A COMPARATIVE STUDY OF TEACHER´S SALARY FORMULA METHODS, CASE OF REGIONAL SCHOOL FUNDING

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ABSTRACT:
To assure equity in allocation of the funds for teacher´s salary is a part of national budgeting policy that aims at providing a quality and sustainable education. Last decade, many countries have undergone structural changes in the salary funding allocation. Mostly, the changes in funding formulas are a part of an overall educational reform. Regional school budgeting is a complex of methods that are supposed to sustain, develop and react on the social and economic changes. The paper analyses and compares the school budgeting formulas used for allocation the public funds for pedagogical and non-pedagogical staff of the secondary schools in the Czech Republic. A bundle of methods was exploited based on standard search of the relevant data and literature followed by empirical method of interviewing, consequently, the analysis of the financial flows followed in order to pursue the comparison and proceed calculations executed through the use of deductive methods. It compares the funds received by a chosen group of secondary schools based on the former and the newly established school funding policy. In order to proceed the comparison a representative survey sample of selected schools had to be compiled. The present paper is supposed to be the first applied research that gives a comprehensive analysis and comparison of funding methods on the homogeneous group of schools in the determined region. It presents the real and actual data and own calculations necessary for further evaluation. It reveals the main drawbacks and allows to evaluate the efficacy of present budgeting.

Key-Words: Funding, budgets, educational policy, salary, school

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INTRODUCTION:

Public school systems have limited resources with which they try to achieve their objectives. The overall budget level of school funding to provide a high quality education for everyone matters, but the proper allocation strategies are likely to be more important. The mechanisms through which school funding is governed, distributed and monitored play a key role in ensuring that resources are evenly directed to where they can make the most difference.

As per International Student Assessment research: „Among the countries with higher overall levels of school funding, there is no observed relationship between cumulative spending per student and student´s performance". What matters more is not the aggregate level of expenditure, but rather the design of educational policies and the mechanisms through which funds are allocated (OECD, 2017b). Whereas even in countries where the overall level of funding for schools is comparatively high, there may be underinvestment in certain parts of the school system, which can result in serious educational inequalities (Yilmaz & Jafarova, 2019). Thus when talking about school funding it would be a mistake to focus merely on either budget increase or cost savings. The thing is to implement the strategies to achieve greater efficiency in a school funding system that would go in line with a focus on improving quality and equity. Various educational funding policies aim at reshaping the organisational structures and changing institutional habits in school systems. In general, it takes time to accept the changes and consequently to develop and implement carefully (Suleymanov, 2020).

In the Czech Republic, there is a number of different sources of funds for school budgets, depending also on the type of school and level of education. These include the state budget (coming through the regional budget), additional funding from the regional budget, additional funding from the municipality budget (especially for basic schools), funds earned by the school itself, donations and parental contributions. Since January 2020, the new mechanism used for the distribution of the assigned funds for funding Czech public schools from the state budget has been introduced. The newly introduced so called school funding reform focuses on the setting of the main part of the assigned funds intended for educational work that include mostly salaries of teachers. It derives from the amount of financial means for tariff salaries in the given school and additional per capita amounts per teachers. The Ministry of Education, Youth and Sports (MEYS) states that the new method allows taking into account the real needs of the schools better than the previous formula funding per pupil. It is applied in nursery, basic and upper secondary schools and conservatoires.

The resources for individual schools are directly set by the MEYS, the regional authorities have only a limited power. Ministry sets the new calculation formula based on a combination of cost and performance financing and declares the funds provided to each school to be more predictable (MEYS, 2019). The reform is connected with an increase in the total amount of resources for public education sector from the state budget. The budget of current expenses for schools and school facilities established by municipalities and regions for 2020 is of about 12,1 % higher than that approved for 2019. The first year running on new funding rules is over and it provides space for evaluating the recent impacts and comparing the effects. The present paper is supposed to be the first applied research that gives a comprehensive analysis and comparison of both funding methods on the homogeneous group of selected secondary schools in the determined region in the Czech Republic. It presents the real and actual data and own calculations necessary for further evaluation.

The studies on formula funding of schools (Bischoff, 2009, Levacic, 2008, Levacic and Downes, 2004, Ross and Levacic, 2000) provide a straightforward categorisation of the different variables (e.g. pupil number, socio-economic background of pupils) and coefficients (i.e. the cash amounts which multiply the variables to determine funding allocation). Policy measures and goals regarding the school funding, allocation models that are aligned to a school system's governance structures, linking budget planning procedures at different levels are described in the OECD Review (OECD, 2017). Education and Training Monitor 2019 published by European commission (EU, 2019) includes twenty-eight individual country reports, main education and training indicators that discus measures to modernise education provided the principles of effectivity and equity

OBJECTIVES OF THE STUDY

This report gives the comparison of the funding models and compares the funds received by chosen group of secondary schools based on the former and the newly established school funding policy in the Czech Republic. It provides a comprehensive explanation and comparison of the changes in funding the secondary schools that have taken place. The key assumption is based on the idea of the equity of salaries for educational staff at the similar types of school. Fair and equal salaries stand for the equity and stability to provide education on the regional level taking into account different size and location of the school units. A particular attention will be paid to funding for teaching costs as this item serve the research for carrying out the crucial analysis. The outcomes will be compared and analysed consequently.

The analysis based on the comparison resulting from the own calculation will allow to pursue the main objective of the presented study: to make recommendation on the appropriate flexible budgeting process of the secondary schools. To what extend can the new calculation method change the allocation of funds? Do these elements cover the initial assumptions for the flexible budgeting process? These starting points and questions refer to the construction of hypothesis set for the present research: (1) The real effects of establishing Phmax calculation formula demonstrates in higher financial flows in case of smaller schools. (2) The calculation method cannot assure the flexible budgeting.

The present paper will firstly provide basic facts of school funding in the Czech Republic, consequently will explain both former and current central funding formulas used to allocate funding for teaching costs to be able to present a comprehensive analysis of the data concerning both methods. Finally, the results will be discussed and evaluated.

METHODS AND DATA

A complex of theoretical methods has been used as the basis of the research. The methods for presented study were chosen as follows: At the beginning it a was a standard internet search on the official web site of the MEYS and educational department of the Zlín Regional office in order to gain all necessary information on the changes in school funding mainly on the calculation formulas. The following empirical method of interviewing the staff of regional department has been used as well. For comparative study the data were observed, obtained and downloaded from the official annual reports of the concerned schools. The references for theoretical framework were outsourced in the key publications by Levacic (Levacic, 1998), Levacic and Downes (Levacic and Downes, 2004) with a view to build up own concept of flexible budgeting. Collaterally Consequently, the analysis of the financial flows followed. The use of comparative methods was realised on the own calculations executed through the use of described formulas.

The selection of school units whose financial flows were analysed was executed on the following limits: among seven tens of regional secondary schools (of which 16 gymnasia) 8 of them were chosen to form an appropriate group suitable for presented research - a representative group of schools, homogenous from the functional point of view, located in different areas of the Zlín region and of a different size as far as the number of students is concerned. The vocational schools where the number of programmes is respectively much larger and difficult to detect correctly must have been excluded from the presented research.

Only the secondary grammar schools „Gymnázium“ are included in the presented research. It was necessary to exclude the multidisciplinary schools or the religious schools (for example Gymnázium and Industrial school, Gymnázium and Commercial school). Anyhow the data calculation of the funding on per student normative basket formula allocation it was necessary to take into account the number of students in each of the following six programmes that typical gymnasium offers: 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. Table No1 presents the list of selected schools and number of students.

Table No 1: list of the schools analysed in the present research

	school	number of students (2020)
1.	Gymnázium Uherské Hradiště	939
2.	Gymnázium Zlín - Lesní čtvrť	920
3.	Gymnázium a Jazyková škola s právem státní jazykové zkoušk	703
4.	Gymnázium Kroměříž	539
5.	Gymnázium J.A.Komenského Uherský Brod	466
7.	Gymnázium Františka Palackého Valašské Meziříčí	405
8.	Gymnázium Ladislava Jaroše Holešov	387

Source: own processing, based on annual reports of the schools

As a matter of fact, the research applies to relatively small group of school entities. Nevertheless, the selected group is an easily understood and homogenous sample that could manifest the effect of the changes. The comparative analysis will show if and on what scale do the changes in financial flows manifest. The comparative analysis will be conducted for two periods of time. The former 2015-2019 will simulate the theoretical financial flows distributed to each school according the principles of student basket formula the latter 2020-2021 will show the flows calculated on Phmax principal. A particular attention will be paid to funding for teaching costs as this item serve the research for carrying out the crucial analysis. The outcomes will be compared and analysed consequently.

The budgeting analysis can be executed from different points of view. For that reason, the funds intended for salaries of pedagogical staff seem to be the most relevant items to be analysed and compared. In the presented research a special attention will be paid to the construction of the former and current school budget formulas that determine the redeployment of the funds that are intended to cover salaries of educational staff at secondary schools in the Czech Republic.

BASIC FACTS OF SCHOOL FUNDING IN THE CZECH REPUBLIC

Education funding in the Czech Republic is decentralised. The central government budget is the main source of funding for public education in the Czech Republic including both central (state) budget and local funding. Local governments are responsible for various levels of education. Municipalities manage and finance basic schools, while regions manage and finance secondary schools, both general academic and vocational. Local governments play an important role in case of secondary schools both in assuring the funding and influencing the distribution and use of school resources. Common rules of funding secondary education in the Czech Republic have undergone particular changes over last 5 years. In this period of time, there are two major points to emphasize as far as the cash flows are concerned. These changes include in the first place the total raise of volumes and secondly structural changes. The new school funding reform was enacted in 2019 and introduced in 2020, setting up new formula funding scheme model of financing schools. In order to compare the two mechanisms, it is necessary to understand the expenditures of schools.

All non-investment education expenditures of schools and education institutions in the Czech Republic are divided into two categories: the direct costs and the operational costs. Direct costs come from the central budget, and operational costs are covered from the local budgets. Costs regulated by the state are direct costs and include primarily salaries for teachers and non-teaching staff, textbooks, teaching aids, further professional development of teachers and other expenditures resulting from labour laws. In this way the state takes responsibility for the financing of those educational functions, which are centrally regulated. The operational costs of schools include maintenance of schools, energy expenditures, communal services, small repairs. Operational costs of schools are financed from regional revenues; they are not included in national or regional normative. The regions receive an education grant from the central budget to finance the secondary schools under its managerial control and allocate these funds to individual schools. Regions being the founders of the secondary school are responsible for these operational costs.

SCHOOL BUDGETING

Theoretical framework

By a flexible budgeting process, we mean a process of establishing budgets of all secondary schools managed by the region. Through the budget formulas the authorities try to satisfy the different needs of schools within the context of limited available budget funds.

Funding schools by formula is quite commonly used method to determine school budgets. Previously the budgeting was based on a very simple formula assuming that the amount receive by schools is based on the previous year and adjusted by a small percentage typically upwards (cf. Jones, 1996). In Europe, in the early 2000s 13 countries employed formula based school funding regimes along with significant financial delegation to schools (Levacic, 2008b). Since that time the formula funding regimes have changed substantially by being extended and in many cases becoming more complicated. Nevertheless, there are some clear trends in how formulas are constructed: countries are moving away from simple, pupil number-based formulas towards taking into account differences in learning needs of students, varying curriculum goals of education programmes, and different cost of schools sites (cf. Levacic and Ross, 2000).

Levacic states that formula funding for schools is a mathematical formula which "contains a number of variables (items such as number of pupils in each grade, area of school, poverty […]), each of which has attached to it a cash amount" (Levacic, 2008b, p. 206). Caldwell gives another formulation of formula funding as: "an agreed set of criteria for allocating resources to schools which are impartially applied to each school" (Caldwell et al., 1999, p. 9). In compliance with the first formulation of the definition, formula funding can be applied to more centralised education systems as well; the key is the mechanism of allocation rather than how the money is spent. It excludes formula funding schemes between different levels of government. The impact of formulas on incentives and school finances can be clearly distinguished from other allocation mechanisms whereas this is not the case when redistribution by formula takes place between different levels of government. It also excludes the question of how the total education budget is determined and focuses on the distribution of available public money (Fazekas, 2012).

There are four main groups of variables used in school funding formula in OECD countries (Levacic and Downes, 2004):

(1) basic, student number and grade level-based,

(2) needs-based,

(3) curriculum or educational programme based,

(4) school characteristics-based.

Each of these may serve different policy goals:

(1) Most formulas allocate funds to schools mainly on a student number basis (equivalent number of enrolled pupils at each grade level or number of courses thought which is adjusted according to grade or age level to correct).

(2) Needs-based variables are included in school funding formulas in order to take into account the additional resource needs of teaching pupils with learning disabilities or who come from disadvantaged socio-economic backgrounds. The additional resources are meant to provide further help for such pupils by offering them, for example, additional teaching time, specialised learning material, and smaller classes.

(3) Curriculum or education programme-based variables acknowledge the different resource implications of enhanced and specific education programmes such as music, languages or sports education. Higher costs can arise from additional courses, more expensive teaching materials, higher salaries for specialist teachers.

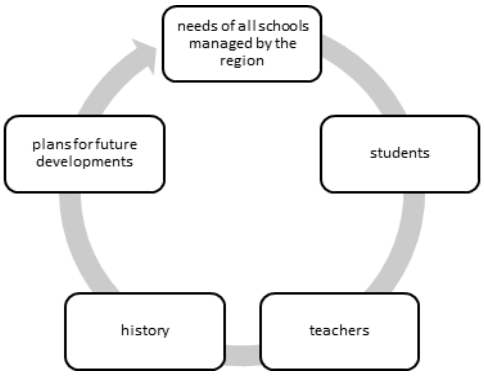
(4) School characteristics-based variables reflect the cost differentials arising from the size of the school, the relative isolation of the school's community, physical aspects of the school premises, and local price levels. School size substantively changes the per pupil costs of education: small schools are typically costlier per student than larger ones. Isolated and rural communities tend to incur higher

After fixing the variables and used indicators the formulas count on with the coefficients attached to each indicator. The use of school funding formulas surely depends on the characteristics of the wider policy environment, the autonomy of schools to manage the allocated funds. Even after fixing the variables and indicators for the calculation the difficult question remains: what monetary values or coefficients to attach to each indicator. costs due to extra autonomy of travelling expenses.

Suggested principles of flexible budgeting

Based on the above mentioned assumptions the following chart No 1 assumes own proposal of flexible budgeting process.

Chart No 1: Flexible budgeting process



Source: own processing

The flexible budgeting process enables to establish a flexible funding mechanism of the secondary schools managed by the region to satisfy their different needs within the context of limited available budget funds. It includes:

- a comparative review of the needs of all schools managed by the region
- 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
- comparison of characteristics of their teachers (including new or experienced teachers, needs for in-service training, need for additional positions of pedagogues or psychologists)
- their current and historical budget allocation
- plans for future development including forecast demographic trends and changing requirements of the regional labour market

Allocating formulas

Before the explanation of both former and current financing system in the Czech Republic it is important to briefly present the basic facts of school funding in the Czech Republic. As it will be explained in following chapter the student basket allocation formula is a complex calculation with many variables.

Former system to allocate public funding to schools - the funding principle based on the standardised "student basket" formula¨

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. The allocation of central funds for direct costs in education used to be designed through a system of per student normative amounts. This system was in operation since 2001 and covered 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 secondary schools managed by the region itself. The allocation system based on per student normative amounts was simple at the national level, with just five age-based normative amounts, and at the same time extremely complex at the regional level. For secondary education there were regional normative amounts for every educational programme provided in the region's schools. 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.

Each school managed by the region received the allocation based on the number of education programmes offered in the school and on the number of students in each programme. This was the case of gymnasia that were allocated by the student basket only through the formula given as a fixed amount in each budget year. Other decisions made by the schools were not affected directly by any single component of the formula or method of calculation. The key component and essential determinant of the system was the number of students officially attending the school. At this point it is necessary to underline that using a large number of different normative amounts made the regional allocation process rather difficult.

Teaching costs were funded from the central government budget in the form of a specific formula grant, namely the "student basket" scheme. based on the so called normative per unit of effort. This scheme was elaborated and introduced as the core of the education finance for each school by the

The key elements of this calculation are the number of students taught in the school unit, salary regulation and the coefficient that can be interpreted as the major determinant of funding is the number of students in the school. The amount needed to cover teacher and other staff salaries per a school unit was calculated on the base of the average salary for 12 months. This amount forms the core of the student basket. This was given as a fixed amount of annual salary limit (SL) for a school unit in each budget year counted on the principle of the formula that took into consideration number of teaching (NTS) and non-teaching staff (NNTS) multiplied by the average salary of teaching (AST) and non-teaching staff (ASNT):

$$SL = 12 \times (NTS \times AST + NNTS \times ASNT)$$

The grant is calculated as a fixed per-student amount. NTS and NNTS were given by a performance – coefficient ratio that calculated with a given number of students in total per a school unit (P) and coefficients for the teaching (CftT) respectively non-teaching staff (CftNT):

$$NTS = P/CftT \qquad NTS = P/CftNT$$

As already mentioned the key component of the system that was crucial was the number of students officially attending the school. Other decisions made by the schools were not affected directly by any single component of the formula or the method of calculation, only through the amount of the student basket. This is given as a fixed amount in each budget year and the budget or other decisions made by the municipalities or schools were not affected directly. The CftT / CFtNT, AST / ASNT were revised or updated annually. See table No 2:

Table No 2: overview on the annual growth of average salary AST, ASNT in CZK

	2015	2016	2017	2018	2019
AST	24 550	26 080	28 170	31 507	36 841
ASNT	14 617	15 527	16 119	18 875	20 812
annual growth AST (%)		106%	108%	112%	117%
annual growth ASNT (%)		106%	104%	117%	110%

Source: Region of Zlín, Department of Education

Once the amount of the student basket was approved, total expenditures could not increase unpredictably within the fiscal year. The amount of the student basket for each school unit was set every budgetary year by the central government.

Apparently, the higher the share of teachers with more years of experience or belonging to a higher qualification category, the larger the actual salary expenses are in the school. In the short term schools had only limited influence over this factor. As a matter of fact, the total funding for a school was determined not on the basis of raw enrolment figures but the number of equivalent students, i.e. a weighted sum of students.

In response to this criticism, the ministry elaborated a radical reform, aiming at a complete change of the system of financing the education. The goals settled by the MEYS are declared as follow:

(1) To allocate funds in a transparent and predictable way

(2) To establish a more equitable system of allocating resources

The idea behind this is to acknowledge the legitimately higher costs of smaller schools which have lower enrolment rates due to their rural location. The following part will present an overview of the new system of redistribution of funds for the secondary schools which principles will be presented in the following chapter. In order to compensate the additional incurred costs or the losses caused by the decrease of the number of students the local governments were forced to use several methods to balance the school budgets or to increase school resources. Resourcing this way was not systematic, transparent and presented uncertain financial resources not convenient on the long term.

The data on which the research is based can be completed by the comments of educational department staff: "In order to allow regions to perform their duties, the ministry provided us (regions) with software that supported the calculation of the normative amounts (from year to year), and to actually allocate funds to individual schools. For each individual school it was difficult, even impossible to control the calculation and if the funding was done correctly." This fact means that the computerisation and mechanical application of the rigid calculation done by a special computer programme reduced understanding the formula and using it strategically to address differentiated needs of schools.

Another fact important to emphasize is that due to the existence of different programmes at gymnasia (upper and lower stages of six-year long and eight-year long programmes) in many cases it may be very difficult or even impossible to distribute the funds correctly according to the method as many teachers and other school staff contribute to the teaching in the education programmes on a different scale. there is no sound methodology to allocate parts of FTE staff to different programme.

At the same time, this approach oversimplifies actual employment situation at schools, because there are more than just two distinct categories of school staff: apart from teacher conducting classes or conducting practical training, 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.

New system of funding "Reform 2020"

The formula should essentially ensure horizontal equity of funding across schools. In order to ensure the equitable system, the new funding approach includes the elements that takes into account school size, by means of weighting factors. They are supposed to increase proportionally with the real teaching costs and are inversely proportional to school size, acknowledging higher per student costs when class size is smaller. These coefficients can be derived from the basic formula for the student basket by substituting higher values for students' weekly school hours, determined by the curricula for each school year and lower expected class sizes for small rural schools. As administration costs are included in the formula proportional to the required spending on teacher salaries, higher coefficients for smaller schools do also account for higher administration spending due to fixed costs to some extent. Unlike the previous student basket calculated basically on a performance – coefficient ratio and an average salary of the teaching staff the introduced formula called Phmax is supposed to express the maximum of teaching lessons per one class. The calculation is adjusted for each field of education and organisation of the classes. As for secondary grammar school there are two types of educational levels lower-secondary and upper-secondary education. Consequently, the level of Phmax differs.

Calculation method of Phmax enables to cover and adjust different components of the salary - compulsory components of extra – pay salary for management, educational advisory services. By the 2020 reform the MEYS aims at fulfilling one of the strategic goals which is to make the education on primary and secondary level more efficient, to eliminate the discrepancies and disparities of each individual school unit as far as the evaluation of the teachers is concerned.

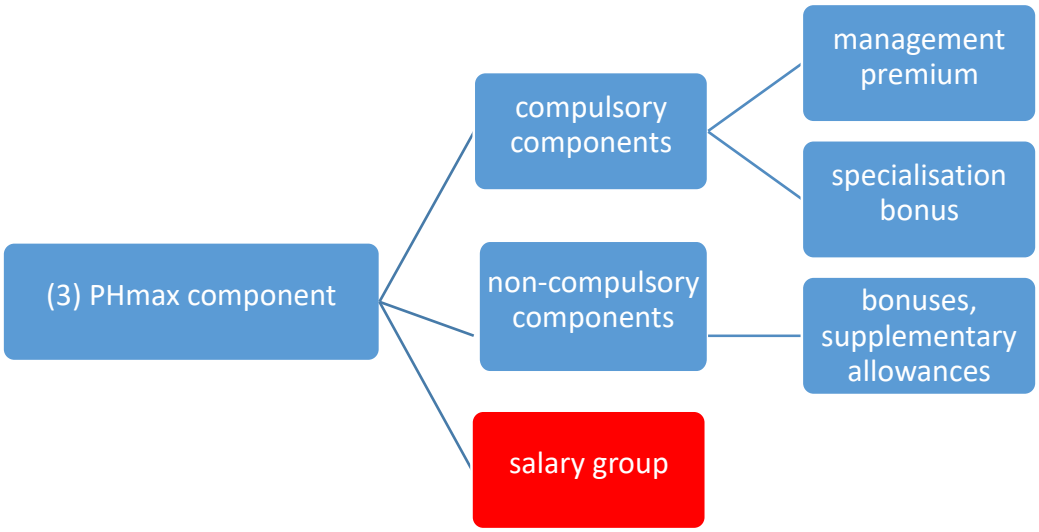
By establishing a new calculation formula, the MEYS sets the rules for making the funding more flexible going beyond the pure number of students and considering other relevant factors in the allocation process by increasing the number of parameters that would reflect different factors to add some more flexibility in funding scheme as the allocation formulas should always reflect the education priorities and education policies of the governance level which adopts them. Unlike the student basket former calculation, the Phmax formula allows to take into account the groups and grades of particular educational establishments, specialisation bonus for educational advisory services or methodologists for forecasting and preventing major educational and formative problems. Other surcharges and bonuses are individual and depend on headmaster´s choice. Unlike the student basket former calculation, the Phmax formula allows to take into account the groups and grades of particular educational establishments.

Specialisation bonus for educational advisory services or methodologists for forecasting and preventing major educational and formative problems. Other surcharges and bonuses are individual and depend on headmaster´s choice.

Teacher´s salary scale and it´s components.

To make the overview complete it is useful to provide information on teacher´s salary scale and it´s components. Salary scale is settled by government regulation. More aspects are taken into account: salary groups, compulsory and non-compulsory components. Chart No 2 gives a description of components included in Phmax calculation.

Chart No 2: description of components of Phmax calculation



Source: Own processing

The chart is supposed to reveal the components of the teacher´s salary that hasn´t changed since the introduction of the Phmax formula. Through Phmax it is possible to consider salary groups and other individual components. As far as the salary groups are concerned following table shows the differences between the groups.

Table No 3: Development of salary grades of teaching staff and the differences in salary grade groups

salary grade	parctice	2015	2016	2017	2018	2019	2020
1	within 2 years			22 620	26 020	28 630	30 930
2	within 6 years	21 000	21 530	23 100	26 570	29 230	31 570
3	within 12 years	21 700	22 280	24 020	27 630	30 400	32 840
4	within 19 years	22 800	23 430	25 030	28 790	31 670	34 210
5	within 27 years	24 280	25 000	26 590	30 580	33 640	36 340
6	within 32 years	26 350	27 250	28 810	33 140	36 460	39 380
7	over 32 years		27 940	29 500	33 930	37 330	40 320

The difference between salary grade is significant and can differ by 30 % for the first and last grade.

RESULTS OF THE RESEARCH

Research outcomes

Having presented both calculation schemes it is possible at this point to compare the funds distributed to a chosen sample of secondary schools in years 2015 - 2021. As stated before, for the comparative reasons the period is divided into two parts: 2015-2019 when the funds were allocated through student basket formula and a shorter period of two years 2020-2021 going on already under Phmax funding. Table No 4 serves for the analysis of financial flows of salaries of the teaching and non-teaching staff.

Table No 4: List of analysed schools and financial flows intended for salary of teaching and non-teaching staff in CZK

	student basket formula					Phmax	
	2015	2016	2017	2018	2019	2020	2021
1. Gymnázium Uherské Hradiště	**26 240 851**	**28 389 283**	**30 960 467**	**34 958 726**	**41 004 835**	**48 187 710**	**52 981 533**
annual salary rise in income for school unit (in %)	100%	108%	109%	113%	117%	118%	110%
number of students	915	928	932	936	944	939	N/A
2. Gymnázium Zlín - Lesní čtvrť	**26 185 561**	**28 029 650**	**30 086 479**	**33 566 822**	**40 076 244**	**47 894 443**	**53 308 476**
annual salary rise in income for school unit (in %)	100%	107%	107%	112%	119%	120%	111%
number of students	913	916	906	899	923	920	N/A
3. Gymnázium a Jazyková škola s právem státní jazykové zkoušky Zlín	**19 840 842**	**20 613 598**	**22 439 213**	**25 014 978**	**29 896 527**	**43 050 617**	**49 416 063**
annual salary rise in income for school unit (in %)	100%	104%	109%	111%	120%	144%	115%
number of students	688	675	677	671	676	703	N/A
4. Gymnázium Kroměříž	**14 938 781**	**15 601 902**	**17 095 664**	**19 544 094**	**22 890 782**	**29 749 716**	**33 051 722**
annual salary rise in income for school unit (in %)	100%	104%	110%	114%	117%	130%	111%
počet žáků	533	520	525	533	537	539	N/A
5. Gymnázium J.A.Komenského a Jazyková škola Uherský Brod	**15 567 182**	**15 670 446**	**15 820 655**	**17 101 988**	**19 882 561**	**24 554 127**	**27 905 581**
annual salary rise in income for school unit (in %)	100%	101%	101%	108%	116%	123%	114%
number of students	545	513	476	457	457	466	N/A
6. Gymnázium Františka Palackého Valašské Meziříčí	**11 323 064**	**12 088 252**	**13 434 408**	**15 446 495**	**17 725 016**	**22 891 711**	**24 833 395**
annual salary rise in income for school unit (in %)	100%	107%	111%	115%	115%	129%	108%
number of students	392	392	402	411	406	405	N/A
7. Gymnázium Ladislava Jaroše Holešov	**11 650 017**	**12 886 414**	**13 963 047**	**14 712 723**	**16 837 167**	**21 829 638**	**24 201 412**
annual salary rise in income for school unit (in %)	100%	111%	108%	105%	114%	130%	111%
number of students	408	422	422	396	390	387	N/A
8. Gymnázium Otrokovice	**8 130 714**	**8 825 987**	**10 039 668**	**11 641 086**	**13 749 036**	**18 381 684**	**20 269 285**
annual salary rise in income for school unit (in %)	100%	109%	114%	116%	118%	134%	110%
number of students	288	292	306	315	320	320	N/A

Source: Own calculations, MEYS

The calculations of student basket in the period 2015 – 2019 formula are based on the own calculations of fixed amount of annual salary limit (SL) for a school unit in each budget year. They are individually counted on the principle of the formula that was explained previously on the theoretical principle of consideration number of teaching and non-teaching staff multiplied by the average salary of teaching and non-teaching staff that was used for allocating the funds. The data for funds distributed in years 2020 and 2021 are obtained directly form the official source of MEYS.

The quantitative comparison

The functional dependence on number of students vs received funds is evident. The unfavourable situation was in practice compensated by extra pay ups that were allocated evenly, unpredictably and not systematic and took into account especially the number of students.

Consequently, this could negatively affect the standards required by the school in order to gain as much students as possible respectively as much money as possible. It is for example the case of Gymnázium Jana Amose Komenského, Uherský Brod (unit No 5) that registered a drop in number of students four years in a row (2016-2019) by 56 students that was more than 10 %. The effects for the income of the school were destructive. In general, the years 2016-2017 were difficult for smaller schools due to unfavourable demographic development and low increase in average salaries (see Table No 2 – an overview on the annual growth of average salary AST, ASNT). Since 2020 the Phmax calculation method has been fully introduced. Besides an overall annual increase in 2020 in comparison with year 2019 for each school unit in the examined group there are similarities to be observed: in case of smaller schools in terms of number of students (units No 5-8) there is a higher increase in salary funding of 30-34 % in 2020 for units No 4-8 and at the opposite end the bigger school units with twice more students registered the increase only of 18 – 20 %. As for school unit No 4 a steep increase (by 144 % in 2020) cannot be explained by means of standard budgeting formulas. The representatives or the school and regional authorities confirmed that the above average increase is caused by the organisational changes in the education process and resize of the classes and is connected with recruitment of additional pedagogical staff.

On the one hand the above mentioned facts reflect the effects of the systemic changes caused by Phmax allocation formula. The student basket formula didn´t take at all into consideration the additional needs that are though indispensable for meeting the needs of pedagogical practice: for in-service training, need for additional positions of pedagogues or psychologists as described before. The allocated costs consider and express the maximum of teaching lessons per school. Some of these salary costs were financed from extra funds and in practice the bigger schools were able to spread these costs among more students. The allocation didn´t consider the fact that even if the number of students varies from year to year and drop the number of teaching hours remain the same in order to provide the curriculum. Loss of students presented always a slump in the income of schools even if the teaching time didn´t change. These inconveniences are supposed to be solved by the Phmax calculation. This effect demonstrates in the higher increase of funds allocated to smaller schools. As for 2021 the increase in funding the salaries are evenly distributed: 10-11 % for each school unit. As far as unit No 5 is concerned there is a certain point to be raised on. This school unit registered a drop of one fifth of the students and the school had to eliminate the number of classes. The adjustment of the Phmax calculation mechanism didn´t reflect to such an extent in 2020 and is supposed to be matched in 2021.

On the other hand, the individual cases (school unit No 3 and 4) confirm that the capacities of both student basket formula as well as Phmax formula go beyond the limits of formula budgeting and the organisational and structural tasks had to be solved separately. This matter will be discussed in the next analysis.

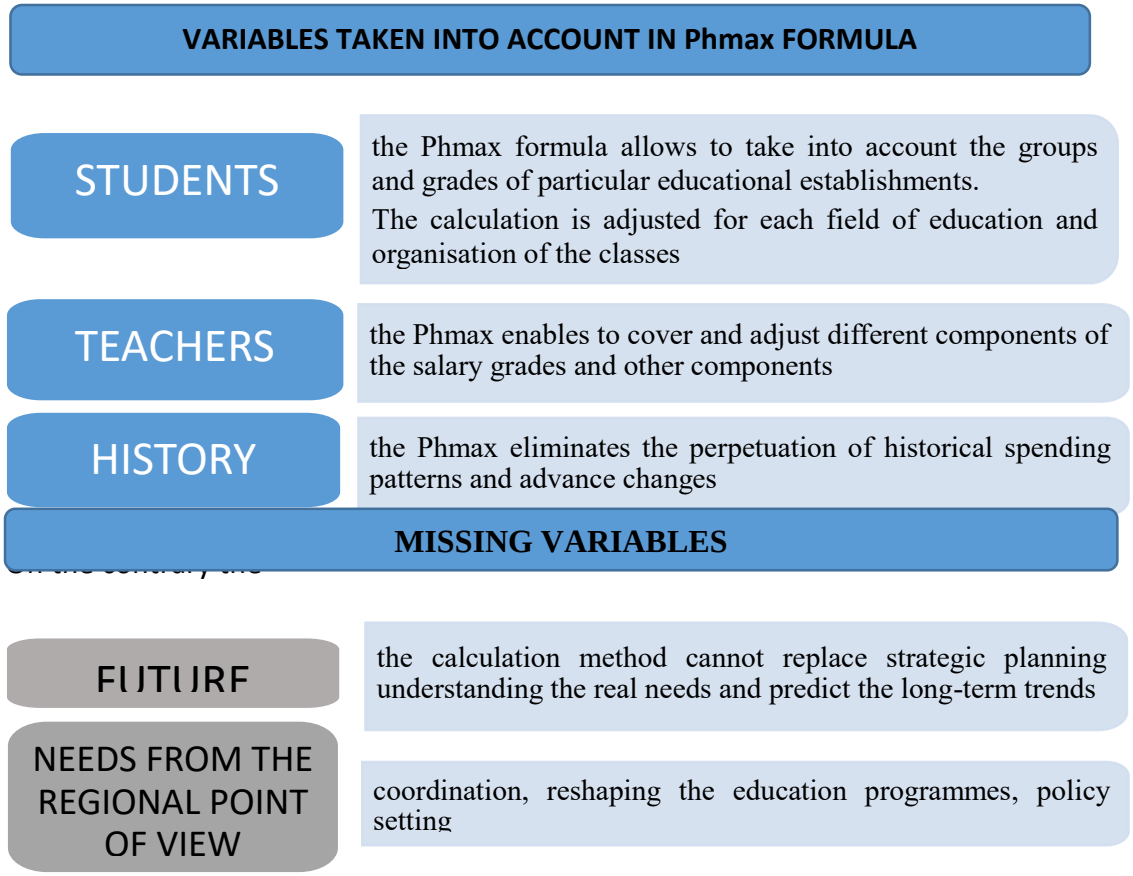
The analysis of budgeting principles

The above mentioned aspects that result from the comparative part of the study carry the budgeting on the regional level. In order to answer the second hypothesis, it is necessary to ask if the new calculation method covers the initial assumptions of the flexible budgeting described in the chapter 4.2.

From this point of view, the role of process of allocating the funds is supposed to assess the regional equity of school finance. The method of the Phmax calculation is able to ensure that the funding cannot be cut below a sufficient level on average. Nevertheless, it does not cover all necessary components of the chart No 1: Flexible budgeting process. Keeping these assumptions in mind the flexible budgeting process consists of the following main points and is assumed in the chart No 3:

These both aspects of missing variables are important from a long-term planning perspective. They proof that the Phmax formula cannot assure the flexible budgeting process as described in chapter 4.2. The Phmax formula does not consider long term strategy policy neither on local nor on national level. The complete budgeting process follows an approach to use the funding which involves analysis of both financial and educational data and the identification of effective policies and programmes that are supposed to improve and support decision making process. These complex methods of effective managing and planning the financial resources require comprehensive information about resource inputs, educational processes and outcomes. It is necessary to keep in mind that the existing data on different aspects of a school system are often split across levels of governance and different institutions. All these aspects confirm that it is not possible to transfer the planning and strategy policies on one level.

Chart No 3: Flexible budgeting process and Phmax formula



Source: own processing

In the case of Phmax formula funding, the variables are able to ensure the local disparities in case of students, teachers and the historical funding data but cannot reflect other local conditions: the demographic previews, labour market situation or follow the overall education strategic policy.

6.3. Results of the main objectives of the study

Follow-up the comparison and analysis the summary of the results will focus on the hypothesis set for the present research.

The analysis and comparison based on the own calculation and data provided by MEYS and Regional Education Department show the redistribution in favour of smaller schools that previously suffered from unfavourable demographic development. These changes demonstrated mainly in case of the schools that suffered from the decline of their students due to unfavourable demographic development.

We have seen that the previous student basket formula attributed to these schools only the increase of by 1-4 % even though they were supposed to maintain the number of classes and teaching hours. After the implementation of school funding reform, the smaller schools were compensated. Their income increased by 29 to 34 % in comparison with bigger school units with more students, their increase in funding the salaries was around 18 %. The scale of variable components included in the Phmax formula enables to cover and adjust different components of the salary - both compulsory and extra pay salary for management, educational advisory services and supplementary pedagogical services. The salary grades are considered as well, which could be quite an important aspect as the lowest and highest grade differs by about one third, considering the rising age of teachers. New coming teachers need mentor support and supervision of their more experienced colleagues which is as well considered in Phmax formula. Last but not least the Phmax involves the specific needs of the curriculum in the variable of teaching lessons per one class and the school as a whole. It is important to remind that the research focused mainly on the first year going on new founding principles. The second year (2021) demonstrated equal rise in salary and does not reflect any differences between the schools. This can mean that for coming years the changes will follow the data from previous year. Anyhow the flexible budgeting principles are not limited by the facts mentioned above. The method of the Phmax calculation is able to ensure that the funding cannot be cut below a sufficient level on average. From this point of view, the structural changes comprising the demographic development as well as the long term school programme and field structure planning must be executed on the regional levels taking into account the clear objectives coming from the central level. They should be in accordance with the overall policy strategies of the country but above all, it is highly important to reflect the local particularities of the region. That´s why the regional authorities should work on the long term strategies of the educational policy in the region taking into account the demographic prospective. Setting the right goals requires comprehensive information and communication on all levels of the process: school units – regional authorities – central authority. Data relevant for effective long term school planning are split across levels of governance and different institutions. At this time the construction of Phmax formula serves to guarantee the level of financial resources for each school unit as described above taking into account students´ and teachers´ specific variables as well as previous financial flows. The Phmax formula does neither deal with the long-term setup of the schools nor the strategic planning. These areas of interest require a set of governance arrangements and split responsibilities based on the existing data on different aspects. From these points of view both hypothesis set at the beginning are confirmed.

CONCLUSION

The presented research demonstrated on the predefined sample of secondary schools located in the Region of Zlín the impact of two budgeting formulas. The description of both funding principles provided a deeper comprehension of the weaknesses of the former budgeting formula that left very little room for a flexible budgeting process at the regional level. The 2019 education funding reform set the expectations in terms of fairer and more equal allocation. The objective by which the aim of the reform was supposed to be met was the newly established allocation Phmax formula that was also described. The analytical and comparative methods allowed to summarize the effects of the funding reform funding. For that reason, the funds intended for salaries of pedagogical staff seemed to be the most relevant items to be analysed and compared. In order to prosecute the analysis, own calculation based on the student basket formula of the five-year period 2015-2019 and the retrieved data for 2020 – 2021 were treated. Consequently, the rise in financial flows over the reference period were analysed and compared. The comparison allowed to confirm the hypothesis set. The comparative analyses proved that the changes in the redistribution appeared to be significant and approved the first hypothesis. The real effects of establishing Phmax calculation formula demonstrates in higher financial flows in case of smaller schools. The impact of the changes in budgeting formula is significant as far as the effects of the reform are concerned. Thanks to the scale of variable components of Phmax formula, it enables to cover and adjust different components of the salary - both compulsory and extra pay salary for management, educational advisory services and supplementary pedagogical services. Another feature important to achieve more precise salary cost is the consideration of real salary groups of pedagogical staff at each school. Last but not least the Phmax involves the specific needs of the curriculum in the variable of teaching lessons per one class.

The calculation Phmax formula takes into account the student, teacher and historical factors. It was explained that policies aimed at reshaping the organisational structures and changing institutional habits in school systems as well as the strategic planning and educational policies are not involved in the formula. Therefore, as per hypothesis 2, the calculation formula itself cannot assure the flexible budgeting. The school funding policies are closely interlinked with wider developments in school governance contexts. There must exist wider cooperation between schools – regional and national level on the design of strategic long-term plans. To choose the right fields of study in appropriate number of schools and classes to balance the labour market demand in conformity with overall long term strategic policy seems to be crucial.

The introduction of a school funding formula brought about the desired results ranging from transparency to increased efficiency to allocate resources. However, as the analysis based on flexible budgeting principle shows it cannot contribute to balancing the strategic long term policy oriented goals. In this respect there is an ample room for co-ordination work of school profiles and for improving cooperation between schools and the regional authorities. Education responsibilities of regions are complex and require serious strategic planning and oversight of many quite different institutions. In particular, their duty is to phase out old education programmes, no longer in tune with the expectations of the market and to phase in new ones, that are more in demand and relevant for future competitive economy strategies. This makes the allocation of funds extremely difficult and must be discussed on all the levels of educational process.

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