in two quite distinct regions (such as the capital city and a poor, rural region), would allow the reformers to understand better the impact of the new system on the practices of pedagogical counselling services and on the budget liabilities. Part of the preparation of the pilot will be introduction of temporary new budgeting procedures for SEN students in the pilot regions. Therefore the pilot projects needs to be carefully monitored, and its effects openly and publicly analysed. The pilot would also provide time to review and refine the catalogue of intervention measures, both regarding its content (list of measures) and the price list, as well as the new budgeting procedures. Of course, the pilot project must cover all special needs students in all schools in selected regions, including special schools, special classes in mainstream schools, and individual SEN students in mainstream classes at all levels of education.

A more challenging task would be to design some in-built control mechanisms into the new system. These control mechanisms should give the central authorities some degree of influence over how the system actually works. Such a potential system may include, for example, a new national body, charged with oversight and professional monitoring of the work of the counselling centres. In fact, subsequent to the OECD review visit, a new body has been established (by law): the Revision Centre under the National Institute of Education. This is an appeal body for parents in the case that they disagree with the recommendation given by the counselling centre or school. The OECD review team is advised that this new body has the authority to revise a recommendation and to investigate individual cases. While it is difficult to foresee that such a new institution could challenge or overturn individual assessment decisions of pedagogical professionals across the country, it should have the capacity to review the work of individual counselling centres and to impose on them stricter procedures for assessment and advice to the students and to their parents.

An altogether different approach may consist of a budgetary decision to fix overall funds for the financing of special needs students under the new system. This would mean specifying in the national budget a separate budget category, with fixed budget limits for each region and for the whole country. Such limits could be exceeded only through amendments to the budget laws. In a proper multi-year budgeting framework, it is possible to forecast these limits for a number of coming budget years. Of course, a budget reserve for these expenditures would be needed, but if some regions will need to start using the reserve, it would send very strong message to all experts involved that the system is being financially stretched. Presently, no such warning feedback information system is being planned.

Consider reviewing the division of education finance for staff costs into state and local components

Current education finance system is based on the division of all education expenditures into direct costs (state component) and operating costs (local component). This is a flexible system, clearly aligning managerial responsibilities with financing responsibilities, and it serves the Czech education system well.

The one point in this this system which represents some difficulty and inflexibility regards salaries for school staff. All salaries are included in the direct cost and are paid for from the national budget through grants based on national normatives. However, as argued above, only a part – although a very significant part, typically above 70% – of the school staff is directly involved in teaching, with employment nationally regulated. Indeed, administrative, technical and cleaning staff really corresponds to operating costs of schools and could be included in the local component of education finance.

There are two major benefits of implementing this recommendation. The first is that this will increase the flexibility of education expenditures at the school and municipal or regional level, by allowing school owners to decide on different trade-offs in management of school facilities. This argument has been provided above.

The second, no less relevant benefits concerns education finance efficiency. While teacher salaries are nationally regulated and are rather uniform across the country, salaries of technical staff are much more varied across the regions and municipalities. In the capital city and in richer cities, both the salaries of the technical staff and the own revenues of local governments are higher than in poorer, rural areas. So it makes good sense to allow school owners more flexibility and more autonomy in employment and remuneration of the technical staff. By fully adapting the expenditures on the salaries of the technical staff to local labour market conditions, education finance becomes much more efficient. This is the case both in rich and in poor jurisdiction. In rich municipalities, such as the capital city, allocation for technical staff based on national normatives (national average salaries) may be insufficient, so due to higher local salaries either the number of this staff may be below the optimal, or the selection process to technical positions in schools may be inadequate. In poorer jurisdiction, in contrast, excess national allocation may lead to wasteful expenditures (too many positions, too high salaries compared to local conditions).

Implementation of such a change in the definition of state and local component faces some difficulties. Indeed, since technical school salaries are today covered in national normatives, while technical and maintenance expenditures of school are financed from own revenues of municipalities and regions, simply assigning responsibility of paying technical staff salaries to local governments amounts to an unfunded mandate. What is surely needed

is a reduction of national normatives by a negotiated amount and corresponding increase of other revenues of local governments (for example, local shares in some national taxes) by the same amount. Moreover, the share of technical staff salaries at different stages of education is surely different, so it may be necessary to adopt different reduction rates for each of the national normatives. This course of action may become a difficult political process.

The proposed reform may be somewhat easier to implement if it is conducted together with the overhaul of the national system of normatives, as recommended above to increase flexibility of the national allocation system. In such a more comprehensive reform, there will be more ways and means to adjust overall education finance system in a way satisfying the requirements and concerns of all stakeholders, including different levels of local governments.

Such a division of salary expenditures into the state and local components, based on breaking not only material expenditures, but also salaries into two parts is not typical in the region, but has been successfully implemented in Lithuania and Estonia (Herczyński, 2011; Santiago et al., 2016; Shewbridge et al., 2016). There are good reasons for the Czech Republic to review Lithuanian and Estonian experiences and assess to what extent this is applicable in the Czech context.

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ANNEX 3.A1

Evolution and structure of the national normatives

Table 3.A1.1. **Index of growth in national normative (2005 = 100)**

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
3 to 5 years	100	104	109	111	113	120	109	117	117	118	118
6 to 14 years	100	106	117	121	124	131	129	140	140	141	141
15 to 18 years	100	104	109	113	112	117	115	124	124	125	125
19 to 21 years	100	105	110	113	114	119	115	123	123	125	125
KZÚV	100	100	105	118	120	125	125	133	133	135	135

Note: KZÚV (Krajská zařízení ústavní výchovy – Regional institutional care facilities) comprises students in correctional facilities.
Source: Author calculations based on data in MŠMT (forthcoming), *OECD Review of Policies to Improve the Effectiveness of Resource Use in Schools National Background Report: Czech Republic*, Czech Ministry of Education, Youth and Sports, Prague.

Table 3.A1.2. **Normative amount for each group relative to the normative amount for the 3 to 5 years group, 2005-15**

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
3 to 5 years	100	100	100	100	100	100	100	100	100	100	100
6 to 14 years	107	110	115	116	118	117	128	128	128	129	129
15 to 18 years	140	140	140	142	139	137	148	149	149	149	149
19 to 21 years	120	121	121	121	121	120	127	127	127	127	127
KZÚV	534	515	517	567	567	558	614	610	610	610	610

Note: KZÚV (Krajská zařízení ústavní výchovy – Regional institutional care facilities) comprises students in correctional facilities.
Source: Author calculations based on data in MŠMT (forthcoming), *OECD Review of Policies to Improve the Effectiveness of Resource Use in Schools National Background Report: Czech Republic*, Czech Ministry of Education, Youth and Sports, Prague.

ANNEX 3.A2

Regional allocation formulas for direct costs

We provide a general description of the regional normatives (based on MŠMT, 2005), but due to their complexity for the details we limit ourselves to just two examples from two specific regions: the Moravian-Silesian region (Odbor školství, mládeže a sportu Moravskoslezského kraje, 2015) and the Pilsen region (Odbor školství, mládeže a sportu Plzenskeho kraje, 2015). The specific examples provided are for the fiscal year 2015, although the formulas are not changed from year to year (values of average salaries and of other non-investment expenditure are changed from year to year).

We first discuss the general structure of regional normative amounts (section 3.A2A), then discuss separately normative amounts for pre-school and basic education, that is for pre-schools and schools managed by municipalities (3.A2B), and finally the normative amounts for upper secondary education, that is for schools that are managed by the regions themselves (3.A2C).

In the present discussion we focus on pre-schools, basic and secondary schools. We do not cover other education functions (psychological services, sports activities and similar), which are also financed through the system of regional normative amounts.

3.A2A. General structure of regional normative amounts used in the Czech Republic

The Decision 492/2055 (MŠMT, 2005) of 8 May regarding regional normative amounts sets up the numerical approach to their calculation. Namely, regional normative amounts are based on the following parameters:

- average number of accounting units (students) per pedagogical staff (N_p)
- average number of accounting units per non-pedagogical staff (N_o)
- average monthly salary of pedagogical staff (P_p)
- average monthly salary of non-pedagogical staff (P_p)
- average yearly "other non-investment expenditures" per accounting unit (ONIV)
- legal percentage of salaries for social security and employment contributions (Proc).

With the above parameters, the per student amount is calculated as:

$$\frac{1}{N_p} * P_P * 12 * 1, Proc + \frac{1}{N_o} * P_o * 12 * 1, Proc + ONIV$$

Under this formula, regional differences are taken into account in the following manner:

- Average monthly salaries of pedagogical staff (P_p) and of non-pedagogical staff (P_o) are based on empirical averages assessed separately for each region and for each education profile. Variation of salaries within the region, for example between the regional capital and small villages, are not taken into account.

- "Other non-investment expenditures" (ONIV) include funds for textbooks and other education aids. It is determined separately for each education profile by regional authorities.

- The value of social contributions (Proc) is regulated by national labour legislation (taxes and social contributions related to salaries). In 2015 in the Czech Republic Proc was 35%.

- In each region, different average class sizes in different schools (and education profiles) lead to different numbers of full-time equivalent teaching and non-teaching staff, so also the parameters N_p and N_o are regionally differentiated.

The formula to calculate the per student amount is very important and deserves comment. First, the formula very clearly differentiates between the salary and non-salary components of the allocation. This is in line with the design of the Czech system, under which transfers from the central budget cover salaries and quite minimal non-salary expenditures. Thus, it is not surprising that – for example – with 276 vocational normative amounts in the Moravian-Silesian region, ONIV covers between 0.3% to 5.8% of the allocation. Second, and maybe more importantly, the formula does not distinguish between different groups of students, who may need additional education services. Such potentially relevant groups of students are national minorities (requiring some teaching of additional languages), students with special educational needs in mainstream schools (requiring additional time from teachers), gifted students (provision of in-depth studies or after-school activities). Thus regions cannot use allocation formulas to pursue specific education policies, aimed for example at integrating Roma students into mainstream schools. Finally, we note that the formula leaves very little room for adjustment at the regional level, introducing a systemic inflexibility. There may be many situations when the region may desire to use higher per student normatives than dictated by the formula above, but is unable to, for example, while introducing a new educational profile or to support the development of some successful schools with low student numbers.

It is worth reviewing some consequences of the normative amount determined by the above formula. Let us assume for simplicity that a specific education profile is taught in only one school in the region, and that this school teaches only this profile. If we take the number of students (U), pedagogical staff (S_p) and non-pedagogical staff (S_o) in that school, then

$$N_p = \frac{U}{S_P} \text{ and } N_o = \frac{U}{S_o}$$

Similarly, let W_p, and W_o be the total monthly wages of pedagogical and non-pedagogical staff in that school, then

$$P_p = \frac{W_p}{S_P} \text{ and } P_o = \frac{W_0}{S_o}$$

With this notation, the overall allocation A of direct costs to this school will be equal to

$$A = U * \left(\frac{1}{N_p} * P_P * 12 * 1, Proc + \frac{1}{N_o} * P_o * 12 * 1, Proc + ONIV \right)$$

or, inserting the definitions of the parameters N_p, N_o, P_p, P_o,

$$A = U * \left(\frac{S_p}{U} * \frac{W_p}{S_p} * 12 * 1, Proc + \frac{S_0}{U} * \frac{W_o}{S_o} * 12 * 1, Proc + ONIV \right)$$

and we note that U, S_p and S_o cancel out, we are left with the formula:

$$A = \left(W_p + W_o \right) * 12 * 1, Proc + U * ONIV$$

In other words, the allocation is equal to the total salaries of pedagogical and non-pedagogical staff (for the whole year and with social contributions), plus the amount for teaching aids ONIV multiplied by the number of students U. We thus see that the allocation for salaries does not depend on the number of students at all. This rather curious result shows that Czech education finance system only in some part is a genuine per student allocation system. Allocation to the school does not change when student numbers change (except for the ONIV part), but it will change if salaries paid to school staff change, even if the number of students remains the same.

Of course, this is a simplified example (one school in the region teaching one education profile, with no other school in that region teaching it). Different schools offer overlapping education profiles (most schools offer more than one education profile) and regional normatives of number of students per pedagogical and non-pedagogical staff or of their salaries may be averages of significantly differentiated schools. Nevertheless, we need to note that basing the allocation on actual values of salaries and student-staff ratio, according to a rigidly applied formula, locks it into inherited spending patterns and limits room for innovation. Moreover, since the parameters are calculated in the regions, this approach may also perpetuate regional differences in education spending in the Czech Republic, despite uniform application of national normatives.

3.A2B. Normatives for pre-schools and for basic schools

According to the general definition of the regional per student normatives discussed above, the key to determine allocation to municipal pre-schools and basic schools is how to set the five parameters involved. Of these, only numbers of students per school staff N_p and N_o depend on school and class size. The remaining three parameters, average monthly salaries of pedagogical and non-pedagogical staff and ONIV, may be defined uniformly for all schools in the region.

The following tables provide the values of P_p, P_o and of ONIV for pre-schools and basic schools in the Moravian-Silesian and Pilsen regions in 2015.

Table 3.A2.1. **Values of average teacher and non-teacher salaries and ONIV in the Moravian-Silesian and Pilsen regions**

Index (3 to 5 years = 100)

Education programme	Moravia-Silesia			Pilsen		
	P_p	P_o	ONIV	P_p	P_o	ONIV
Pre-school, full day	23 470	11 370	370	23 340	12 040	346
Pre-school, half day	23 470	11 370	185	23 340	12 040	174
Basic school, only initial years	27 080	12 640	1 355	26 380	12 780	1 177
Full basic school, initial years	27 080	12 640	1 060	26 280	12 780	887
Full basic school, upper years	27 080	12 640	1 060	26 280	12 780	829

These values are set according to national regulations, taking into account relatively small regional differences in salaries. Interestingly, teacher salaries are significantly higher in schools than in pre-schools (by 15% in the Moravian-Silesian region and by 13% in Pilsen), but less so for non-pedagogical salaries. Non-teacher salaries are on average about half the salaries of pedagogical staff. It is also very interesting that other non-investment expenditures (ONIV) are much lower in pre-schools than in basic schools (in both regions). This is probably due to the fact that there are fewer textbooks used in pre-schools (recall that ONIV covers textbooks and teaching materials). Lower ONIV in full basic schools compared to schools with only initial years probably reflects their larger size (and resulting economies of scale).

However, the two parameters setting number of students per pedagogical and non-pedagogical staff, N_p and N_o, clearly depend on school size and have to be adequately determined. The approach chosen is to make both N_p and N_o functions of the number of students (they depend directly only on this number). This approach is justified by the fact that most Czech municipalities manage one basic school, if at all (typically, problems may arise if a municipality manages both a large school and a few small schools, as is the case in many other countries with larger average size of municipality). The functions used to determine N_p and N_o are defined differently in different intervals of student numbers. It is useful to review these functions in some detail.

For full-time pre-schools in the Moravian-Silesian region the following functions defining N_p and N_o are used. In the formulas in Table 3.A2.2, x denotes the number of pre-school students.

Table 3.A2.2. **Number of students per pedagogical and non-pedagogical staff in pre-schools, Moravian-Silesian region**

Number of students x	N_p	N_o
Less than 12	9.42	30
Between 13 and 18	$6.4028 * x^{0.1506}$	$-0.0007 * x^2 + 0.1662 * x + 27.96$
Between 19 and 24	$1.8307 * x^{0.5885}$	$-0.0007 * x^2 + 0.1662 * x + 27.96$
Between 25 and 106	$0.8425 * Ln(x) + 9.185$	$-0.0007 * x^2 + 0.1662 * x + 27.96$
Above 107	13.15	37.71

In the Pilsen region the functions for these parameters for full-time pre-schools take the form as shown in Table 3.A2.3.

Table 3.A2.3. **Number of students per pedagogical and non-pedagogical staff in pre-schools, Pilsen region**

Number of students x	N_p	N_o
Less than 12	9	35
Between 13 and 18	$2.4962 * x^{0.5}$	$-0.0005 * x^2 + 0.1103 * x + 35$
Between 19 and 24	$3.89 * x^{0.355}$	$-0.0005 * x^2 + 0.1103 * x + 35$
Between 25 and 56	$Ln(x) + 8.803$	$-0.0005 * x^2 + 0.1103 * x + 35$
Between 57 and 106	$0.0015 * x + 12.74285$	$-0.0005 * x^2 + 0.1103 * x + 35$
Above 107	$0.0015 * x + 12.74285$	41

These functions are so striking that they require a few comments:

- The functions are exceedingly complicated. The use of logarithms and of fractional powers makes them incomprehensible to most education experts. This means that the formulas are either left unchanged from year to year, or are being adjusted by outside experts.

- The parameters used in the functions are stated with excessive numerical precision, up to five decimal points. In fact, one decimal point, for example 12.7 in place of 12.74285, would be clearly sufficient and would make no difference at all to the allocation of funds for pre-schools. Similarly, fractional powers of the number of students are stated with up to four decimal points, a degree of precision which is obviously unnecessary (rounding the fractional powers to one decimal point would have negligible effect on allocation of funds).

- In recognition of this complexity, the regional authorities provide Excel tables with the values for both N_p and N_o for all relevant possible number of students. It is not assumed that staff working on education finance in the regions would be able to calculate the N_p and N_o on their own. To put this difficulty into perspective, in-built Excel functions allow the calculation of fractional powers $x^{0.355}$, but not without the use of exponentials and logarithms. In practice, this means that very few people working for either the ministry or the regional offices can in fact calculate these parameters, check whether the calculation is correct, or recalculate them if for policy reasons it is decided to change the allocation formula.

- The structure of formulas in the two regions is similar, suggesting a common point of departure, with however different parameters. Also, the functions used in the two regions are very similar. The one important difference is that in the Moravian-Silesian region the number of students per pedagogical staff (coefficient N_p) for pre-schools is capped at 13.15 for large pre-schools, while in the Pilsen region it grows indefinitely as the number of pre-school students x increases. The growth is linear, albeit very slow. The number of students per non-pedagogical staff is capped in both regions, at about 40 (about 2.5 full-time equivalent per one hundred students).

- For pre-schools with 12 students, the formula assumes about 1.3 FTE pedagogical staff and 0.4 FTE non-pedagogical staff. It is very difficult to imagine that this level of staffing is sufficient to run a reasonably good pre-school. On the other hand, for a pre-school with 110 students, the formulas would allocate about 8.5 FTE pedagogical staff and 2.8 FTE non-pedagogical staff.

- Replacing the logarithms and other functions by linear functions for each interval would have negligible impact on the actual allocation, but would greatly simplify the calculations (at the very least, it would make it possible to check that the calculations of regional authorities are arithmetically correct, a task which is now beyond the reach of most education experts in the country). A further simplification may be achieved by reducing the number of intervals used in the tables above.

We now turn to the functions defining N_p and N_o for basic schools. For simplicity we limit ourselves to basic schools with just initial years. Again, we use x to denote the number of students. The definitions used in the Moravian-Silesian region are presented in Table 3.A2.4.

Table 3.A2.5 presents the functions for these parameters for such basic schools used in the Pilsen region.

Table 3.A2.4. **Number of students per pedagogical and non-pedagogical staff in basic schools, Moravian-Silesian region**

Number of students x	N_p	N_o
Less than 9	7.49	18
Between 10 and 25	4.25 * Ln(x) - 2,3	-0.0009 * x^2 + 0.4065 * x + 14.2
Between 26 and 109	2.38 * Ln(x) + 3.627	-0.0009 * x^2 + 0.4065 * x + 14.2
Above 110	4.6 * Ln(x) – 6.8286	47.82

Table 3.A2.5. **Number of students per pedagogical and non-pedagogical staff in basic schools, Pilsen region**

Number of students x	N_p	N_o
Less than 9	7.57	21.56
Between 10 and 15	4.83 * Ln(x) – 3.5	-0.00628 * x^2 + 0.5855 * x + 16.447
Between 16 and 21	3.95 * Ln(x * 0.51) + 1.3	-0.00628 * x^2 + 0.5855 * x + 16.447
Between 22 and 44	2.98 * Ln(x * 0.86) + 2	-0.00628 * x^2 + 0.5855 * x + 16.447
Between 45 and 99	0.04 * x + 11.14	-0.00628 * x^2 + 0.5855 * x + 16.447
Above 100	15.20	48.2

Again, similar to pre-schools, we note that the structure of these functions in the two regions is very similar. The main difference is that in the Moravian-Silesian region, the number of students per pedagogical staff grows indefinitely as the number of students grows, while in the Pilsen region it stops at the value of 15.2 for large schools (interestingly, this is the reverse of what we have observed for pre-schools, for which the formulas used in the Pilsen region are not capped). On the other hand, the Pilsen region formulas introduce an additional and unnecessary level of complexity by using logarithms not just of the number of students, but also of a fraction of this number (according to the standard product rule of logarithm: Ln[x*0.51] = Ln[x] – 0.673).

The functions for full basic schools in both regions are similar to formulas for basic schools with just initial years, though slightly more cumbersome to present, because the intervals in which N_p and N_o are defined by different functions are not only different in the two regions, but also different for N_p and for N_o. Nevertheless, the reader has by now understood how these regional allocation formulas are defined.

All the comments made above with respect to pre-school formulas apply equally to formulas for basic schools. Let us just reiterate that the level of complexity of these formulas far exceeds what is required for careful and equitable allocation of funds for direct costs for pre-schools and for basic schools. At the same time, it prevents their verification or adjustment. The use of such complex formulas does not serve any useful purpose for Czech education.

3.A2C. Normatives for secondary schools

Certainly, the regional normative amounts for secondary schools are much simpler than the normative amounts for basic schools, because they do not depend on the school size (no need to define complex functions which determine N_p and for N_o). However, the law requires that they be defined separately for each education profile (*gymnasium* profile or vocational and professional profile) offered in schools managed by the regions. For example, for general academic secondary schools (*gymnasium*) the following five education programmes are defined: standard four-year programme; lower and upper years in six-year

long programme; lower and upper years in eight-year long programme; programme teaching in a foreign language; and sports programme. Depending on the region, the need to provide a normative for each educational programme may require the determination, every year, of between 200 and 400 normative amounts.

The determination of all parameters for each programme is a major bureaucratic task. As for pre-schools and basic schools, the normative amounts are defined using the five parameters discussed above in section 3.A2A, namely average salaries of pedagogical and non-pedagogical staff (P_p and P_o), average number of students per pedagogical staff and non-pedagogical staff (N_p and N_o), and yearly per student "other non-investment expenditures" (ONIV). Thus, for example, to establish the number of students per FTE staff (N_o) requires not only the identification of how many students attend that particular profile in the region's schools (which should be easy), but also the identification of how many FTE teachers are involved (more complex task) and also how many FTE non-teaching pedagogical staff, such as psychologists and pedagogues, is assigned to the profile (this is in practice very difficult to do). Analogously, to determine N_o for each profile requires assigning a share of all technical staff (such as school cleaners or kitchen staff) to that profile. The same needs to be done with their salaries.

Interestingly, the distribution of these five parameters among the education profiles is quite different. We provide, as an example, this analysis for the Moravian-Silesian region in 2015 (see Tables 3.A2.6, 3.A2.7, 3.A2.8 and 3.A2.8). The regional system of normative amounts includes 222 profiles (excluding special schools). We may observe that:

- Average salaries are dictated by national regulations, and there is some link between the salaries of pedagogical and non-pedagogical staff. For almost all profiles (more than 89%), the average salary of pedagogical staff and of non-pedagogical staff (P_p and P_o), assume one of three pairs of values: $P_p=24.84$ and $P_o=14.77$; $P_p=26.67$ and $P_o=14.77$; or $P_p=26.81$ and $P_o=13.42$ (in thousand CZK).
- Number of students per pedagogical staff (N_p) is based on empirical values for each profile. Most of the values of this parameter appear in the regional table only once.
- However, the number of students per non-pedagogical staff (N_o) is based on some policy recommendations. For most educational profiles (more than 95%) this parameter has one of the following four values: 39.77; 53.1; 54.1; or 70.9.
- Similarly, the values of ONIV are based on the policy perspective. For almost all profiles (more than 96%), ONIV is either CZK 325 or CZK 650.

The following tables provide the distribution of different values of all five parameters for the 222 education profiles used in the Moravian-Silesian region.

Table 3.A2.6. **Distribution of average pedagogical and non-pedagogical salaries by education profile in secondary schools, Moravian-Silesian region**

Value of P_p (CZK)	Value of P_o (CZK)	Number of profiles
24 840	14 770	71
26 670	14 770	72
26 810	13 420	11
26 999	14 410	3
27 050	13 940	10
	14 410	55
Total		222

Table 3.A2.7. **Distribution of number of students per pedagogical staff by education profile in secondary schools, Moravian-Silesian region**

Value of N_p	Number of profiles
Between 5 and 10	22
Between 10 and 15	82
Between 15 and 20	50
Between 20 and 25	33
Between 25 and 30	14
Between 30 and 35	10
Between 35 and 40	5
More than 40	6
Total	222

Table 3.A2.8. **Distribution of number of students per non-pedagogical staff by education profile in secondary schools, Moravian-Silesian region**

Value of N_0	Number of profiles
19.23	6
37	3
39.77	46
53.1	24
54.1	70
70.9	71
More than 71	2
Total	222

Table 3.A2.9. **Distribution of ONIV by education profile in secondary schools, Moravian-Silesian region**

Value of ONIV (CZK)	Number of profiles
325	143
650	72
685	3
1 060	4
Total	222

As a result, the distribution of secondary school normative amounts by education programme (profile) has a clear bipolar character, as illustrated in Figure 3.A2.1.

We note that two normative amounts have particularly high frequency: between 25 and 30 thousand CZK and between 40 and 45 thousand CZK. The first comprises mainly different vocational and technical programmes, while the second comprises almost all *gymnasia* and profiled *lyceum* programmes, as well as some more advanced professional programmes. The different financial treatment of vocational and general academic education profiles is the reason for bipolar distribution noticed in the graph above. Significantly higher allocation for *lyceum* and *gymnasium* programmes is an important element of education policy, hidden in the hundreds of individual per student normatives.

Figure 3.A2.1. **Histogram of per student normatives by education profile
in secondary schools, Moravian-Silesian region**

No. of education profiles

Per student normative amount in CZK