EDUCATION FINANCE IN UKRAINE:
SELECTED STRATEGIC ISSUES

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Swedish-Ukrainian project
'Support to Decentralisation in Ukraine'

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JAN HERCZYŃSKI

Institute of Education Research

Warsaw, Poland

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The book discusses key problems of education finance in Ukraine, presenting them in the context of institutional and demographic changes. The book focuses on issues of allocation, both at the central level (allocation of education subvention to school owners) and at the local level (setting school budgets).

The book provides several references to the experience of other transition countries, which may be helpful to Ukrainian reformers. The book is intended for Ukrainian policy makers, for education experts, for experts on decentralization reforms and on intergovernmental fiscal relations.

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| ABBREVIATIONS USED IN THE BOOK

ASC administrative and support component of per student amount

FTE Full time equivalent

KEKB Code of Economic Classification of Expenditures

MES Ministry of Education and Science of Ukraine

MF Ministry of Finance of Ukraine

NCS normative class size

OECD Organization for Economic Cooperation and Development

TP teaching plan

TS teacher salary

TW teacher workload

ZNZ General Education Teaching Unit

| INTRODUCTION

The present book represents a contribution to Ukrainian discussions regarding the reform of the financing of Ukrainian secondary education. These discussions are especially important and relevant today, when Ukraine embarks on far-reaching reforms following the victory of so called *revolution of dignity* between November 2013 and February 2014. There are two separate strands of these reforms with impact on the work and activities of all Ukrainian secondary schools, namely the decentralization reform initiated in December 2014, and the education reform *New Ukrainian Schoo*l, initiated in September 2016.

The decentralization reform aims at creating a modern, European system of local governments in Ukraine, which will be run by democratically elected public officials, will have independent budgets, will enjoy strong institutional autonomy, and will be responsible for a range of social functions, with secondary education being one of the most important ones. Several important steps of this reform process were already undertaken. These include adoption of new Budget Code in December 2014, which defines modern system of local government finances, with specified revenues streams and expenditure responsibilities. Education features prominently on both sides of the budget. On the revenue side, gromadas, cities of oblast significance and rayons will be receiving from the central budget education subvention, calculated based on student numbers. On the expenditure side, these tiers of local governments will be responsible for managing and

financing all secondary schools. Other important revenue streams defined in the amended budget code include shares in national taxes (such as the personal income tax), other sectoral subventions such as health subvention, and equalization subvention to support fiscally weaker municipalities. Simultaneously, the government embarked on consolidation process of lowest tier of local governments, namely gromadas. It is expected that through so called amalgamation process out of historically determined 12 thousand small and weak gromadas today there should emerge a much smaller number of stronger and larger amalgamated gromadas. Gromada amalgamation is the prerequisite to taking over the new social functions, such as preschool and secondary education, and to becoming the recipient of revenues streams listed above, including education subvention. Presently, there are 413 amalgamated gromadas established legally and many more are in the process of being established. The decentralization process foresees that all gromadas will amalgamate in accordance with regional plans, and will take over a large proportion of present tasks of rayons, including key sectors of education, namely preschools and secondary schools. In parallel, a process of amalgamation of rayons is planned, but has not yet started.

Decentralization reform will affect all secondary schools in Ukraine, because historically local state administrations have been managing and financing schools. The transformation of these local state administrations into democratic local governments should lead to much stronger role of local communities in the management of education. Interestingly, only a part of local administrations meets already the conditions of the European Charter of Local Governments. Apart from amalgamated gromadas, these are the cities of oblast significance, which long enjoyed their own budgets and which had administrations appointed by elected city councils.

The second important reform which was started in Ukraine is the education reform *New Ukrainian School*. This reform has only been announced very recently, and the Ministry of Education and Science published its first concept of the reform (MES 2016). This reform focuses on content, on teaching methods and on textbooks and teaching materials. Nevertheless, it also addresses structural reforms (potential division of secondary schools into two separate education institutions) and financing issues, namely it foresees greater financial autonomy of schools and more transparent and equitable allocation of resources. Therefore, like the decentralization reform, education reform will impact the functioning and financing of every secondary school in Ukraine.

Given the importance and urgency of these two reforms, it seems that a book on education finance in Ukraine is especially needed. We discuss problems of the reform of financing of Ukrainian schools focusing on

general secondary education (preschool and vocational education are mentioned only in passing). Two main themes of the book are rural schools and allocation formulas. Recent national and regional trends in secondary education are reviewed in chapter 1, with a focus on low efficiency of rural schools. This topic is continued in chapter 2, where the results of in-depth analysis of education in 40 rural rayons are reported. Chapter 3 reviews policy options open to Ukrainian reformers how to address inefficiencies of networks of rural schools.

With chapter 4 the attention is turned towards the second theme, namely allocation formulas for education subvention. A review of two different model formulas from Poland and Estonia (chapter 4) is followed by detailed analysis of Ukrainian allocation formula used in 2015 and 2016 (chapter 5). The following chapter 6 offers a proposal of an alternative formula, better adjusted to Ukrainian conditions and not dissimilar to the Estonian model, and discusses technical issues which arise. The final chapter 7 discusses approaches to the problem of setting budgets of individual schools applied in different transition countries and reviews lessons for Ukraine. This chapter, like earlier chapter 4, attempts to locate challenges faced by Ukrainian reformers in wider context of former Communist countries.

It may be noticed that the book does not include macroeconomic review of overall education expenditures in Ukraine. The reason for this omission is that the World Bank is finishing its Public Finance Review (World Bank 2016), which will include a chapter of education finance, so it was felt that a separate analysis of the same topic will not be useful for Ukrainian experts.

Education finance has been the subject of rather little research in Ukraine. Voytov (Войтов 2003) provided a systematic review of allocation formula in operations 15 years ago. There are several recent papers discussing the issues of financing of secondary education, but often they avoid statistical and empirical analysis and concentrate on legal reviews and on recommendations. A recurrent recommendation is to increase the level of financing (see for example Чередник 2015, Коверник 2015). Another strand of publications is devoted to guidelines for school directors how to manage school budgets (see for example Шукевич, Ковальчук, Оленич , Паращенко 2009). Two radical proposals, very different from each other, are formulated by Y. Hanushchak and Y. Vitrenko (see Вітренко 2017, Hanushchak 2012). These proposals are not based on empirical review of education finance in Ukraine and are not discussed in the present book. There have been a few reviews prepared by non-Ukrainian experts, including by the World Bank (World Bank 2003, 2008, 2016) and by the present author (Levitas, Herczyński 2001, Herczyński 2011c).

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Swedish Agency for International Development SIDA and implemented by SKL International, a subsidiary of Swedish Association of Communes and Regions SKL. We note that successful implementation of this project was made possible through close cooperation with the Ministry of Education and Science of Ukraine and the Institute of Education Analytics.

Preparation of the book would not have been possible without supportive involvement of Lilya Grinevich and Segey Kvit, the current and former Ministers of Education of Ukraine. The author received constant support from project coordinator Ieva Kalnina and from project manager Erik Faxgard. While all the errors contained in the book are the sole responsibility of the author, the positive and useful contributions are in greatest measure due to my many discussions with Pavlo Hobzey, Igor Ostrovski and Kostyantin Gavrilov.

1. | REGIONAL TRENDS IN UKRAINIAN GENERAL SECONDARY EDUCATION

The purpose of the present introductory chapter is to review recent changes in the composition of Ukrainian secondary education. We discuss demographic changes, namely decline of the number of students, and analyze how the Ukrainian system of secondary education coped with those challenges. We take a global perspective, analyzing the situation at the level of 5 major regions and the city of Kiev and, where possible, separately for urban and rural schools. There is no place in this chapter for a more detailed analysis at the level of oblasts and regions (see for example chapter 2).

The following table lists the regions and the oblasts which belong to them.

Table 1. Regions of Ukraine and oblasts which belong to them.

Region	Oblasts
Central	Vinnytska, Kirovohradska, Poltavska, Cherkas'ka
East	Dnipropetrovska, Donetska, Zaporizka, Luhanska, Kharkivska
West	Volynska, Zakarpatska, Ivano-Frankivska, lvivska, Rivnenska, Ternopilska, Khmelnytska, Chernivetska
North	Zhytomyrska, Kyivska, Sumska, Chernihivska
South	Mykolayivska, Odeska, Khersonska
Kyiv	Kyiv city

Eastern and Western regions are most populous. Since the antiterrorist operation in the East of country begun in 2015, the reported numbers of schools, students and teachers in Doneck and Lugansk oblasts, both belonging to Eastern region, decreased significantly through internal migration. Crimea and the city of Sevastopol are not included in the analysis.

The data used in the present chapter are derived from yearly statistical bulletins published by the Ministry of Education and Science and from BOOST database of local government expenditures, compiled by the World Bank on the basis of data from the Ministry of Finance. The analytical work profited from the support of staff of Institute of Education Analytics in Kiev, in particular of Natalia Vashchaeva, Viktorya Kolodiy, and Zhenya Longvinenko.

1.1 Students, schools and classes

The following graph presents the evolution since 2007 of the number of students of general secondary schools in Ukraine by region.

The decrease of the number of students in the Eastern Region since 2014, due to ATO, was mentioned above. In remaining regions, demographic changes are smaller, so in order to see them more clearly the following graph presents student populations in the regions as percent of the population in 2007.

We notice that after initial uniform decline, the number of students stabilized in all the regions and begun to increase in Kiev. This process was somewhat but not significantly strengthened since 2014, with internal migrations from the ATO territory to other regions of the country. Presumably, apart from migration to Kiev, much of this internal migration was within regions and within oblasts.

The demographic situation becomes more apparent when division into urban and rural population is considered. We treat Kiev separately as a special case. The following graph displays relative change of number of students by school location.

We observe steady steep decline of the number of students in rural schools, at average the rate of over 3%. The number of students of urban schools, in contrast, stabilized in 2011. The only change since then is related to ATO in the East. Thus we can foresee that in the next few years

Graph 1. Number of students of secondary schools 2007 – 2015, by region

- - - - - Central	- - - - - - - West	- - - East
- - - North	- · - · - · - South	· · · · · · · · · Kyiv
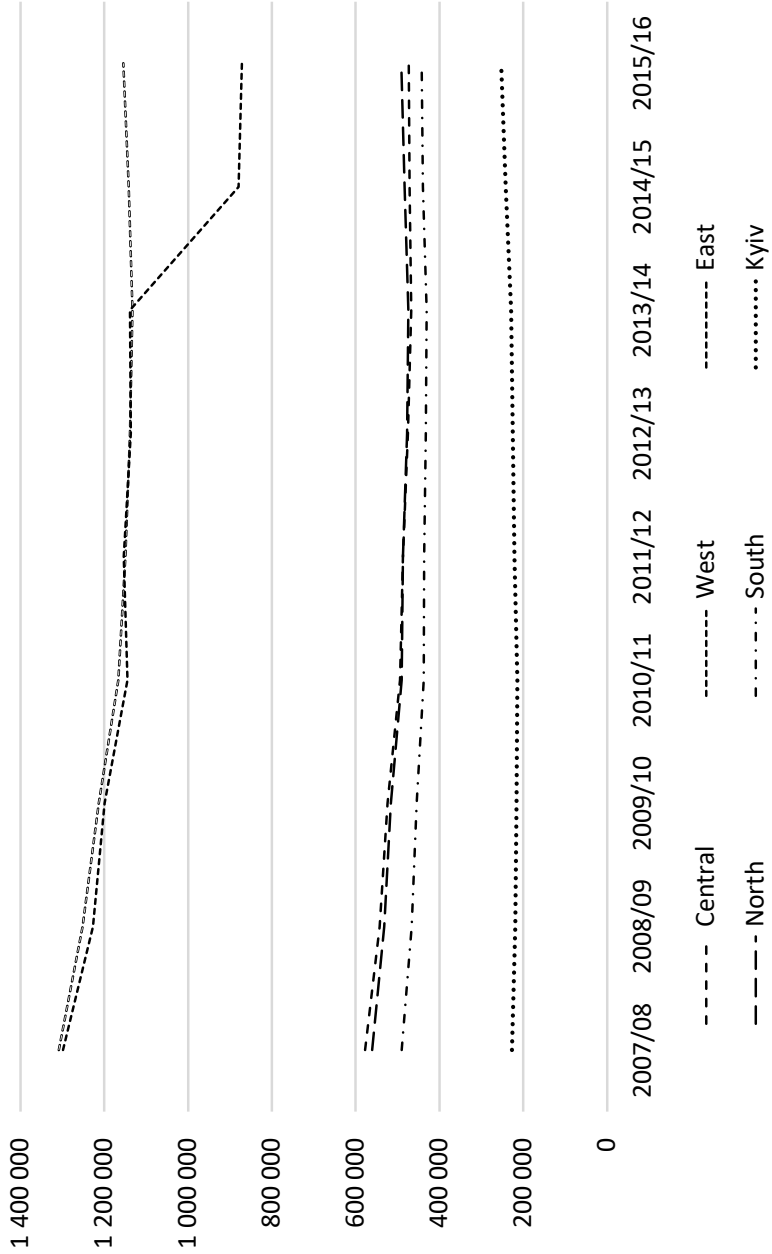
Graph 2. Relative change of student numbers 2007 – 2015, by region
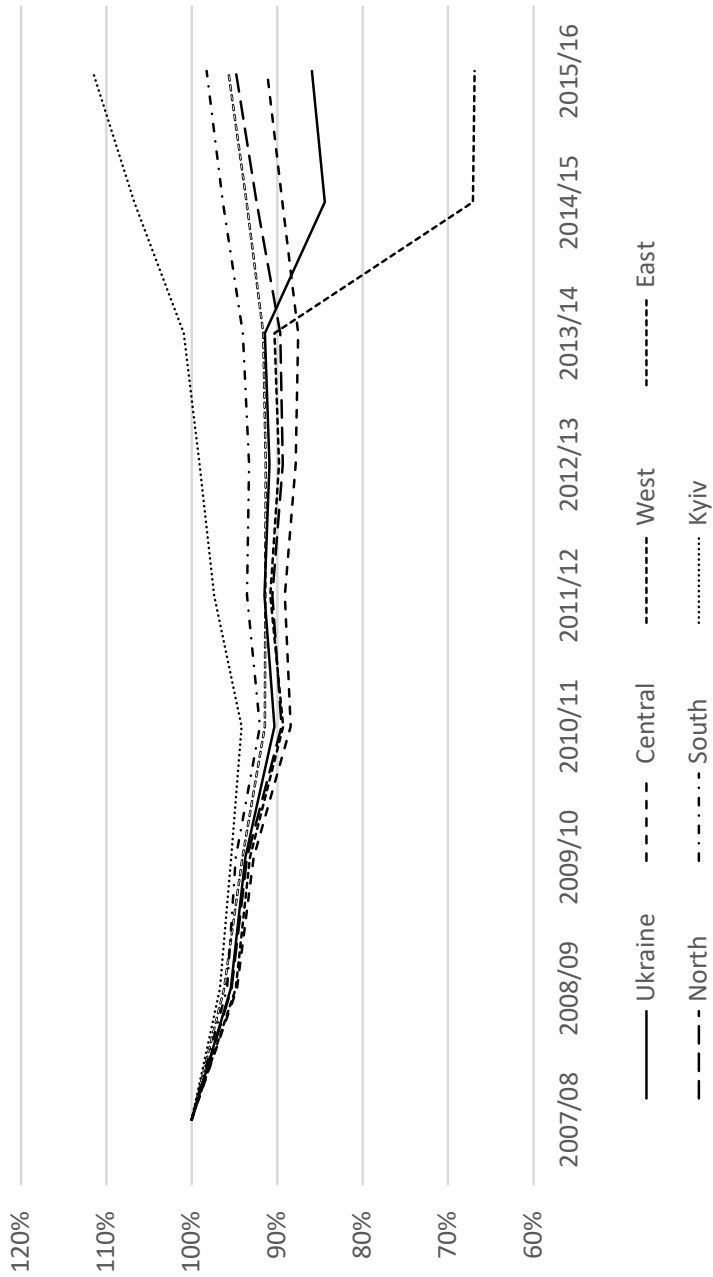
student population in the cities is likely to increase, and in the rural areas is likely to decrease further.

Institutional response of the education system to these may be observed in two areas: the changing numbers of schools and the changing numbers of classes. The following graph displays relative number of schools by region.

Again, we note drastic decrease (reduction of 27%) of the number of secondary schools in the eastern region, a result of ATO. However, perhaps more interesting is the fact that the number of general schools in Kiev also declined, despite an increase in the number of students (see Graph 2). Moreover, decline of the number of schools in other regions was more pronounced than the decline in the number of students. This observation may be verified by analyzing the average school size (average number of students in school), which we do for each region separately for urban and rural schools.

Average school size of urban schools is provided in the following graph.

Graph 5 confirms what we have already seen, namely that urban schools have adjusted well to the demographic pressure, even in the Eastern region. Indeed, in Kiev we have seen school consolidation despite a decrease of the number of students. This has led to a significant growth of 23% of average school size in the period under review. Even in the eastern region, with average urban school teaching 11 grades and having 450 students will have on average about 40 students per grade, which allows to organize the work of school reasonably well.

A somewhat different picture emerges when we analyze rural school, as the following graph indicates.

Of course, city of Kiev is absent from Graph 6, because it has no rural schools. The first thing to note is the very small size of rural secondary schools, which in Ukraine offer teaching of 11 grades. If such a school has under 85 students, as is the case in central and Northern regions, then the number of students per grade becomes 7 to 8 students. Correspondingly, this is also the expected class size.

On the other hand, is it worth pointing out that the size of rural schools, quite uniformly across the Ukrainian regions, declined in the first few years until about 2012 and stabilized since then. It even started to increase in most recent year, despite further decrease of the student population (see Graph 3). Thus, Graph 6 indicates that the overall situation, averaged for large numbers of schools, is not significantly deteriorating. Rural education in Ukraine is about as inefficient as it was in 2007, but seems to be not less efficient.

Graph 3. Relative change of student numbers in rural, urban and Kiev schools, 2007 – 2015

City ——— Rural ------- Kyiv ·········
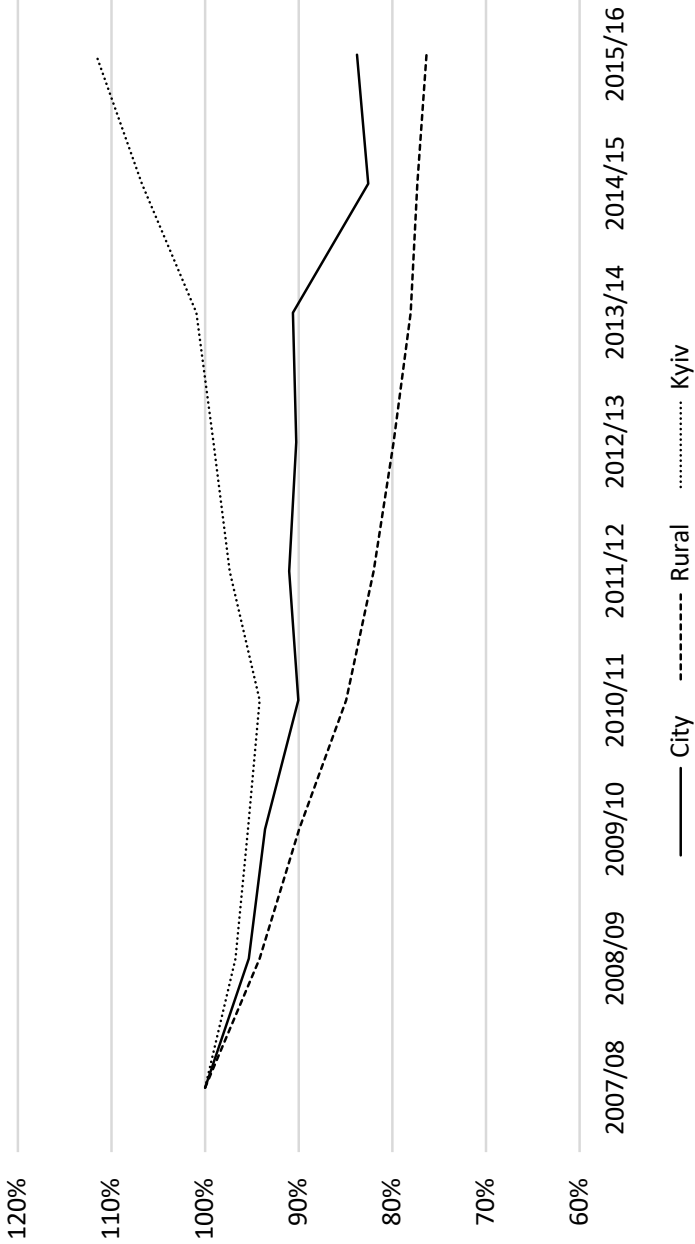
Graph 4. Relative numbers of secondary schools 2007 – 2015, by region
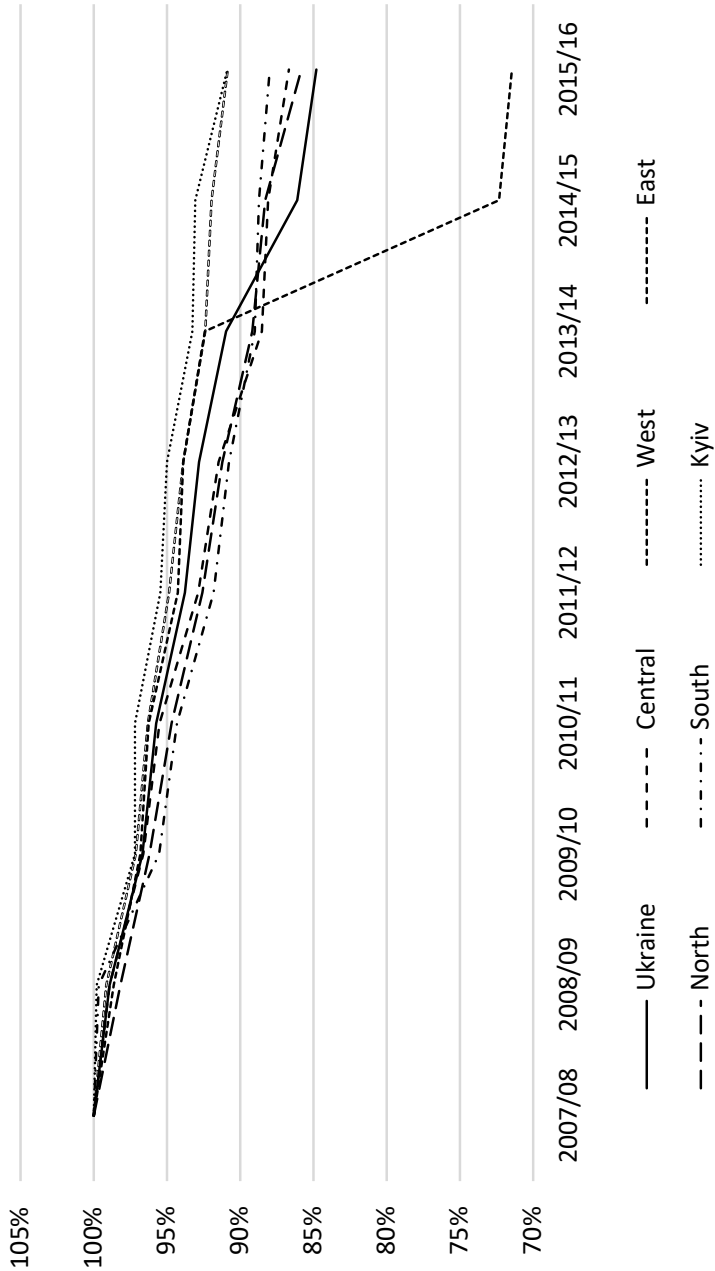
Graph 5. Average size of urban secondary schools 2007-2015, by region

Legend: Ukraine — North — — — — Central — — — — West — — — — — East — — — — South — — — — Kyiv ⋯⋯⋯

X-axis: 2007/08 2008/09 2009/10 2010/11 2011/12 2012/13 2013/14 2014/15 2015/16

Y-axis: 350 400 450 500 550 600 650
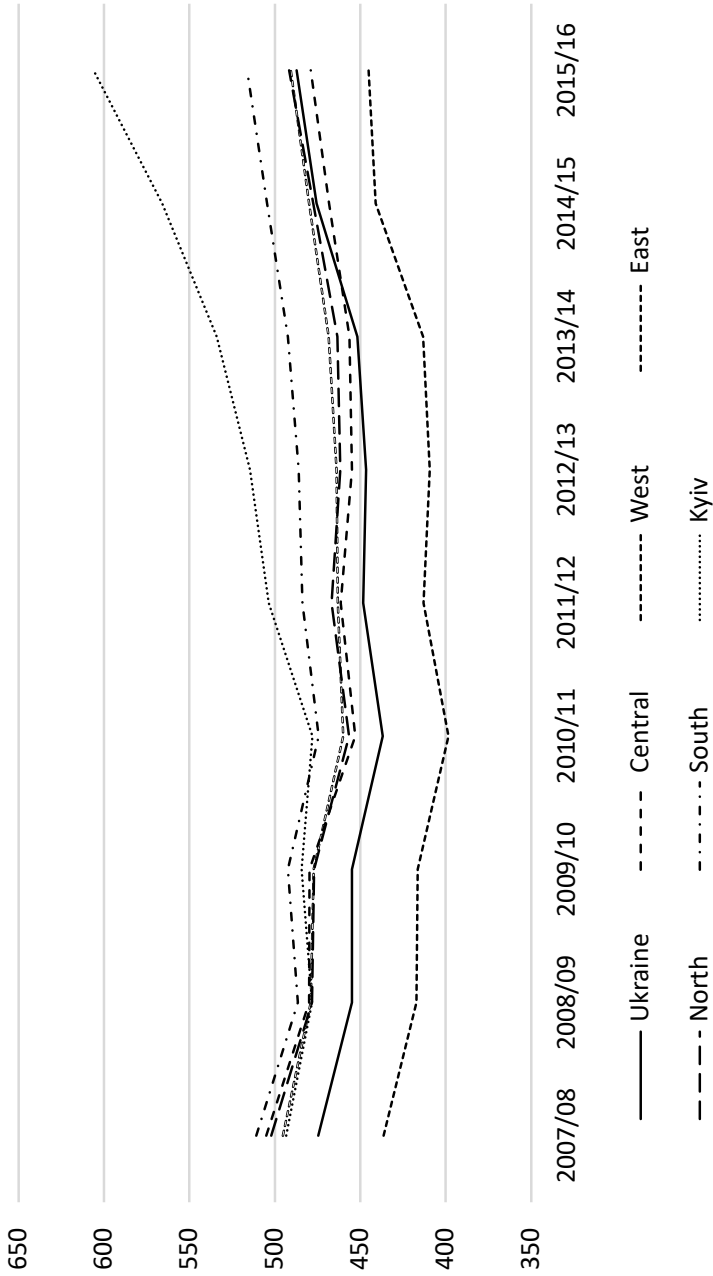
Graph 6. Average size of rural secondary schools 2007 – 2015, by region

—— Ukraine	- - - - Central	------- West	
------- East	— - — North	- · - · - South	
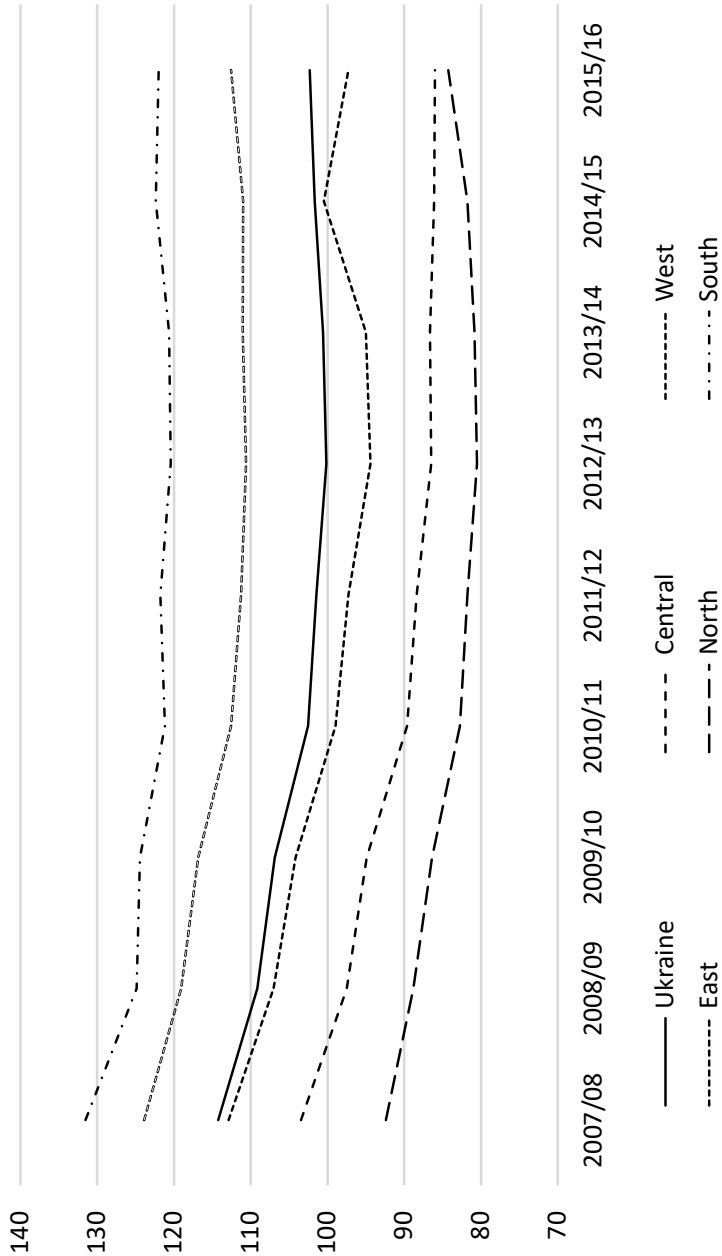
Unfortunately, with the current education statistics available in Ukraine, the key school classification which may be used is the division of schools into urban and rural. Hopefully, with the introduction of new education databases more in-depth analysis will be possible.

As our last topic in this section, we turn to the average class sizes by the region. Class sizes are more relevant for the analysis of the efficiency education than school sizes, because per student costs are largely driven by average number of students in a class (because each class needs to receive the same number of lessons in accordance with the curriculum). Furthermore, it is common in some parts of Ukraine that rural schools are divided into those providing initial education (grades 1 to 4) and schools providing basic education (higher grades). An initial school with 80 students will have on average 20 students per grade, which would make it quite efficient. Similarly to school size, we discuss separately urban and rural schools. The following graph displays average class sizes in urban secondary schools.

There is some fluctuation with the data, which may indicate that not all data are equally trustworthy[1], but the overall picture is quite clear and consistent with Graph 5. Despite initial decrease of average class size, leading to loss of efficiency, since about 2012 urban Ukrainian schools have intensively consolidated their network of classes, with increasing class size. The increase is the largest for Kiev schools, but urban schools in other regions are also improving.

The situation with the rural schools is rather different, as the following graphs shows.

The first thing to note in Graph 8 is the very low average number of students in rural schools, at about the half of the urban counterparts. The possibility mentioned above, that some rural schools provide only initial education and other provide mainly basic education, is not widely used in Ukrainian villages.

On average, Ukrainian rural schools have between 12 and 13 students per class, but there is large regional differentiation. Certainly, this variation is even larger at oblast and rayon levels (therefore rayon level analysis is very relevant, see for example chapter 2). Western and Southern regions have relatively larger classes, but Eastern and Northern regions, and especially the Central region, has rural schools with extremely small classes.

Furthermore, there is continuing decline in average class sizes. Like the school size (see Graph 6), the decline slowed since about 2010, but the

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1   In particular, the data on the number of classes for 2010 seem to be systematically underestimated and were corrected.

Graph 7. Average class size in urban secondary schools 2007 – 2015, by region.
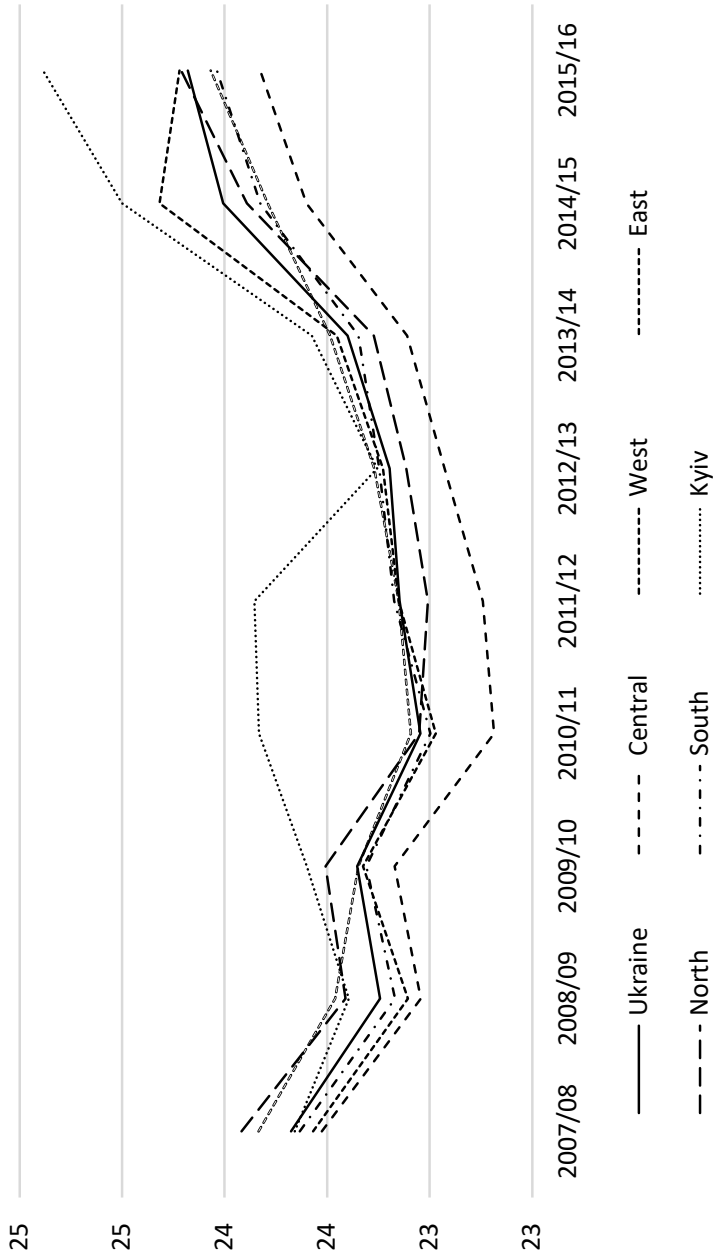
Graph 8. Average class size of rural secondary schools 2007 – 2015 by region.
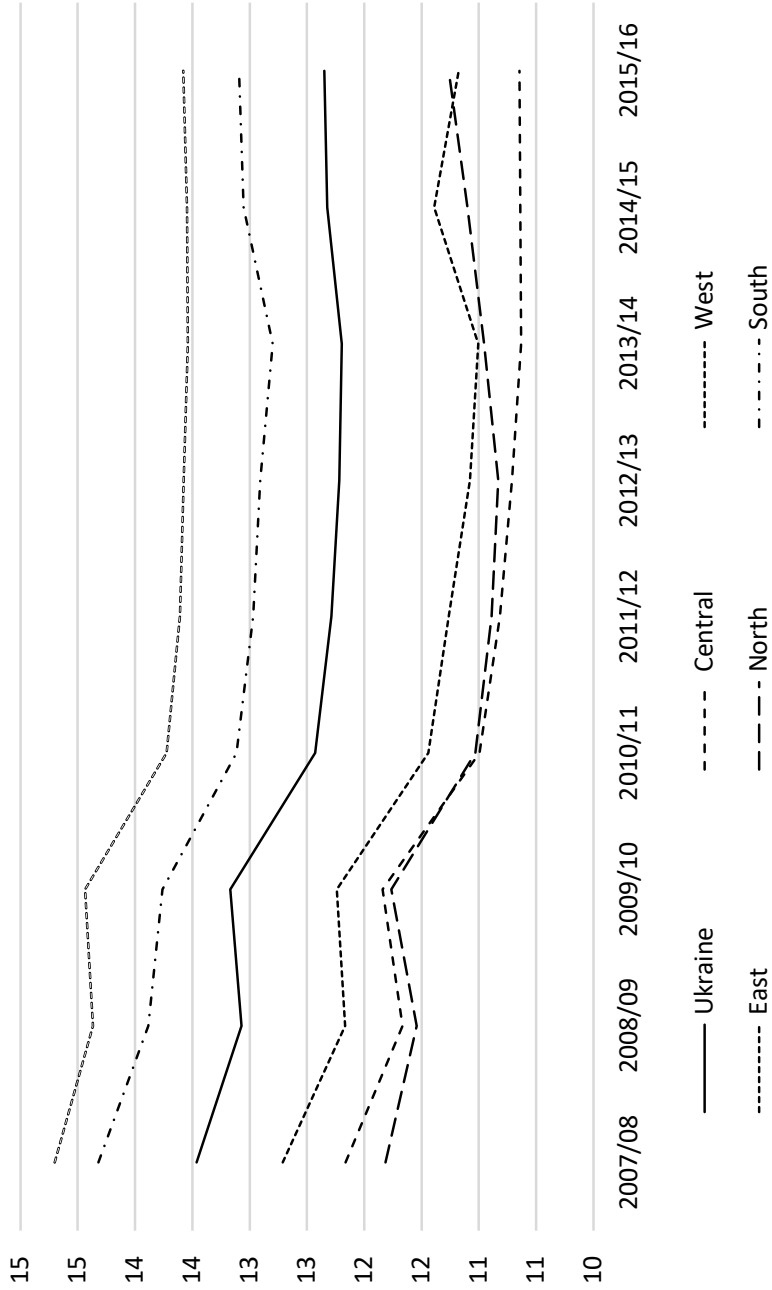
situation is not improving. The only exception seems to be the Eastern region, where there may have been migration of students away from small schools at the front line to nearby villages away from ATO, leading to closures of front line schools and to corresponding increase of classes in remaining schools. However, even after this increase the average class size remained below 12.

1.2 Per student and per class expenditures

In the present section, we limit ourselves to a review of per student and per class expenditures on general secondary schools. The expenditures recorder by the Ministry of Finance were all recalculated in 2015 prices, using the official index of consumer price inflation in Ukraine.

The following graph displays per student expenditures (in 2015 Hryvnas) between 2007 and 2015 in secondary schools by region.

In reviewing Graph 9 it is important to note that the amounts quoted are adjusted for inflation, so are comparable between years. The year-to-year variations indicate some recurrent problems with the data (either financial data or statistical data).

The pattern of expenditures that can be see is as follows: there was a serious increase of per student expenditures between 2011 and 2012 (maybe due to some increases of teacher salaries), and then the expenditures stabilized. There is nevertheless some variation between the regions, probably due to different levels of urbanization in different parts of Ukraine. For example, there are high per student expenditures in Northern and Central regions, which may reflect small class sizes in their schools (see Graph 8), and relatively lower per student expenditures in Eastern, highly urbanized region (where average class size is much higher). Clearly, these factors require some more in depth analysis (chapter 2 offer some financial analysis of 40 rural rayons from 4 oblasts).

It is very useful to complement Graph 10 with a review of per class expenditures. This indicator is a much better measure of the financial effort put into the education system. The following graph provides the data for the period 2007 to 2015.

The above graph is rather striking in several ways. The first is that per class expenditures are remarkably uniform across the regions of Ukraine (with one

Graph 9. Per student expenditures in secondary schools 2007 – 2015 by region

2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16

Ukraine — — — Central — — — — West — — — — — — East

— — — North — · — · South .... Kyiv

14 000 13 000 12 000 11 000 10 000 9 000 8 000 7 000
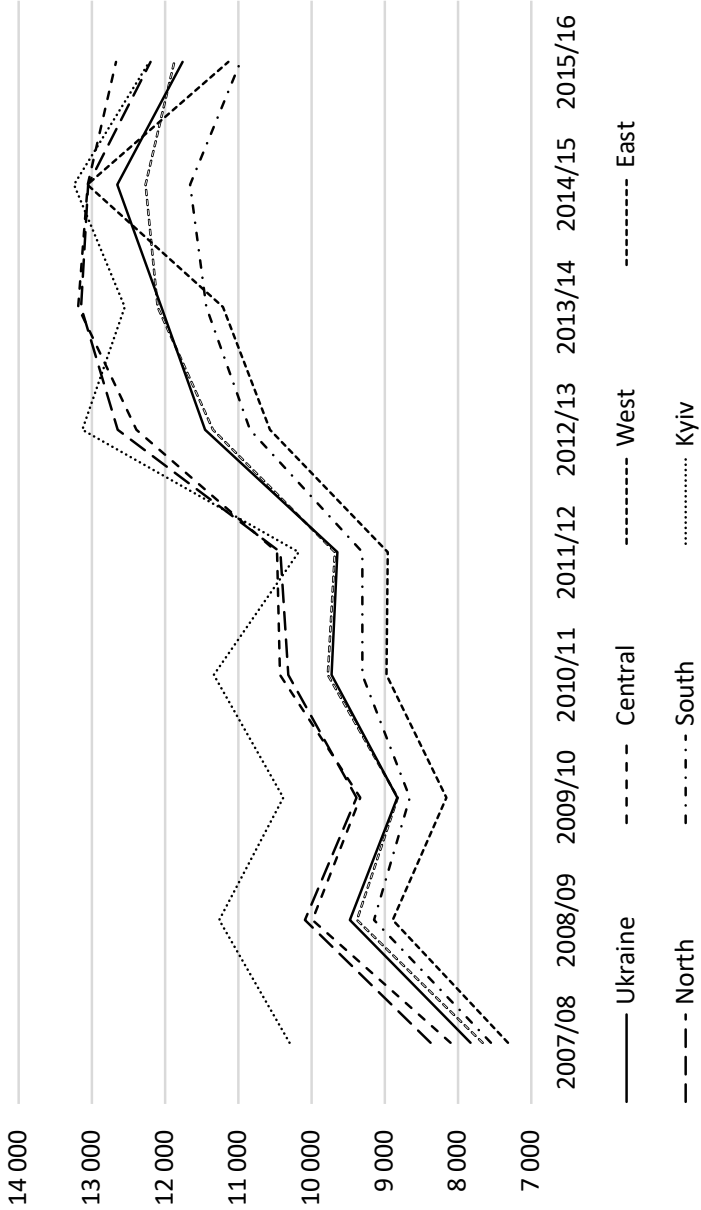
Graph 10. Per class expenditures in secondary schools 2007 – 2015 by region

| | 2007/08 | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 | 2013/14 | 2014/15 | 2015/16 |

—— Ukraine - - - - - Central - - - - - West ------- East

- - - - North - - - - - South ········ Kyiv

330 000
305 000
280 000
255 000
230 000
205 000
180 000
155 000
130 000
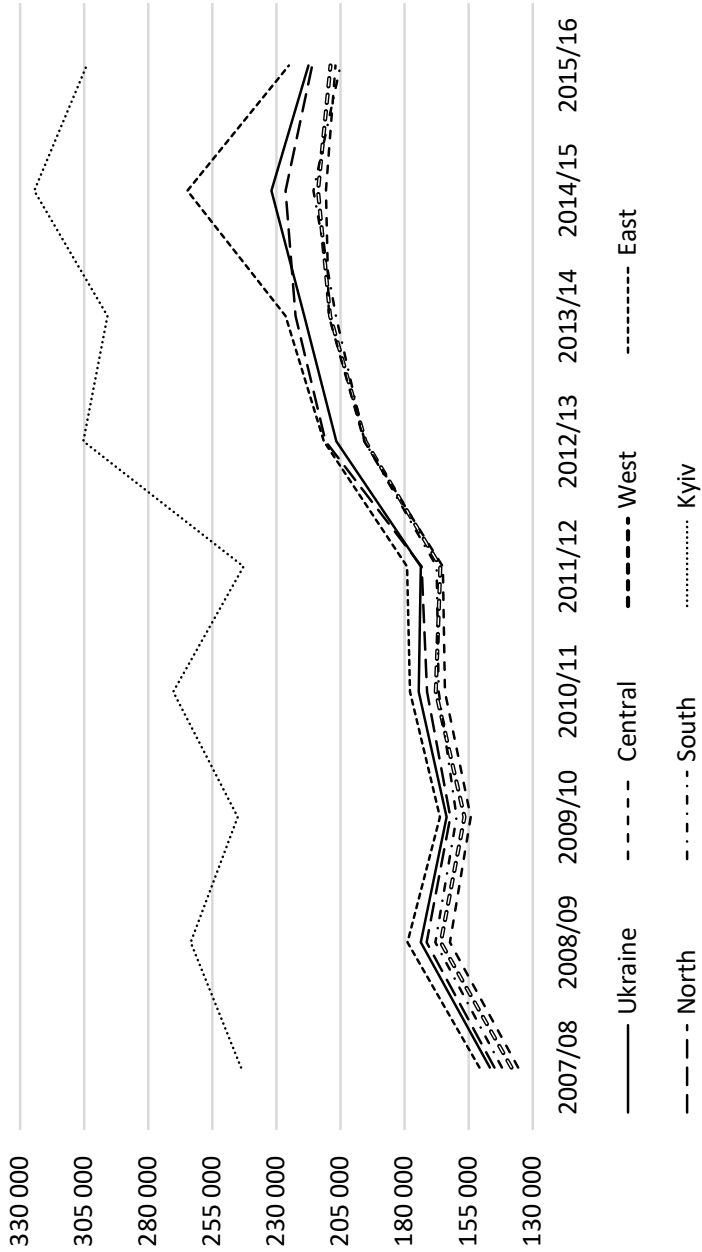
exception, to which we will return). This means that the regional differences of per student expenditures, exhibited in Graph 9, are due to differences of class sizes, which are largely the effect of the share of students of urban schools (rate of urbanization). The national system of norms and regulations seems to ensure that the amount of education provided to schools in different regions of Ukraine is similar. This hypothesis should be tested at the level of oblasts and rayons, and using more detailed information about the functioning of schools (such as the number of full-time equivalent teachers), but the initial findings of are Graph 10 encouraging.

Nevertheless, the graph also indicates one very important exception, which is Kiev. Systematically across all the years analyzed above per class expenditures are significantly higher than in other regions. This is an interesting issue which was hidden in Graph 9 and which requires additional analysis. Per class expenditures of Kiev schools in comparison to the Ukraine average decreased from 160% in 2007 to 140% in 2015. Nevertheless, the difference remains significant. Higher per class expenditures in Kiev schools may be the result of two processes, namely higher teacher salaries (the special salary add-ons for teachers financed from the city budget), or more teaching time per class (additional lessons from variable part of curriculum or more splitting of classes into groups).

The preliminary findings reported in the present chapter raise many issues and indicate potential useful questions for further research into the actual financing of Ukrainian secondary schools.

2. | REVIEW OF EFFICIENCY OF RURAL SCHOOLS

The issue of low levels of efficiency of Ukrainian education system is becoming an important problem for Ukrainian reformers. Judging by one of most widely used efficiency indicators, the average class size, Ukrainian general secondary schools appear to be among the least efficient in Europe. At the same time, spending on education has been growing quite rapidly in Ukraine, much more so than in other sectors (World Bank 2008). This is especially troubling in the period of fiscal constraints due to on-going war in the East of the country, with the need to spend on armaments for the war, and with associated large numbers of internally displaced people, who have to be supported. Reform of the education sector, and in particular reform of the teacher remuneration, which is one of the goals of the current reformist government, will be difficult to achieve without a sustained effort to improve efficiency of rural schools in Ukraine.

In order to assess the situation, MES and MF conducted a joint research program in May to July 2015, with technical support from SDU. The analysis covered 40 rural rayons in 4 oblasts (see a review of the research program in Appendix A). The present chapter summarizes main finding of this research, drawing on the four oblast reports. In section 2.1, we discuss the goals and scope of the research. The main findings are summarized in section 2.2.

2.1 Empirical basis of the review

The main goal of the joint research program of MES and MF was to review sources and scope of inefficiencies of Ukrainian general secondary schools in small rural rayons. The following areas were identified as possible sources of inefficiencies:

- School employment.

  This is relevant because salary expenditures constitute the majority of school expenditures.

- Class formation.

  This is relevant because conducting lessons with small classes increases per student costs of education and lowers efficiency.

- Network formation.

  This is relevant because small schools are generally associated with small classes and with diseconomies of scale.

At the same time, the goal of the research was to identify objective factors which have negative impact on school efficiency. Among these factors the most important are geographical barriers to network consolidation. It was important therefore to identify how far from each other are located schools within each of analyzed rayons.

Accordingly, the research was designed by selecting a number of indicators covering these three areas of school operations. To this we need to add a number of financial indicators, because the final result of inefficiency is the necessity to spend more money. Moreover, it was decided to select for analysis a number of rayons with particularly inefficient network. The criterion used was the average class size.

4 oblasts were selected for the analysis: Vinnitsa, Sumy, Cherkasy and Chernihiv. In each of them 10 rayons with lowest average class size were selected (the list of the rayons is provided in Appendix A). All schools within each selected rayon were analyzed. The following table provides a summary of the school networks in selected rayons:

Table 2. School networks in selected rayons.

	Schools	Students
Vinnitsa (10 rayons)	264	25 783
Sumy (10 rayons)	236	18 709
Cherkasy (10 rayons)	259	27 717
Chernihiv (10 rayons)	213	21 037
Total (40 rayons)	972	93 246

Altogether, nearly a thousand schools with over 93 thousand students were analyzed. Although the sample is not statistically representative of the whole country, the large size of the sample allows to draw conclusions regarding other small rural schools in Ukraine.

To assess rayon school networks, we provide below minimum, average and maximum values of the number of general education schools and of the number of their students.

Table 3. Schools and students in selected rayons.

	Number of schools			Number of students		
	Mini- mum	Ave- rage	Maxi- mum	Mini- mum	Ave- rage	Maxi- mum
Vinnitsa (10 rayons)	15	26,4	34	1 846	2 578	4 152
Sumy (10 rayons)	14	23,6	36	1 304	1 871	2 934
Cherkasy (10 rayons)	19	25,9	35	1 510	2 772	1 510
Chernihiv (10 rayons)	11	21,3	30	937	2 104	3 259
Total (40 rayons)	11	24,3	36	937	2 331	4 152

On average, there are above 24 schools in the analyzed rayon, ranging from 11 schools in a rayon in Chernihiv oblast to 36 schools in a rayon in Sumy oblast. Similarly, there are on average 2330 students attending those schools in the rayon, ranging from under 940 in a rayon in Chernihiv oblast to over 4150 students in a rayon in Vinnitsa oblast. The smallest rayons in terms of school numbers are in Chernihiv, and in terms of student numbers – in Sumy oblast.

In the following section 2.2, we follow the same convention of providing rayon level minimum, average and maximum values for the education indicators. These values are averaged over schools in the rayons, and so are more reliable than minimum and maximum indicators for individual schools (which may be due to specific data errors).

For each school, a number of data items were collected. The selection of these data items was dictated by their availability and by their usefulness to calculate indicators in areas described above. The following table summarizes data items used:

Table 4. Data items collected for analysis.

Data type	Typical data items
Financial	Expenditures of individual schools, by major categories
Statistical	Numbers of students and classes
Employment	Number of full time equivalent staff, by major categories
Geographical	Distances and travel time between schools in rayon

Complete list of data items used in research is provided in Appendix A.

Two comments are useful here. Contrary to traditional Ukrainian education statistics, which typically reports number of staff (physical persons) irrespective of whether they are employed for half-time or for more than full time, staff data were collected for FTE staff. Distances and travel times between schools were assessed using Google Maps functionality. Both of these methodological approaches are new in Ukrainian context.

The data items collected were used to assess a large number number of indicators for each school. These indicators are summarized in the following table:

Table 5. Groups of indicators used.

Indicator group	Number of indicators
Indicators of employment in schools	9
Indicators of class networks within schools	14
School networks (geographical data)	12
Expenditure indicators	8
Total	43

It needs to be stressed that some indicators, such as financial indicators or number of FTE staff, were assessed both on per student and per class basis. Per class indicators provide a better measure of pedagogical efforts of schools, because they are not influenced by class sizes. Complete list of indicators calculated is provided in Appendix A.

The analytical part of the research consisted of the comparative review of the indicators for all schools within each selected rayon. This comparative analysis is presented in 40 rayon level reports and 4 oblast level reports prepared by the research team from the Institute of Education Analytics. The reports on Sumy oblast and Vinnitsa oblast were prepared by Igor Ostrovski and Natalia Vashchaeva. The report on Cherkasy oblast was prepared by Valentina Gaponand Maria Sharaevska, and the report on Chernihiv oblast was prepared by Olena Gorbach and Olena Filinyuk.

2.2 Main findings

We will focus here only on key findings, referring the readers to oblast reports for details and for more specific analysis. These key findings concern employment levels in schools (especially technical staff), individual teaching and distances between schools.

We begin with an overview of main efficiency indicators in education, school size and class size (average number of students per school and per class). The following table provides indicators of school sizes and class sizes.

Table 6. School and class size in selected rayons.

	School size (students)			Class size (students)		
	Mini-mum	Average	Maxi-mum	Mini-mum	Average	Maxi-mum
Vinnitsa (10 rayons)	69,8	97,7	133,9	8,7	11,2	12,6
Sumy (10 rayons)	60,5	79,3	108,7	6,9	10,5	13,6
Cherkasy (10 rayons)	107,2	107,0	127,6	8,0	11,0	13,5
Chernihiv (10 rayons)	67,6	98,8	130,4	10,0	13,0	14,4
Total (40 rayons)	60,5	95,9	133,9	6,9	11,3	14,4

The use of criterion of small average class size in the choice of rayons is clearly visible in the basic statistics. The analyzed schools enroll on average under 100 students and the average class size is 11. To put these indicators into perspective, we note that in 2014 average class size in urban schools was 23,9 students, and in rural schools – 12,1 students (MF 2015).

The smallest schools with smallest classes in 10 rayons are in Sumy oblast. In that oblast, there is a rayon with average class size under 7! On the other hand, among the 40 rayons there is a rayon with average class size of over 14. This is also the result of the selection procedure used in the research program (for example, if 40 rayons with lowest class sizes were selected from all Ukrainian oblasts, the largest average class size would be certainly lower).

Data in table 6 indicate that on average there are less than 9 classes per school (we obtain this number by dividing average number of students by the average class size). The smallest average number of classes is in Sumy oblast, namely 7,5 classes per school. This has important consequences. First, most of these schools have only one class per parallel (grade). Further, many of these schools conduct only initial teaching (grades 1 to 4) or initial and basic (1 to 9), with few teaching higher classes. Presumably many

graduates of 9 grade in these schools continue to attend PTU's, while other move to secondary schools in cities.

We now review per class and per student recurrent expenditures (excluding investments). As mentioned above, we analyze rayon level averages.

Table 7. Per class and per student expenditures in selected rayons

| | Recurrent expenditures (thousand Hryvna) | | | | | |
| | Per class | | | Per student | | |
	Minimum	Average	Maximum	Minimum	Average	Maximum
Vinnitsa (10 rayons)	135	149	172	11,8	13,5	15,5
Sumy (10 rayons)	117	167	192	12,1	16,0	18,8
Cherkasy (10 rayons)	127	156	187	11,9	14,1	17,5
Chernihiv (10 rayons)	158	202	260	12,8	17,8	23,5
Total (40 rayons)	117	166	260	11,8	15,4	23,5

To put these values into perspective, we note that in 2014 average per student expenditure in Ukraine was 10,0 thousand Hryvna, and average per class expenditure was 181,2 thousand Hryvna (MF 2015). The recurrent expenditures in 40 analyzed rayons are about 50% higher than the national average on a per student basis, but at the same time is about 9% lower than the national average on a per class basis. This shows a not uncommon approach to the funding of small schools: as per student expenditures are so high, in many schools more than triple the national average, rayons try to make savings by restricting expenditures other than salaries, and in this way manage the reduce per class expenditures below the national average.

We note, nevertheless, that class size is not the only factor responsible for high per student expenditures in some schools in 40 analyzed rayons.

For example, observe that schools in 10 rayons in Sumy oblasts have lowest average class size, while those in Chernihiv oblast have the highest class sizes. Nevertheless, per student expenditure in 10 rayons in Chernihiv oblast are higher than those in Sumy. This is reflected by exceptionally high per class expenditures in 10 Sumy rayons, above the national average. This finding indicates that class size is not the only important factor which needs to be analyzed.

We now turn to specific issues identified during the research program. We begin with full-time equivalent staff (Stavka) employed in schools, calculated on a per class and per student basis for all schools (table below provides only rayon level averages). This indicator covers all staff employed by the school (see types of school staff provided in Appendix A).

Table 8. Per class and per student full-time-equivalent school staff

	Full-time-equivalent (FTE) staff					
	Per class			Per student		
	Mini-mum	Average	Maxi-mum	Mini-mum	Average	Maxi-mum
Vinnitsa (10 rayons)	2,9	3,8	5,8	0,26	0,34	0,52
Sumy (10 rayons)	2,7	3,9	4,8	0,30	0,37	0,45
Cherkasy (10 rayons)	2,9	4,0	5,8	0,26	0,36	0,52
Chernihiv (10 rayons)	2,9	4,2	6,5	0,27	0,37	0,59
Total (40 rayons)	2,7	4,0	6,5	0,26	0,36	0,59

The data presented in the above table is very surprising and will require additional verification (see section 2.3). On average in over 970 schools in 40 rayons, there are 4 FTE staff per class. There is also a rayon when this indicator is above 6! As we see below, there are on average 35 lessons per

week per class in the selected rayons, which means that there are about two FTE teachers teaching per class. The remaining 2 FTE staff are school management, pedagogical support staff and technical staff. Clearly, there are a lot of them in the rural schools.

We also note that the indicator of FTE staff per class is consistent with the indicator of per class expenditures (correlation coefficient 0,94). In particular, there is exceptionally high per class employment level in 10 rayons in Chernihiv oblast, which partly explains why recurrent expenditures per class are so high there.

Per student indicator of FTE staff is also very high. Please recall that if there are on average in a given rayon over 0,5 FTE staff per student, this means that there are less than 2 students per FTE staff. In other words, in 3 out of 4 oblasts studied (with the exception of Sumy) there are rayons, in which the number of FTE staff is more than half the number of students. If the data are correct, they indicate serious overstaffing of these schools.

In order to analyze this closer, we discuss two additional indicators, namely number of weekly lessons per class and percentage of FTE technical staff among all FTE staff.

Table 9. Teaching offered and share of technical staff in selected rayons

	Weekly lessons per class			Percentage of FTE technical staff		
	Mini-mum	Average	Maxi-mum	Mini-mum	Average	Maxi-mum
Vinnitsa (10 rayons)	30,5	33,2	40,7	20,7%	31,2%	38,1%
Sumy (10 rayons)	27,4	35,4	39,2	32,7%	37,4%	42,0%
Cherkasy (10 rayons)	23,2	32,2	36,5	20,0%	32,0%	39,0%
Chernihiv (10 rayons)	32,3	41,2	47,8	24,1%	33,1%	44,8%
Total (40 rayons)	23,2	34,9	47,8	20,0%	33,4%	44,8%

The number of weekly lessons per class is regulated by the teaching plans and should be uniform between schools. The main sources for differentiation are conducting joint lessons (for students in different grades), the variable component of the curriculum and the option of dividing classes into groups for some subjects (the last option is only rarely used in rural schools, due to small class sizes). For this reason, the differentiation exhibited in Table 9 is somewhat surprising. We may perhaps discount extreme cases of 23 or 48 lessons per class per week as possible data errors.

However, even the averages for 10 rayons in different regions are quite differentiated, ranging between 32 and 41 lessons per week (difference of 28%). This may indicate that the monitoring of application of curriculum norms in Ukraine is inadequate.

We note, indeed, that the percentage of technical staff at the rayon level is very high, on average 33%, reaching 37% in 10 rayons in Sumy. At individual rayon level, this indicator varies from 20% to almost 45%. Of course, variation at the school level is even greater, with many schools employing over 50% of FTE technical staff.

Table 10. Individual teaching in selected rayons

	% of individual teaching		
	Minimum	Average	Maximum
Vinnitsa (10 rayons)	4,0%	10,5%	26,1%
Sumy (10 rayons)	13,0%	18,4%	23,2%
Cherkasy (10 rayons)	2,4%	8,2%	15,8%
Chernihiv (10 rayons)	2,9%	12,7%	21,6%
Total (40 rayons)	2,4%	12,4%	26,1%

Once again, we need to warn that these indicators are so distressing that they need further verification. If they are correct, they suggest the following process. Number of teaching hours in schools is regulated by the national curriculum and controlled by school owners. Thus we see that average number of weekly lessons are more uniform across 40 analyzed rayons, with some worrying exceptions. However, the normatives of employment of technical staff are not formulated as sharply. Over the years, some schools in some rayons have been allowed to employ and retain increasing number of full time equivallent technical staff.

Table 11. Distances between schools in selected rayons

	Below 5 km		Between 5 and 12 km		Average distance to closest neighbor
	Pairs	% of all schools	Pairs	% of all schools	
Vinnitsa (10 rayons)	9	3,4%	31	11,7%	6,0
Sumy (10 rayons)	4	1,7%	38	16,1%	7,7
Cherkasy (10 rayons)	25	9,7%	202	78,0%	6,4
Chernihiv (10 rayons)	19	8,9%	134	62,9%	8,2
Total (40 rayons)	57	5,9%	405	41,7%	7,0

We now turn to individual teaching in schools in selected 40 rayons. This indicator has been assessed for each school separately, based on the classes which are formed in these schools (see Appendix A). In particular, in schools without classes all teaching is individual (indicator equal 100%).

We first note that share of individual teaching varies greatly between rayons, from 2,4% to over 26%. The variation among individual schools is

even greater (from zero up to 100%). There are also significant differences between oblasts, with individual teaching in 10 rayons in Sumy oblast equal to more than double that of Cherkasy oblast. Thus individual teaching varies between oblasts and between rayons, and seems to be another important contribution to high per student expenditures in rural schools in Ukraine.

Finally, we turn to geographical indicators. These are important if there are plans for school network consolidation, meaning closures of some schools and transfer of their students to larger, consolidated schools. The following table provides information about the number of pairs of schools located closer than 5 km from each other, and pairs of schools located between 5 and 12 km from each other.

Altogether, in analyzed 40 rayons there are 57 pairs of schools located closely to each other (under 5 km), which is 6% of all schools in these rayons. This means, for example, that if all pairs of schools located closer than 5 km from each other are merged, we would see 6% reduction of schools in all 40 rayons analyzed (and 10% reduction of schools in the rayons of Cherkasy oblast).

Moreover, there are over 400 pairs of schools with distances between 5 and 12 km (42% of all schools). Please note that percentage of pairs of closely lying schools is not correlated with average distance between schools. For example, average distance between closest neighbors in 10 rayons in Chernihiv oblast is the largest among analyzed rayons, but in that there are exceptionally many pairs of closely located schools in rayons. This finding indicates that average distances are not a useful information, and that more detailed analysis of closely located schools is necessary.

2.3 Conclusions

It is clear that if Ukrainian student population declines and no active measures are taken to adapt school networks to these demographic changes, there is a significant risk that the average size of schools, especially in rural areas, will also decline and with them the average size of classes. This is in fact was has been happening in the last 20 years in Ukraine. While number of students decreased by 40% between 1990 and 2010, the number of schools fell by 7% and the number of teachers by 4% (Coupe et al. 2011).

Clearly, Ukraine has been pursuing a policy of *preservation of local school networks*. As chapter 1 shows, this was primarily the case of rural schools.

By preserving the school network and by protecting teacher employment, Ukraine avoided conflicts over school closures. The price for these local decisions, taken in many villages across the country, has been the lowering of school efficiency. The average school size decreased from about 320 students in 1991 to 215 students in 2012 (CeDoS 2013). As a result, share of education in Ukrainian GDP has soared to over 7.1% in 2010 (Coupe et al. 2011).

One of the arguments used to support the policy of preservation of school networks is that smaller classes lead to better contacts between students and teachers, more time for individual pedagogical interaction, and better learning conditions, and thus contribute to improved education quality. However, recent analysis of determinants of education outcomes of Ukrainian schools, using independent testing of national external examinations as a criterion, showed that small classes do not positively influence student results (Coupe et al. 2011).

The findings of the research program outlined here were quite unexpected to the researchers themselves. High levels of individual teaching and of technical staff, identified in the review, seem to be new findings on Ukrainian education. As noticed in section 1, although selected 40 rayons are not representative, they do form a large sample allowing to assume that these two issues appear in other schools across Ukraine.

The findings of the research program may be used to improve operations of the Ministries. However, one important general lesson concerns the degree to which actual functioning of the Ukrainian education system today is understood by Ukrainian experts and politicians.

On the one hand, Ukrainian experts have direct experience of the mentality of all education stakeholders, first-hand knowledge of current legislation and of working procedures, from own and family perspective they know best how Ukrainian schools operate. Therefore, they tend to dismiss calls for more empirical analysis by a general statement that *we know all this already*.

At the same time, however, there is remarkably little empirical review of how schools in fact operate. For example, there is general perception in the country that there is a degree of corruption in Ukrainian education system, as is in every sector of Ukrainian economy (see OECD 2017). However, no systematic review is available about the most typical forms of corruption (other than related to textbooks), types of schools most affected, or indeed the reasons for parents to participate in corrupt practices. Similarly, while there is broad understanding that management of education at the local

level is "politicized", the forms and effects of this politicization are not identified and analyzed. Thus, even if Ukrainian experts really *know all this already*, little of this knowledge is available in the form of published reports, quantitative evidence or written analyses.

The findings of the limited research program conducted jointly by MES and MF shows that – to some extent – Ukrainian education is still *terra incognita*, waiting to be objectively analyzed and described. Further empirical analysis of how Ukrainian schools really work is thus of great interest and of significant potential usefulness to all education reformers in the country.

Appendix A. Research program on rural education

Work on the data from selected rayons was conducted in May and June 2015. Altogether, 40 rayons from 4 oblasts were selected and analyzed (see the list of analyzed rayons below). For each selected rayon, statistical, personnel and financial data on each school in the rayon were collected (see below the methodology of the analysis). 40 short rayon reports were prepared according to agreed methodology. On that basis, four summary reports were prepared for the four oblasts (see also References).

It needs to be stressed that oblast reports discuss local school systems in 10 rayons within each oblast, and do not provide comprehensive review of all oblast schools.

The following oblasts were jointly selected by leadership of MF and MES: Sumy Oblast, Vinnista Oblast, Cherkasy Oblast and Chernihiv Oblast. In each oblast, 10 rayons with the smallest average class sizes of general education day schools for youth were selected. These rayons are as follows:

- In Sumy Oblast:

  Burinski rayon (Буринський), Velikopisarivski rayon (Великопи-сарівський), Gluhivski rayon (Глухівський), Konotopski rayon (Конотопський), Krolevetski rayon (Кролевецький), Lebedinki rayon (Лебединський), Lipovodolinski rayon (Липоводолинський), Ohtirski rayon (Охтирський), Romenski rayon (Роменський), Shistkinski rayon (Шосткинський).

- In Vinnitsa Oblast:

  Zhmerinski rayon (Жмеринський), Kozyatinski rayon (Козятинський), Mogiliv-Podilski rayon (Могилів-Подільський), Murovano-Kurilovetski rayon (Муровано-Куриловецький), Nemirivski rayon (Немирівський), Orativski rayon (Оратівський), Pishchanski rayon (Піщанський), teplitski rayon (Теплицький), Hmilnitski rayon (Хмільницький), Chechelnitski rayon (Чечельницький).

- In Cherkasy Oblast:

  Horodishenski rayon (Городищенський), Zhashkivski rayon (Жашківський), Zolotoniski rayon (Золотоніський), Kamyanski

rayon (Кам'янський), Kanivski rayon (Канівський), Katerinopilski rayon (Катеринопільський), Lisyanski rayon (Лисянський), Monastirishchenski rayon (Монастирищенський), Smilyanski rayon (Смілянський), Chornobaivski rayon (Чорнобаївський).

- In Chernihiv Oblast:

  Borznyanski rayon (Борзнянський), Ichnyanski rayon (Ічнянський), Menski rayon (Менський), Kulikivski rayon (Куликівський), Nizhninski rayon (Ніжинський), Nosivski rayon (Носівський), Semenivski rayon (Семенівський), Sribnyanski rayon (Срібнянський), Ripkinski rayon (Ріпкинський), Shchorski rayon (Щорський).

Number of schools and students in ten rayons of each oblast is summarized in Table 2.

Data indicators at rayon level are provided in 4 oblast reports. For each of 10 rayons in every oblast, a short analytical report with school level indicators was prepared by authors of oblast analytical report (these 40 reports are not listed in the bibliography).

METHODOLOGY USED IN THE RESEARCH

The methodology followed in the research program consisted of the following steps:

1. Selection of rayons to be analyzed, see above.

2. For each selected rayon, a list of schools was obtained from MES (for each selected rayon, all day general secondary schools in that rayon were analyzed).

3. For each school, financial data were obtained from MF, school statistical data were obtained from MES (see below the list of data items used).

4. An Excel file with automated calculation of school level indicators was prepared (see below the list of indicators calculated).

5. A separate Excel file with a macro accessing Google Maps functionality was prepared.

6. Collected data, including data from Google Maps, were entered into rayon Excel files[2]. This resulted in automated calculation of indicators.

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2   For some rayons this required some level of manual data entry, if the data collected from MES were not in appropriate electronic format.

7. Forty rayon level brief analytical reports, based on comparative analysis of school level indicators, were written, according to a general outline prepared for the research team.

8. Four oblast level summary analytical reports were written, according to a general outline prepared for the research team (see bibliography).

The reports were reviewed and discussed among the research team (see below) and corrected to ensure consistency of approach and of tables used.

The following data items were collected for all schools:

- Expenditure data collected by MF.

  For each school, total expenditures in 2014 were collected from national Treasury database, broken down by salaries (with associated social contributions, KEKB[3] 2110, 2120), food products (KEKB 2230), communal charges and energy (KEKB 2270), other recurrent expenditures and capital expenditures (the last category was excluded from analysis due to its incidental nature).

- Statistical forms ZNZ-1 collected by MES.

  These forms are submitted by all general secondary schools in September and include various statistical data on school enrollment (no data on teachers). Only data on students and classes from September 2014 were used.

- Data on school employment levels, collected by MES.

  The following data items were used: number of full time equivalent (FTE) teaching staff whose salaries are calculated based on weekly teaching load (teachers, educators), number of FTE of pedagogical staff – directors and their deputies, number of FTE of other pedagogical staff[4], number of FTE of other staff[5]. Moreover, total numbers of teaching lessons per week were collected.

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3 KEKB is the Ukrainian budget classification.

4 This includes pedagogues-organizers, practical psychologists, social pedagogues and similar.

5 This includes deputy directors responsible for school maintenance, secretaries, laboratory assistants, guards, cleaners, heating system operators and similar.

- Data on distances between schools within each rayon.

  Using Google Maps functionality, for each pair of schools the distance (kilometers) and the travel time (minutes) between schools was assessed. This allowed to identify pairs of schools which can be consolidated without excessive travel time for students to consolidated schools.

The collected data were used to calculate automatically over 50 indicators for each school, in 4 groups: employment indicators, class network within school indicators, school network within rayon indicators and financial (expenditure) indicators. All calculated indicators are listed below.

Indicators for employment levels (9 indicators):

1. Full time teaching teachers per class.

2. Number of weekly lessons per class.

3. Pedagogical non-teaching staff (managers and other pedagogical) per class.

4. Pedagogical non-teaching staff (managers and other pedagogical) per student.

5. Technical staff per class.

6. Technical staff per student.

7. Total full time equivalent staff per class.

8. Total full time equivalent staff per student.

9. Percentage of technical staff among all school staff (FTE).

Indicators for class networks within school (up to 14 indicators, depending on grade composition):

1. Average number of classes per grade (number of classes divided by number of grades taught).

2. Average class size.

3. Average class size for each grade (if no students are reported in the grade, the indicator is not calculated) – this is potentially to 11 indicators.

4. Percentage of individual teaching.

The last indicator was assessed using the following approach. Individual teaching is organized in small schools when there are less than 5 students per grade, instead of class teaching. However, the problem is to assess how many lessons are provided in this way. We considered all grades for which existence of a class was reported, assessed according to the national curriculum how many lessons per week this class should have, and estimated that all the remaining weekly lessons were used for individual teaching. The indicator was then equal to the percentage of all weekly lessons organized in schools devoted to individual teaching. In particular, if no classes are formed, all teaching is individual and the value of the coefficient is 100%. Some problems have been encountered in this analysis, so the reliability of this indicator is weaker than for other indicators.

Indicators for school networks (12 indicators):

1. For three nearest schools by distance, distance to the school (kilometers).

2. For three nearest schools by distance, travel time to the school (minutes).

3. For three nearest schools by distance, number of students in the neighboring schools.

4. For three nearest schools by distance, average class size in the neighboring schools.

These 12 indicators were used to assess which pairs of schools are located sufficiently close to each other, so that school consolidation can be attempted. The distances were used, because it is recognized that travel time are less reliable in Google Maps, especially in rural areas with poor road network.

Indicators for expenditures (8 indicators):

1. Total recurrent expenditures per class.

2. Total recurrent expenditures per student.

3. Total wages expenditures per class.

4. Total wages expenditures per student.

5. Non-wage recurrent expenditures per class.

6. Non-wage recurrent expenditures per student.

7. Percentage of wages in total recurrent expenditures.

8. Average yearly wages.

Investment expenditure data were collected from MF but not used in the analysis, because these expenditures are quite sporadic.

As mentioned in the chapter, the importance of per class indicators is related to the fact that teacher salaries form a large part school budgets, and therefore significant deviations of per class expenditures may indicate some potential problems (recall that salaries of Ukrainian teachers are regulated nationally and are quite similar across the country).

3. | POLICY OPTIONS REGARDING FRAGMENTED SCHOOL NETWORKS IN UKRAINE

There is growing recognition in Ukraine that many inefficient, fragmented local school networks in rural rayons provide inferior education to children coming from small villages and at the same time are extremely expensive (on a per student basis). The challenge to rationalize these networks and to ensure both minimum education quality and efficient use of public funds has become apparent both to the Government, to the Ministry of Education and Sciences and to the Ministry of Finance, and in the regions, to local experts and officials of rayon and oblast education departments. This challenge is particularly acute in the current period of serious external threat to the stability of the Ukrainian state and of the need to include in education all internally displaced children.

At the same time, the policy response of the Ukrainian Government to this challenge is quite difficult. First, education legislation in Ukraine delegates the authority to close schools to their owners, that is gromadas, cities and rayons (they also have the right to open these schools). The Ministry itself or oblast education departments cannot close the schools through their own decisions. Even if the Ministerial appointees in the oblast and rayon education departments were ordered to pursue a policy of school closures, this policy would be difficult to execute without the approval by democratically elected councils at either level.

Moreover, Ukraine is a large and geographically diverse country, with three levels of local governance. This makes formulating and implementing education policies regarding school networks quite difficult. Indeed, there are very serious differences in the structure of education networks between urbanized and industrialized regions in the East and mountainous or rural regions in the West of the country, to mention just one differentiating factor. Options for network consolidations are similarly differentiated.

Further, Ukraine is a young democracy, in which there is ample space for different parties and interest groups to voice their expectations and articulate their dissatisfactions. While in more autocratic regimes school closures will meet only minimal – or none at all – opposition from local communities, in Ukraine these communities will quite easily make themselves heard across the nation. This means that the process of network consolidation should be conducted in open dialogue and through discussions which will at least make it clear to all involved the education and social costs of not improving school network. It is of course quite difficult to achieve this goal.

Finally, in Ukraine the issue of school network consolidation is particularly difficult to discuss, more so than in many other countries, because of the financial crisis. It is necessary – but almost impossible – to take into account interests of teachers who will find it very difficult to find work outside of education, interests of students for whom transportation to a distant school over a dilapidated road creates an additional barrier in access to education, and interest of the national budget, which is under enormous pressure of war and of economic decline.

In the present chapter we describe a few potential policy responses to the overriding challenge of low efficiency of rural schools in Ukraine. The chapter is based on the assumption that these issues – although divisive and difficult – should be openly discussed in a professional and calm manner. We begin with brief (and necessarily superficial) identification of two main causes of school network inefficiency we observe in Ukraine today. We then discuss in what way decentralization, if implemented properly, may address these problems. We also formulate a few policy options which can be discussed by all sides and which hopefully will not immediately lead to mutual incomprehension and rejection. Such a public discussion may allow the Government of Ukraine to adopt a common strategy composed of useful and targeted policy measures.

3.1 The Ukrainian road to school inefficiency

The present highly undesirable state of local school networks in Ukraine is the result of 25 years of confused responsibilities in the education sector and of poor sectoral and budget management. It is worth to discuss briefly both of these here.

Confused responsibility in the education sector is due to parallel reporting lines. The primary evidence for these double reporting lines is visible in the constitutional structure of rayons and oblasts, where local (rayon/oblast) executive apparatus is responsible both to local (rayon/oblast) council, who sets the budget, and to higher level executive offices, who appoint the local executive. In other words, the officials at rayon and oblast level represent both local population (through their subordination to the council) and the national authorities (through the appointment procedure). This creates confusion and many opportunities for local political games, instead of pursuing the long term interests and strategies of any single governance level. The only local governments which avoid these double reporting lines, and thus can be considered to be bona fide local governments, are cities of oblast and rayon significance. All other Ukrainian local governments fail to comply with the requirements of European Charter of Local Governments (as we discuss below, currently Ukrainian reformers discuss amendments to the constitution which will correct this, however these constitutional reforms are not yet implemented).

A very important example of this confusion was, until last year, the legislative norms which delegated the recurrent financing of schools to rayons, but the decision to close the schools was taken by the villages (gromadas). In other words, a village could vote to keep a school open without taking upon itself the responsibility to finance it. As a result, over two decades very few schools were closed, despite serious decline in birth rates and massive migration to the cities. Simply put, many villages were slowly becoming dominated by elderly, retired persons, but still refused to close schools serving fewer and fewer children. Not surprisingly, the result of this process is a huge number of small schools with extremely small classes. This particular legislative norm was fortunately lifted last year, but it will take some time before the effects of this change become visible.

At the same time, education was beset by problems of poor budgeting practices and poor management. The problem of budgeting practices in Ukraine is the absence of hard budget constraints. In literature these

practices are called *deficit budgeting* and consist of the process in which different budgetary units plan their budgets excessively, beyond the expected revenues, and towards the end of the budget year they claim that their funds are not enough and demand additional budget allocation. In this budget game, those who run largest deficits face most difficult problems and therefore are likely to receive highest additional allocations. Similarly, some rayons and some oblasts, due to political protection they enjoy, may feel free to overspend beyond the budget allocation with the knowledge that in November or December they will be supported to avoid budget collapse. Thus those who maintain the budget discipline are punished, and those who break it are rewarded. Indeed, if all budget users across the country understand – as they do understand in Ukraine – that there are no hard budget constraints and that in the end the Ministry of Finance will find additional budget allocation, the incentive to overspend is quite strong. Specifically in education, this motivates local officials to avoid unpopular decisions of school closures and to maintain increasingly inefficient local school networks. In this way, poor budget practices support poor management of schools.

3.2 The promise of education decentralization

The main positive novelty for governance of education in Ukraine that may come with decentralization is the creation of strong local agent, namely democratically elected, budget-independent local governments, who will take responsibility for all local decisions regarding school networks. In particular, local governments will be able to decide on school closures in the interest of local population, without double reporting lines discussed above. They will combine in their hands the responsibility to finance schools and the responsibility to manage school networks. They may decide, of course, to keep a small school open, but this decision will be taken together with the decision to allocate additional funds from their own budget to this school.

Important motivation to consolidation of fragmented school network comes with decentralization and per student allocation formula for education grants. As mentioned, decentralization creates local managers of school networks in the person of local governments. By law they are typically given responsibility to provide education to their population, by exercising tasks of managing, adapting and financing school networks.

Also typically, local governments receive grants from the national government to finance schools. These grants may be categorical (as in Ukraine) or general (budget funds can be used for any purpose, not only education). The allocation formulas for these education grants is usually based on the number of students, with some groups of students allocated higher per student amount (for example, students of rural schools, national minorities students, special needs students, see chapter 5).

The motivation system functions in the following way. Small schools with small classes tend to be much more expensive on a per capita basis (more expensive than the funds allocated through the education grant). Closure of small school and transfer of its students to a nearby school reduces expenditures of the local government, but does not reduce the funds allocated under the education grant, because the number of students does not change. Thus local governments are able to use the savings to improve conditions of teaching in remaining schools. Good management of school networks may be rewarded then through the democratic process (elections returning local authorities to power).

A number of conditions must be fulfilled for this motivation system to become effective:

- Local authorities need to be real local governments, regulated according to the European Charter of local Governments, and not local extensions of state administration. Current proposals to amend the Constitution of Ukraine should bring Ukraine closer to this goal. However, presently this condition is satisfied in Ukraine only in cities of national and oblast significance.

- Education grants should be allocated according to a on per student methodology (formula). Thus is a necessary prerequisite, because this would ensure that school closure does not lead to reduced allocation to the rayon, as was the case under previous system, but instead leaves the allocation unchanged. Thus school consolidations frees money for possible reinvestment in consolidated schools. This condition is already satisfied in Ukraine.

- Local governments operate under hard budget constraints (see the following section 3.3).

- The education law should regulate clearly the process of school closures, allowing local government main rights in this area. In Ukraine, recent and forthcoming legislative changes are making rayons and future amalgamated gromadas strong agents of local management of education.

Taken together, Ukraine has already taken important steps towards a reasonable model of education decentralization, and is considering further steps to fulfill remaining conditions. It is a separate matter to discuss when the newly elected local governments will begin to act as independent and responsible owners of local school networks.

3.3 Hard budget constraints

As discussed above, lack of hard budget constraints is one of key reasons for inefficient fragmented school networks in Ukraine. Therefore one important policy of the national government should be to impose hard budget constraints at both the local and national level. However, this is much easier said than done.

Introduction of hard budget constraints at the national level means, essentially, that the Ministry of Finance will refuse to grant additional budget allocation to budget users who have engaged in deficit budgeting. However, there are always some cases, even in countries with very strictly imposed budget constraints, where due to unexpected events or natural causes beyond control of local governments they may face justified need for additional allocation, for example due to internal migration (in Ukraine this is related to internally displaced persons, especially of school age for whom it is necessary to find places in schools). Thus the Ministry of Finance needs to have a developed set of criteria and procedures to assess whether the budget claims it receives are justified or not. It is also necessary to keep sufficient budget reserves for this purpose. Moreover, local governments may claim that the budget allocation they have received, for example under education subvention, is insufficient for their needs. In this case, the central government must be sure that the formula it uses for allocation of budget funds to local government is justified and provides sufficient funds.

One approach to resolve this problem is to include representatives of local governments (and of their associations) in the procedures to allocate different budget reserves. By designing a procedure which includes different local governments, with their differing interests and positions, the central government avoids the situation, in which all local governments unite in a common front and together demand more funds, and creates a space for more serious discussion and for compromise.

Another difficulty which arises with hard budget constraints is how to respond to some local governments breaking budget discipline. While the central government may refuse to allocate additional funds to a rayon which overspends without a good excuse, the resulting problems may lead to lack of funds for teacher salaries and for school maintenance, so that some groups of students and school staff will suffer. Indeed, it is the fear of such local problems which in many cases motivates the Ministry of Education or of Finance to agree to allocate additional funds, to protect interests of students and avoid scandal (and in this way to erode hard budget constraints).

It is clear that good procedures have to be developed to deal with such emergencies. One approach is to conduct constant monitoring of execution of local budgets, so that in case of budget indiscipline (in case of early excessive use of budget funds for specific functions, leaving insufficient funds for the rest of the budget year) Ministry of Finance can intervene. However, it seems certain that budget legislation should also include some stronger measures to deal with budget indiscipline. These may include a range of punishments for local officials breaking the discipline and– even more importantly – the right of the Ministry of Finance to appoint a special envoy who would take over the management of the rayon and be empowered to adjust budget decisions. Ultimately, a rayon or an amalgamated gromada should face the option of being liquidated and included in a neighboring administrative unit if it fails to conduct its budget process correctly.

It may seem strange to insist on this level of central intervention in the affairs of local governments just at the threshold of decentralization, but it seems that such interventions, given the recent history of budgeting processes at the local level, will be required in Ukraine.

3.4 Soft policy measures encouraging school consolidation

When decentralization reform is implemented, all decisions about networks of schools will be taken by democratically elected, budgetary independent local governments, including oblasts , rayons and amalgamated gromadas. These local governments will be implementing existing and new national education policies. Therefore the design of new education

strategies should take into account the interests and motivations of local governments.

There are many financial instruments at the disposal of the Ministries to influence decisions of local governments in the area of network management. The aim of these instruments is to strengthen the incentive mechanisms inherent in the allocation formula (see above).

Among these instruments are investment grants to local governments distributed on the basis of achieved consolidation. For example, investment grants for new schools or for school reconstruction may be conditional on rationalization of school networks. Such an approach would require development of the relevant indicators, so that allocation decisions are not taken in an arbitrary manner. The rationale for this approach will be simple: the Government of Ukraine will limit its investment in schools only to those institutions which are certain to function in the future, so that the investment is useful. Similarly, allocation of school buses can be made conditional on school consolidation (increased need for student transportation).

In many cases, transportation of students to consolidated schools can be organized more efficiently by relying on private transport companies. In this case national investment grants may be targeted to road building, or improvement of bus-stop facilities, or creation of dedicated school space for after-school activities for those students, who have to wait for the school bus after classes.

Another important instrument regards bonuses to teachers who lose work due to school closures. The Law of Ukraine on Assurance of Pension guarantees a financial support equal to 10 monthly pensions (this is lower than 10 monthly salaries) for all teachers who have worked in pedagogical capacity for more than 35 years and are due to retire. Funds for these payments have to be found in the school or local government budget. To facilitate school consolidation, similar support may be offered to all teachers losing work. Obviously, this would be a serious burden on local governments, so such compensation might be supported through a special grant (subvention) from the national budget to local budgets. Again, it is possible to refine the conditions for this compensation (it can be limited to primary and secondary school teachers, or to rural teachers).

It is also possible to encourage local governments to consolidate schools by inclusion of additional weight for transported students in the allocation formula for education subvention. Even without such a coefficient, school consolidation will usually reduce education expenditures of the rayon and will free some funds for transporting students to consolidated schools (see section 3.2 above). However, additional weight in the formula will provide

extra motivation to local governments. As the education subvention is a categorical grant, these additional funds will have to be spent only on education functions.

Yet different soft programs should be devised to facilitate inclusion of students from a closed school into the larger school in a neighboring village. One option is to use boarding houses for students (Internats). However, these are quite expensive to run, do not enjoy good reputation among the parents and there are not enough of them in the villages. Therefore, an alternative would be to place students with the families in the village where the larger, consolidated school is located. The law should specify some conditions, which hosting families must meet (a separate room with a window and necessary furniture, sanitary facilities, distance from the new school and similar). The hosting family should offer both accommodation and boarding. To ensure acceptance of this solution by parents, they should have the right to inspect the family proposing to host their children, talk to them, see the accommodation and to accept or reject the offer of accommodation. The monthly payment to hosting families should be generous enough, so that there is sufficient supply of willing families. Also the rayon need to provide free transportation of students from their homes on Monday morning and back home on Friday afternoon. Hence such a program must be supported by a specific new financial instrument (grant to local budgets).

Specific financial instruments have to be selected by Ukrainian officials on the basis of their best knowledge of local needs. The preferred instruments may also change over time. What is important here is to create a coherent national policy motivating local governments to rationalize school networks and to monitor its effectiveness.

3.5 Focus on quality of small rural schools

The primary concern of MES is – and should be – with the quality of education. Presently, there are two basic instruments available to the Ministry to monitor education quality, external examination system and the State Inspection of Education Establishments. Every school must undergo periodic assessment by school inspection. The report from school assessment may include binding recommendations about what the school should do to correct identified weaknesses.

The actual quality of education in small rural schools is not easy to evaluate. World Bank report assessed that students from larger schools with larger classes have statistically better results on independent tests (Coupe et al. 2011), but economic and social status of students' families was not included in the analysis. Indeed, parents of students in larger, urban schools tend to be better educated, so the better results of those students in independent external evaluation is quite expected and do not indicate that these schools are teaching better than small rural schools. On the other hand, many education experts in Ukraine say that rural schools provide on the whole good education, in part because they have older, better prepared teaching workforce. However, also this judgement is not based on hard evidence. For instance, it is known that these schools have insufficient access to specialized equipment or to foreign language teachers.

It seems that an effort by the school inspection to review the quality of work in small rural schools would be very useful. The pedagogical work of these schools is certainly highly differentiated. Some of them probably provide quality education in adverse conditions and should be supported, and others should be closed immediately for quality reasons, quite irrespectively of economic reasons. A review by school inspection would provide more objective basis for assessing which of the small rural schools belong to which category.

Because these schools are small and quite dispersed across rural rayons, school inspection should develop a specific methodology to assess the quality of their work. For example, many of those schools provide only initial education (first four grades), so there are no external examination results available. In such cases, interviews may be conducted with the teachers of lower secondary grades in schools, to which the students of small school migrate upon finishing initial education. The methodology should also take into account the school equipment, which in the small rural schools is often available only partially. Sending groups of inspectors to a small school may create a feeling of "invasion" and be counter-productive (and will certainly be quite expensive), so methodology should be based on the inspection by one person. These inspectors should be adequately prepared for this work.

By visiting the small rural schools, inspectors from school inspection will also be able to assess whether there are real alternatives to maintaining the small schools. This is essentially the question of whether there is a different school nearby and whether there is a road or other means of transportation available to students to travel to the neighboring school. The methodology of assessing small rural schools should also include visiting the nearby school to obtain information whether students transported there will actually obtain better education than in their current schools.

It is therefore reasonable to expect that the methodology to assess small rural schools to be developed by the school inspection will be rather complex one, and the review of these schools may become a major and potentially expensive effort. Nonetheless the value of such an effort for Ukrainian education cannot be doubted.

3.6 "Small school" program in Ukrainian conditions

Although inefficiency of fragmented local school networks in Ukraine is now a recognized problem, school closures should not be the only option. Indeed, creating alternative solutions will provide more flexibility to local governments and will change the nature of local discussions, primarily of discussions between students' parents, teachers and inhabitants of small villages on the one side, and local governments on the other.

The alternative solutions should allow parents to take over the management of the schools threatened by closure, under conditions regulated by law. Here one example may be provided by Polish program "Small school". Under this program, certain rules governing schools may be suspended for small rural schools, including minimal teacher remuneration, use of school staff for cleaning the premises, and similar. These regulations make the running of schools much cheaper. Moreover the law on education defines a procedure, through which such a school may be transferred from the local government to an NGO organized by parents through a contract (in particular, law on education defines specific conditions which must be met by such contracts).

A similar program may be defined for Ukraine. Instead of mimicking Polish solutions, it should be based on the reality of Ukrainian rural schools. For example, Polish teachers earn relatively well, so Polish program "Small school" includes a possible reduction of their salaries. This is quite unlikely to be possible in Ukraine. On the other hand, Ukrainian rural schools often have excessive number of technical staff (see chapter 2). The work of this staff (such as cleaning school premises) may be done free of charge by parents, or otherwise organized more cheaply, thus significantly contributing to reduced recurrent costs of these schools.

While the details of such a program should be discussed and agreed by Ukrainian experts, the following principles of Ukrainian "Small school"

program should be used:

- The program should be clearly defined in education legislation, including all the procedures. In particular, procedures should be described in the law for transfer of school to an NGO, for monitoring of how transferred school operates, and for retaking of the school back by the local government in case some conditions are not met any more. In particular, the NGO should have no right to close the school it took.

- The law should likewise define basic conditions which should be met by the contract between the local government and the NGO.

- Financial obligations of the local government towards the NGO running such a school should be clearly defined. These obligations should be smaller than actual costs of running the school prior to the transfer, but should still be considerable. For comparison, Polish local governments are obliged to transfer to the NGO running the school funds equal to the number of students enrolled in the school multiplied by the average per student expenditures of all schools run by that local government.

- The law should allow for easy checking of the school activities by the local government.

It is an open question whether it is possible to organize active NGO's in Ukrainian villages to take over the running of small schools in remote villages. If this is a serious difficulty, alternative approaches may be considered. For example, instead of an NGO maybe a selected family from the village – or the village head – can be the party to the contract. Maybe some rayon-level or oblast-level associations or NGO's can undertake this role. All these important details have to be resolved by Ukrainian experts, who understand the situation in villages.

Two innovative small school programs developed in Ukraine are discussed in Appendix B. These are "school family" project of 2006, and "hub school" project of 2016. Interestingly, none of these two projects envisages active involvement of NGO's.

Importance of such programs for rural rayons in Ukraine is clear. By providing an alternative to both maintenance of a very expensive school and to its immediate closure, an Ukrainian "Small school" program may provide flexibility and increase available options to resolve local disputes. If there is strong motivation in the village to defend their school, to put in the effort to manage it in a different manner, such a school may be maintained. If, instead, the village is opposed to school closure but is not ready to put in the effort to save it, the school will most likely not be saved.

3.7 Conclusions

The present chapter describes a few policy options, which the Ukrainian government may implement in order to effectively address low efficiency of local school networks in Ukrainian villages. Some of these options are already pursued by Ukrainian government, at least partially (for example, emerging decentralization strategy or the hub school program). Other options may be included in new legislation, for example in the forthcoming law on secondary education. It is also possible that specific conditions of Ukrainian schools allow for more policy options, not described in the present note, better tailored to expectations and mentality of Ukrainian population. Whatever policy is adopted for implementation, it should be clearly and openly proposed and be publicly discussed.

Improvements of school networks should not be seen as something which can be achieved quickly. It took many years of bad management to slowly destroy efficiency of many rural schools, and the reverse path will not be easy or quick. What is necessary is that the Ministry of Education and Science together with the Ministry of Finance jointly adopt a set of strategies and pursue them obstinately. Even though the decisions regarding specific individual schools will be taken by local governments across Ukraine, the central government is responsible for correcting present legal obstacles to good management of schools, for introducing a system of effective incentives and for implementing improved budgeting procedures.

Appendix B. Innovative Ukrainian approaches to the problem of small rural schools

In the present Appendix, we discuss two approaches used in Ukraine to address the problem of small rural schools, namely so called "one-class" schools (однокомплектна школа, introduced in 2006) and so called "hub schools" (опорна школа, introduced in 2016).

One-class schools

These schools, under the name «Школа-родина» ("family school"), were introduced and piloted in Ukraine in 2006 through Order of the Minister of Education and Science nr. 345 of May 3, 2006. The pilot project initiated creation of one-teacher schools, in which different functions were shared between the teacher and the parents. According to the project, one-class schools enrolled up to 16 students in grades 1 through 4, and the only teacher provided lessons and support to all of them. The activities of the school were supervised by a neighboring regular school. The accounting support and other managerial issues were also the competency of that neighboring school.

By design, the family school required significant involvement of the parents. They took part in school maintenance and organized after class activities. The requirements regarding school facilities and equipment were much simplified. In particular, family school could operate in normal residential buildings, where one or two rooms were allocated to the school.

The pilot project in 2006 was very limited, it included only 10 rural school[6]. Moreover, it was prematurely terminated after a change of the Minister of Education and Sciences. For those reasons the pilot project was not supported by proper monitoring, and no completion report was prepared. It is therefore impossible, unfortunately, to assess the results of this innovative project. Since 2006, Ukraine did not return to similar experimental projects.

Nevertheless, one can formulate the lessons from this experience, relevant for today's Ukrainian conditions.

One-class school was designed as an education institution without the rights of a legal person, planned for students of initial school working ij one

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[6] Further discussion of one-class schools is based on extensive interview with Pavlo Polyanski.

common group (children of different age attending lessons together). As a rule, the school was legally a part of a neighboring larger school, called the basic school.

The basic school performed all support functions of the one-class school, such as accounting, administrative and financial management. This included: accounting of all school expenditures (including teacher salary), centralized purchases of metreials and their delivery to school, financial and statistical reporting. This minimized administrative overhead of the school.

School facilities did not have to conform to standard requirements for school buildings, in operations in Ukraine. Instead, the following basic requirements were imposed:

- Area: at least 2 rooms of sufficient area, depending on the number of students.

- Furniture: working place for each student, a separate place for eating.

- Safety: safe exit in case of emergency.

- Sanitary requirements: access to functioning changing places and water for hand washing.

- Communications: mobile phone for use by the teacher.

The work of teacher of such a school has several specific features (see below). Thus, a change of in-service teacher training may be required, as well as preparations of new methodical documents. Also, the roles of parents and students of one-class schools are different (see below). These schools will depend on constant engagement of parents. This means that before such schools are established in the village, it is necessary to seriously discuss support of local community and to plan it in detail.

The functions of teacher of one-class school, in addition to standard functions, include the following:

- Conduction of joint and individual teaching, according to the teaching plans for grades 1 through 4. However, typical teaching plans (detailing the number of hours of different subjects per week) are not obligatory, the teacher should prepare specific teaching plans taking into consideration the diversity of students.

- Full documentation of the teaching process, according to current regulations (student marks, attendance, homework).

- Monitoring and fostering in school. This includes individual psychological assessment and support for every student. For special needs students, the teachers is professionally supported by the basic school.

- Monitoring of academic progress of each student, including the relevant documentation. This covers conduction of individual assessment of needs of every student, preparation of learning plans for every student and monitoring of how they are implemented.

- Maintenance of all school properties, including furniture, computers, teaching aids, library, sport equipment. In case some equipment is broken and needs renovation, the costs are borne by the basic school.

- Organization of systematic contacts of students of one-class school with students of the basic school. These should be organized at least once a month and should be planned together with teachers of initial grades of the basic school. These contacts should include creative, academic, and sport activities. Transportation to the basic school is organized and financed by the basic school

Functions of director of the basis school, in addition to standard functions, include the following:

- Monitoring of pedagogical operations of one-class school,

- Regular visits to one-class school (at least once a month),

- Extending psychological support to the teacher, organization of visits of school psychologist from the basic school as needed,

- For specific subjects (arts, foreign languages, IT) maintenance of plan of teaching by qualified teachers of the basic school,

- Organization of systematic visits of students on one-class schools in the basic school.

Functions of parents include the following:

- Basic maintenance of school facilities (provision of food to students, cleaning, delivery of cleaning materials, washing of school towels and similar),

- Support to teacher in education of students, especially in situation of conflicts between students,

- Support to teacher in monitoring of students during activities outside of the school building (sports clubs, after school activities, breaks between lessons).

Hub schools

Hub schools have been introduced into Ukrainian education through the Order of the Cabinet of Ministers (Кабінет Міністрів України 2016) in January 2016. The basic model of the hub schools involves the following elements: the central school (Опорна школа) and affiliated schools (школи-філії).

Requirements regarding the central school:

- The hub school has the status of legal person.

- The hub school may have its own accounts in the State Treasury System, its own balance sheet, its own stamps.

- The hub school should, as a rule, have no less than 360 students, not including students of affiliated schools.

- The Hub school should have at least 3 affiliated schools.

- The hub school should provide access to material and technical basis (sport facilities, laboratories for physics, chemistry, biology, geography, workshops and similar).

- The hub school should employ qualified teachers.

- The hub school should be headed by an experienced school director.

Requirements regarding the affiliated schools:

- The affiliated school is not a legal person.

- The affiliated school, as a rule, is an initial school (grades 1 through 4), or after approval from school founder – basic school (grades 1 through 9).

- The affiliated school is managed by affiliated school leader.

The purpose of introducing hub schools is to improve quality of education in rural areas and at the same time to make them more efficient. As a rule, initial teaching (first four grades) will be conducted in villages, close to the students' homes, and after grade 4 students will be transferred to the central school. Because of this semi-consolidation (school consolidation for upper grades) it will be possible to reduce teacher employment and to focus resources in the central school. This approach may also facilitate investment programs, such as specialized laboratories for different subjects, because they will be much better targeted.

Appendix C.   Clarifications regarding some types of Polish schools

In the Ukrainian discussions regarding new framework Law on Education, an example is often made of the legal regulation of different types of schools in Poland, especially so called *szkoła społeczna* ("social school"). The aim of the present appendix is to clarify some misunderstandings regarding the legislative basis of the different types of schools in Poland. It is hoped that the clarifications will be useful to Ukrainian reformers as they decide which parts of Polish experience in education may be useful for adoption or adaptation in Ukrainian legislation. For this reason, the appendix focuses exclusively on Polish cases.

In Poland, the term state school (Державна школа) is not used. The key term is public school (Публічна школа), which according to legislation means a school which has open enrollment (no restrictions on who can become a student), which does not charge tuition fees, and which conforms to all regulations regarding curriculum, teacher qualifications, and required school documentation. Public schools are typically owned and managed by local authorities of different tiers or (in specific cases regulated by law) by government authorities. However, they may also be owned by non-public bodies, such as religious institutions, citizens' associations, foundations, or non-government organizations. Conversely, local governments cannot operate non-public schools. Overwhelming majority of primary and secondary schools in Poland are public.

Our review covers the following types of schools:

- Non-public schools.
- Public school, whose founder is a legal or physical person.
- Small public school, transferred by local government to other subjects.
- Social school (szkoła społeczna).

Non-public school

A non-public school is a school founded by a legal person, who is not a unit of local government, or by a physical person, through entering it into a registry of non-public schools maintained by a unit of local government, which by law is responsible for operating the schools of the given type, and on whose territory the given school is located. This means that

gminas maintain registries of non-public preschools, primary schools and gymnasiums, while powiat maintain the registries of secondary schools (and several other types of education institutions).

Often, in informal use, non-public schools are referred to as "private schools". Some non-public schools, especially those operated by citizens' associations, are informally referred to as "social schools", see the last point of this appendix. Neither of these two terms appears in current legislation.

A non-public school may charge tuition for their services and may set working conditions and teacher remuneration differently from the salary levels legally binding in public schools (typically, salaries in non-public schools are lower, or teaching time is larger).

A non-public school may be either a school with authorization of public school or a school without such authorization. If the school has authorization of a public school, then it is allowed to issue state certifications of completing a grade and state diplomas (these are official documents). A school with authorization of state school may also receive financial dotation for the unit of local government, where the school is registered. In turn, funds for this dotation are included in the education subvention received by the local government from the state budget.

Because of the school obligation (duty of all school-aged children to attend schools), primary schools and gymnasiums without the authorization of public schools are not allowed. The school obligation in Poland covers all persons between the age of 6 to 15. This means that all schools, where student of this age are enrolled, must by schools with public authorization, entitles to issue state certifications and diplomas. Remaining schools (secondary and post-secondary schools) may obtain the authorization of public school, if they meet the conditions specified by the legislation. The administrative decision to award authorization of public school is taken by the unit of local government, where the school is registered. To obtain the authorization of public school, a non-public school must:

1. Execute teaching programs, based on officially approved program bases of general education, and in case of vocational schools also on approved bases of vocational education (program bases are approved by the Minister of National Education).

2. Conduct teaching in the cycle approved for public schools (primary school – 6 grades, gymnasium – 3 grades, lyceum – 3 grades).

3. Conduct teaching of obligatory subjects with teaching time (number of lessons per week in education cycle) not less than teaching time established in framework teaching plan approved by the Minister of National Education.

4. Apply principles of assessment and promotion approved by the Minister of National Education.

5. Conduct external examinations according to rules defined for students of public schools.

6. Maintain internal documentation of the teaching process as public schools.

7. As teachers of obligatory subjects, employ persons with qualifications equal to those demanded of teachers of public schools (including completed tertiary education).

A non-public school with authorization of public school, enrolling students under school obligation, receives for each such student dotation from the unit of local government, where it is registered, equal to 100% of average recurrent expenditures per one students in schools of the same type, operated by that local government.

Public school operated by legal or physical person

A public school may be founded and operated by a legal person, different from a unit of local government, or by a physical person. However, creation of such a school requires an approval, issued by the unit of local government responsible for operation of schools of given type. For example, to open a public primary school on a territory of gmina, and legal or physical person must first secure agreement of the given gmina.

The conditions for issuing these approvals are regulated by the Ordinance of the Minister of National Education. One of key conditions is that the new school should complement the local network of schools operated by the unit of local government. Local government may refuse to approve creation of new public school, if it considers that the new school will duplicate existing public schools or will be in competition with them.

All the pedagogical process and care for students in such a school must be free of charge. The public school will receive dotation from the unit of local government, which issued the approval, equal to 100% of average recurrent expenditures per one students in schools of the same type, operated by that local government.

These schools operate according to the rules established in law for public schools operated by the local governments, with a few exceptions. These exceptions are as follows:

1. School catchment area for the school is determined only if the school founder so requests.

2. The school is not a budgetary institution according to local public finance legislation, and the principles of financial management are established by the school owner (the person operating the school).

3. The school director need not be selected through a public competition.

4. The regulations of the law Teachers' Charter are applied in limited manner. The regulations of teacher obligations, required qualifications, professional advancement, and disciplinary responsibility are applied fully. However, the following regulations are not applied:

   a. Rules of employment,

   b. Obligatory number of lessons per week,

   c. Remuneration and social benefits for teachers.

In these three areas, instead of the Teachers' Charter the regulations of the Labor Code are applied.

Small public school transferred to other subjects

The law allows the unit of local government to transfer, under certain conditions and through a signed contract, the operations of a public school to a different subject, for example a citizens' association or a foundation, or a physical person. This rule applies only to public schools enrolling not more than 70 students. In this manner, the founder of the school may change without the need for closing a school and opening a new one.

The law regulates many specific conditions of such a contract regarding transfer of school operations, in particular that the school transferred may not be closed by the new founder (the school must be first returned to the local government which transferred it in the first place, which can then close it according to the rules). Moreover, the transfer contract must be approved by the regional representative of the Minister of National Education (so called curator).

The facilities of the school transferred through a contract remain the property of the local government, and are only provided for use by the new school founder free of charge.

A school transferred through a contract operates analogously to a public school operated by legal or physical persons other than units of local governments (see point above). This includes also the financial obligations

of the unit of local government which transferred the school. However, the new founder must act according to the clause in the transfer contract. In case the contract, or the laws, are violated, – and in cases the new founder refuses to continue to operate the school – the unit of local government must take over the school

Social school

A social school (szkoła społeczna) is not a legal term, and is not regulated or used in the Law on the System of Education. It is used informally to describe a school operated by a social organization, most commonly a citizens' association, with educational and not commercial goals. The name was adopted because in the initial period of creating on non-public schools (early nineties), many of them were established by the association *Społeczne Towarzystwo Oświatowe* (Social Education Association, STO), and the word "social" in the name reflected their opposition to what was then the system of state schools. Many of STO schools still use the adjective social in their names. In fact, some of the best known social schools in Warsaw were established before the current Law on System of Education was adopted and introduce the concepts of public and non-public school (1991). On the other hand, this term is not used to describe the small public schools, transferred through contract to citizens' associations by units of local governments.

In practice, the term "social school" is applied both to public and non-public schools. Clear majority of STO schools are non-public schools with authorization of public school (they charge tuition). Thus, public or not-public character of school cannot be judged based on the school being "social".

4. | EDUCATION ALLOCATION FORMULAS IN TRANSITION COUNTRIES

In the 25 years of reforms and adjustments of education finance since the collapse of the Soviet Union, former Soviet bloc countries have chosen very different paths of management and financing of their education systems (for comparative reviews see Fiszbein 2001, Davey 2002, Bischoff 2009, Alonso, Sanchez 2011). Despite these differences, some common themes emerge: these are decentralization and transfer of significant managerial and financial responsibility to subnational governments. To effectively finance education, municipalities in transition countries need sectoral transfers, often called education subvention. Thus, they face the problem of allocating these transfers to numerous local governments, that is the problem of the allocation formula.

There are two main types of allocation formulas for education subvention used in transition countries, namely *top-down* formulas and *bottom-up* formulas. In top-down formulas, a fixed pool of funds is distributed between local governments according to some priorities, for example by allocating relatively more funds to rural or mountain schools to reflect their smaller class sizes. Typically, these formulas use the concept of *weighted students*, with numerical weights attached to different groups of students expressing the priorities of education policy. In addition to rural or mountain weights, these formulas may use weights for special needs or minority students, for student transportation and similar. Because top-down formulas do not assume what are the actual costs of education, but instead distribute the funds for

education, based on some priorities, we may call them *distributive formulas*. Polish formula is an example of such distributive formulas.

The bottom-up formulas, in contrast, begin with an analysis of per student costs of providing education in different settings and for different grades. A key element of these analyses are assumptions regarding class sizes in different local conditions, such as in rural schools. Bottom-up formulas are based on a few explicitly stated and estimated parameters, such as the number of teaching hours in the curriculum (sometimes for each grade, sometimes for groups of grades), regulated teacher salaries (often the minimum teacher salaries are considered), and the standard teacher work-load (number of teaching hours per week for full-time equivalent teacher). This allows their adaptation to many different types of education, such as special education (integrated or non-integrated), education of minorities and similar. Since many of these parameters are legally regulated, the resulting formulas may be also called normative formulas. Estonian formula is an example of such *normative formulas*.

It should be noted that both distributive and normative formulas need to consider the key difference between rural and urban schools, namely the average class size. This is not surprising, because differences in class size largely determine the differences in per student expenditures. However, different formulas do this in very different manner. Distributive formulas assess the relative class sizes. For example, Polish allocation formula assumes that schools located in rural areas and in small cities (up to 5 thousand inhabitants) are on average 38% smaller than in larger cities, and use the weight 0.38 for their students. Normative formulas, instead, make direct assumptions about the normative class size. For example, the Estonian formula assumes that primary school in the city has 24 students, and in rural areas may have only 12 students. Upper secondary school in the city has normative class size of 32.

The aim of the present chapter is to review in some detail the two very different allocation formulas, namely the Polish one and the Estonian one (sections 4.1 and 4.2). In the third section, we discuss the one issue in which these formulas are like each other, namely the use of administrative criterion of school location, and review some examples of formulas from transition countries, which used different, non-administrative criteria.

The present chapter, unlike the rest of the book but similarly to chapter 7, , is not focused exclusively on Ukrainian situation. It seems however that it is useful for the Ukrainian audience for two reasons. The first reason is that it presents more general issues related to the construction of the allocation formula, and thus serves as an introduction to the following two chapters. The second reason is that it discusses in some detail the allocation formulas used in Poland and in Estonia, which are currently object of interest and

intensive discussions among Ukrainian experts. Indeed, the formula used in Ukraine in 2016 is similar in some respects to the Polish formula (see section 4.1 and chapter 5), while the formula proposed below is more like the Estonian formula (see section 4.2 and chapter 6). Of particular interest to Ukrainian experts may be discussions of specific conditions in Poland and in Estonia, which contribute to good functioning of allocation formulas (these discussions are at the ends of sections 4.1 and 4.2).

4.1 Example of distributive formula: Poland

Management and financing of all public schools in Poland[7] is the responsibility of local governments (the few exceptions to this rule are some agricultural schools and schools in prisons). There are three tiers of local government in Poland: gminas, powiats and regions (only at the level of the region there is cohabitation of locally elected council and centrally nominated governor). Several large cities, known as cities of powiat rights, receive revenues and execute functions of both gminas and powiats. The following table provides average sizes of different tiers of local governments in Poland.

Table 12. Overview of Polish local government system.

Tier	Name	Number of units	Average number of inhabitants
First	Gmina	2 478	15,6 thousand
Second	Powiat	380	101,2 thousand
First and second	City with powiat rights	66	191,2 thousand
Third	Region	16	2 402,3 thousand

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7   The concept of "public school" in Poland and related legal terms are described in Appendix C.

It may be useful to remark that average number of inhabitants in gminas without the cities with powiats rights is 10,7 thousand, and in powiats without the cities with powiats rights is 82,2 thousand.

The general allocation of education functions in Poland is as follows:

- Gminas, or first tier of local governments, finance special preschools, primary schools and gymnasiums (lower secondary school).
- Powiats, or second tier of local governments, finance secondary schools (general academic lyceums, professional technikums and vocational schools), special primary schools, gymnasiums and and secondary schools, dormitories, psychological-pedagogical centers,.
- Województwa, or regions, finance select secondary schools of national or regional importance, pedagogical libraries, teacher in service training.

The main financial instrument for making this possible is the education subvention, a transfer from the central to local budgets. Education subvention is a general (non-earmarked) grant, and the funds can be used for any purpose in accordance with the laws. The law does not specify which education functions should be covered by the subvention. Although every year there are several municipalities which spend on education less than they receive through education subvention, on average gminas spend on education about 30% more than they receive in education subvention, and powiats about 5% more (Herbst, Herczyński, Levitas 2009).

The formula for allocation of education subvention in Poland is traditionally called "the algorithm", and is adopted every year through an ordinance of the Minister of National Education. The total pool of education subvention is determined every year in the budget law. By law, a small percentage of this total pool is set aside as reserve, to be allocated by the Ministry of Finance, in cooperation with the Ministry of Education, to needing local governments. The algorithm allocates the remaining part of this pool of funds to gminas, powiats and regions. The formula for 2016, which will be reviewed here, was adopted on December 22, 2015, together with explanatory justification. Poland has been using an algorithm to allocate education subvention since 1996, but the present approach to the formula was adopted in 2000 and was subject to numerous changes since then (see Levitas, Herczyński 2002, Herbst, Herczyński, Levitas 2009, Levačić 2011b).

Several general and vocational schools are run by some ministries, primarily the Ministry of Agriculture manages some of agricultural schools (most agricultural schools are still managed by the powiats), the Ministry of Justice manages schools serving the inmates in prisons and correction centers, and the Ministry of Foreign Affairs manages some Polish schools servicing children living abroad. These schools are financed from the budgets of relevant ministries, not through education subvention.

Education subvention is transferred from the central to local budgets in monthly installments, at the beginning of every month. The monthly instalment is equal to 1/13 of the total (yearly) subvention, except for the March instalment, which is equal to 2/13. This is so because in March teachers receive an additional payment, so called "thirteenth" salary (this is the privilege of all public employees in Poland).

The allocation of education subvention is performed in the following manner:

1. First, the reserve of education subvention is separated. The reserve was originally at the level of 1% of the total pool of funds, in 2004 it was reduced to 0,6%, and in 2008 to 0,25%. The reserve is allocated to individual local governments during the budget year, to cover unforeseen expenditures due to flooding, fires or other events. Initially, the reserve was also used to cover differences due to errors in statistical data on student numbers, but this is no longer necessary. The discussions regarding the use of the reserve are conducted by the Ministry together with the representatives of local governments, who together assess the written applications for additional funding. The actual allocation of the reserve is performed by the Ministry of Finance.

2. The rest of the funds are divided into three components, called SOA, SOB and SOC. The first component SOA is proportional to the statistical number of students in each local government, the second component SOB covers additional funds for school tasks, and the third component SOC covers funds for non-school tasks. Both SOB and SOC are proportional to the numbers of weighted students, that is the statistical students in different specified groups multiplied by the appropriate weights. Overall, the allocation is proportional to the number of weighted students in each local government.

3. The total pool of funds (without the reserve) divided by the total number of weighted students determines so called standard of allocation of subvention. This is the amount of funds allocated per one weighted student. Such standard student is a student of primary school located in large city, who does not belong to any other group of students with attached weights.

4. SO_A: The statistical number of students is derived from the yearly collection of statistical data from all schools, submitted by all schools and other education institutions to the national database SIO (System Informacji Oświatowych), and maintained by the Ministry (more precisely, by subordinate budget institution Centrum Informatyki Edukacji CIE). Students of all schools for youth, public and non-public, are treated in the same way (the statistical number of students is the same as the physical number of students). Students of schools for

adults are distinguished by school type, form of studies and public or non-public ownership (see Table 13 below).

5. SO_B: the additional funds for school task are allocated to local governments according to 36 weights defined in the algorithm. Every weight is applied to a specified group of students, to increase the allocation above the basic allocation of SOA. The weights are applied additively, in the sense that a student may belong to more than category of students, and then the additional weights are added (for example a student from national minority in a rural school, or a student with special needs and attending a gymnasium). Selected weights for school tasks are indicated in Table 14.

6. SO_C: there are two types on non-school tasks. The first is when there is a well-defined group of benefitting students, for example dormitories, dedicated support for early childhood development, professional centers for special needs students, and similar. For these tasks the weights apply to these students. The second type reflects tasks the benefits are spread across the whole student population, for example pedagogical libraries (financed by regions), psychological-pedagogical centers (financed by powiats) or after-school activities (financed by gminas and powiats). For these tasks the weights apply to all students attending schools on a given territory. In consequence, the numerical values of these coefficients are very small. Selected weights for non-school tasks are indicated in Table 15.

7. The resulting numbers of weighted students are then multiplied by corrective coefficients related to teacher qualifications. The aim of the corrective coefficients is to increase the allocation to those local governments, which employ more highly qualified teachers who receive higher salaries. These coefficients (in their current form) were introduced in 2006. In two key aspects, the corrective coefficients are different from all other weights of the formula. The first is that they depend not on students and their characteristics, but on teachers and their characteristics. In this sense the Polish formula is no longer a pure "per student" formula. The second is that unlike other, additive weights, the corrective coefficient is multiplicative. It therefore influences the effects of all other weights in a complicated manner. Review of the corrective coefficient is provided above Table 16.

The following table presents coefficients used in the Polish formula to pass from the physical number of students to 'statistical" number, to reflect varying teaching effort depending in part on the form of studies[8].

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8   There are two types of colleges: teacher colleges, three-year HEI introduced for rapid preparation of teachers of foreign languages (mostly English and German), and colleges for social workers. Their inclusion in the education subvention is an exception to the rule and has only historical justification. The number of these colleges is declining rapidly.

Table 13. Coefficients used for adult students in Polish allocation formula

Form of studies	Public schools	Non-public schools	Colleges
Day	0,7	0,35	1
Evening or weekend	0,5	0,25	0,7

As the table indicates, the coefficients assume that the teaching effort in evening or weekend schools is about 50% of the teaching effort in day schools. Similarly, public schools for adults receive about 70% per student as public schools for youth. The smaller allocation for non-public schools for adults is an anomaly, it reflects the fact that initially, since 1996, the allocation for all non-public schools was at the level of 50% of the corresponding allocation for public schools. Allocation for non-public schools for schools for youth was equalized to the allocation for public schools in 2001. The allocation for students who are schooled at home is at the level of 60% of students attending schools. These funds are directed to schools which monitor students' progress and provide them with pedagogical support, not to their families.

Table 14. Selected weights for school tasks in Polish allocation formula

Group of students	Weight in 2008	Weight in 2016
Students of rural primary schools	0,38	0,40
Students of primary schools with less than 70 students		0,18
Students of rural gymnasiums	0,38	0,27
Students of gymnasiums	0,04	0,04
Students of lyceums	0,08	0,12
Students of vocational schools	0,15	0,23
Students of non-special schools in health institutions	1,00	
Students of special schools in health institutions	1,00	1,00
Students entitled to free teaching of Polish language		1,50

The following Table 14 provides an overview of a selection of weights for school tasks. For comparison, the values of the weights used in 2008 are also provided. Missing values indicate that a weight was not used in the formula. Not included in the table are weights for special needs students, for students of artistic schools of different types, and for minority students.

As mentioned above, these are additional weights, thus a student a student of a primary school in a large city appears in the formula as 1 weighted student, while a student of rural primary school as 1,4 weighted students (if no other weights apply).

Table 14 indicates that the weights may be increased, decreased or kept without change. Moreover, not only the values of the weights have been changing, but also some weights are added and some are removed from the formula. Nevertheless, the overall number of weights increases (see Table 17).

Below we exhibit selected weights for non-school tasks.

Table 15. Selected weights for non-school tasks in Polish allocation formula

Group of students	Weight in 2008	Weight in 2016
Students using dormitories (not special needs)	1,5	1,5
Special needs students using dormitories	2,0	2,0
Students using Childhood Retreat Houses[9]	0,2	6,3
Students of vocational schools	0,001	0,0010
Non-school tasks of gminas	0,030	0,0340
Non-school tasks of powiats	0,008	0,0085
Non-school tasks of regions		

Between 2008 and 2016, the set of the weights for non-school tasks did not change, and with one exception their values were either unchanged, or changed only slightly. The one exception is the weight for students using Childhood Retreat Houses. Its massive increase from 0,2 to 6,3 is due to

9   Childhood Retreat Houses are educational institutions for short term activities by students requiring some health support or for normal classes conducted for a week or two away from own school (so called "green schools"). They are financed by powiats.

the change of how the users of these institutions are calculated. Initially, every student who used the Childhood Retreat House was calculated as 1, irrespective of how long they stayed there (typical but not universal period of stay is one week). Recently, with more detailed statistical data available, the weight is applied to average daily attendance in each Childhood Retreat House. This a good example of how the formula evolves; not only through addition or removal of weights, or though some modifications of the value of the weight, but also through changing the method of applying the weight.

The above table does not include weights for students assigned to diverse centers supporting special needs students with dormitories. The weights for these students are very high reflecting high cost of providing specialized care and education, they range from 6 to 11.

The multiplicative corrective coefficient D for each Polish local government reflects the relative differences of teacher salaries due to their different qualifications (as measured by the share of teachers at 4 levels of professional advancement scale[10]). In its current form the corrective coefficient was introduced in 2005. It is defined as

$$D = W + (1-W)*ARS*(1+R*S_r).$$

Here ARS is the average relative salary in the given local government, defined as the ratio of weighted average standard salary in the municipality to the national weighted average standard salary (with weights coming from shares of teachers at four levels of professional advancement), and Sr is the share of students of rural schools among all the students in given municipality. There are also two fixed parameters: W is the share of non-teacher salary expenditures in total school expenditures, and R reflects the add-ons to salaries of teachers in rural schools (see Table 16 for values of these parameters).

If in a gmina or powiat there are relatively fewer beginner teachers and relatively more diploma teachers than at the national level, then the corrective coefficient D will be larger than 1 and the increased allocation should help the local government to pay relatively high teacher salaries. Similarly, gminas with more students in rural schools have relatively more teachers of rural schools, who are entitled to some special add-ons. The factor Sr and correspondingly also the corrective coefficient D will be appropriately larger for these local governments. It is expected that the

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10 Polish education legislation provides 4 levels of professional advancement, called beginner teacher, contract teacher, nominated teacher and diploma teacher. For each level, there is a legally defined minimum salary, which needs to be reached on average in each local government (but not necessarily for each teacher at each level). The minimum salary of diploma teacher equals 225% of the minimum salary of beginner teacher (see Herbst 2012a).

corresponding increase of education subvention will allow the municipality to pay the rural salary add-ons.

The following table provides the values of fixed parameters used in the definition of corrective coefficient D.

Table 16. Parameters used in corrective coefficient in Polish allocation formula

Symbol	Meaning	Value in 2008	Value in 2016
W	Average share of non-teacher salary expenditures	0,2	0,25
R	Weight for salary add-ons for teachers of rural schools	0,12	0,12

The increase of the value of W between 2008 and 2016 reflects the fact that the share of material expenditures and salaries of non-pedagogical staff in total school expenditures in Poland has on average decreased from 80% to 75%. The parameter R remained constant because there was no change in the add-ons to salaries of teachers working in rural schools.

Finally, we review the evolution of the Polish allocation formula from the point of view of complexity. The changing number of weights used in the Polish formula is summarized in the following table.

Table 17. Evolution of the number of weights in Polish allocation formula

Type of weight	2000	2008	2016
Number of weights for school tasks	14	27	36
Number of weights for non-school tasks	7	14	14
Number of all weights	21	41	50

As the table indicates, the number of weights has grown rapidly over the years and presently the algorithm is extremely complicated. This makes any analysis of the algorithm quite difficult. The additional source of complexity is the use of multiplicative correction coefficients. All the weights and coefficients interact with each other, and it has become very challenging to identify the impact of any individual weight on the overall allocation.

The present algorithm operates in Poland already for 16 years, provides necessary stability and is generally accepted. Improvements of Polish students in PISA scores indicate that despite initial worries, decentralization and financing reforms did not contribute to decline of education quality. It is worth to reflect what specific Polish conditions made the implementation and continued use for 16 years of the algorithm a success, despite many problematic issues. We can formulate the following conditions:

- Local governments in Poland are rather rich and may contribute to education significantly more than they receive in education subvention. On average, gminas contribute about 30% above the subvention. This means that any inadequacies or lack of precision in the formula may be compensated by contributions from the municipal budgets.

- Local governments have been heavily involved in the yearly negotiations about changes to the allocation formula[11]. This means that over time they started to view it not simply as decision of the Ministry, but also as result of their own efforts.

- In particular, the political framework of these yearly discussions is that local governments discuss with the Ministry of Education details of the allocation formula (values of weights), and together with the Ministry of Education negotiate with the Ministry of Finance the total pool of funds for education subvention.

- There are considerable funds in the reserve of education subvention, which are used on a case by case basis, with active participation of local governments.

4.2 Example of normative formula: Estonia

Compulsory education in Estonia is provided in basic schools (primary schools, 9 grades). Further students may attend gymnasiums (general academic schools, 3 grades) or continue to vocational education. The responsibility for managing local school networks and for financing them

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11 There are seven national associations of local governments in Poland, and all of them participate in the yearly discussions.

rests, similarly to Poland, with municipalities. There are 213 municipalities in Estonia forming a single tier, with the average population of 6 380 inhabitants. This average masks huge difference of sizes of Estonian municipalities, as the following table demonstrates.

Table 18. Overview of Estonian local government system

Number of inhabitants	Number of municipalities	Share of total population
Under 2 000	119	10,6%
Between 2 000 and 5 000	63	14,9%
Between 5 000 and 10 000	16	12,7%
Between 10 000 and 20 000	10	13,6%
Between 20 000 and 100 000	4	18,2%
Above 100 000	1	29,8%
Total	213	100,0%

Per student allocation formulas have been introduced in Estonia in 1996 and have undergone several reforms and radical changes since then (see Levačić 2011a, Santiago et. al 2016[12]). The current financial mechanism, presented briefly below, is in operation since 2015. It has not been the subject of much analytical reviews, so of necessity the description we provide here is much more limited than one on Polish formula in section 4.1 above.

Unlike in Poland, Estonia clearly distinguishes the financial responsibilities in the education sector of the central budget and of local budgets. The central budget is responsible for providing funds to cover the salaries of teachers and of school directors, to pay for their professional development, to cover the costs of study materials and of school lunches (see components of the education grant in Table 19). All other expenditure items, such as communal expenses (heating, water, electricity, school maintenance) and salaries of administrative and technical staff are the responsibility of the local budgets.

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12 The present chapter is in part based on the study visit to Estonia, organized in June 2016, and on the materials distributed by Estonian officials.

To discharge its responsibility, the central government transfers to each local government in Estonia per student education grant. The grant is targeted (earmarked) and can only be used for education. It is the responsibility of the government to ensure that the grant is sufficient to cover the functions it is designed to finance. If a municipality can organize its local education system more effectively, it can use the savings to improve education, but not to finance non-education tasks.

The calculation of the per student amount is based on several basic assumptions. These may be listed as follows: assuming the normative class size, assuming normative teacher salaries, assuming normative school curriculum.

The main methodological difficulty concerns the calculation of per student amount for teacher salaries. The following calculation was performed in Estonia for two model schools: urban basic school with 3 classes per grade, and urban gymnasium with 5 classes per grade (further calculations depend on this assumption, but not the resulting per student amounts). The step by step calculation is as follows:

- The minimum teacher salary is established by the law, and is the same for basic schools and for gymnasiums (also actual average gross salaries are the same for all education levels, see EACEA 2016). It is now 958 Euro per month. Because some factors such as length of work in education may increase this basic salary, it is increased by 20%. Further 33,8% are added to cover taxes and social contributions. Thus one teacher position costs 18 458 Euro per year.

- The normative class size in urban basic schools is 24 students, and in urban gymnasiums – 32 students.

- As stated above, model urban basic school has three parallel classes per grade, leading to 27 classes in this school. Model urban gymnasium has 5 classes per grade, and hence 15 classes altogether.

- With the class size assumption, we find that there are 648 students in urban basic school and 480 in urban gymnasium.

- According to national curriculum, the average teaching load (including division of some lessons into groups) is 33,6 lessons per week in basic schools, and 44,8 in gymnasiums.

- Hence the number of lessons per week becomes 907 in urban basic school and 672 in urban gymnasium.

- The work load of teachers is on average 21 lessons per week in both basic schools and in gymnasiums.

- Thus, the required number of teaching FTE positions is equal to 43,2 in urban basic school and equal to 32 in urban gymnasium.

- This means that the yearly cost of teaching positions becomes 797,39 thousand Euro in urban basic school, and 590,66 thousand Euro in urban gymnasium.

- Dividing this amount by the number of students in each model school, we obtain for both cases per student amount equal to 1 230,5 Euro.

- The fact that per student amounts of teacher salaries in urban basic school and in urban gymnasium are the same shows that also the student teacher ratio is the same. Indeed, if we divide the number of students in each model urban school by the number of required teaching positions, we obtain 15.

For comparison it is useful to note that Polish allocation formula clearly distinguishes between different levels of education, in line with many international practices (see section 4.1, Ross, Levačić 1999).

The remaining elements of per student amount have been calculated separately by the Ministry of Education, in part based on historical expenditures. The following table summarizes the result of these calculations.

Table 19. Components of per student amount for urban schools in Estonia

Component of per student amount	Value (Euro)	Composition
Support to teacher salaries	1 230	80,6%
Support to salaries of school directors	92	6,0%
Support for study materials	57	3,7%
Support to professional development of teachers and directors	12	0,8%
Support for school lunches	136	8,9%
Total	1 527	100,0%

To reflect the rural character of many small Estonian municipalities (see Table 18), the component for teacher salaries is multiplied by special coefficients, defined for all municipalities. These coefficients range in value from 1 to 1,9. To understand their values, it is useful to recall that before the current formula was adopted, Estonia used a system of coefficients for rural municipalities, rather like Poland, to increase per student allocation (see Santiago et al. 2016). However, unlike Poland which used one rural

coefficient, Estonian used many coefficients based on the number of students in a municipality. The relevant coefficients used in 2004 are listed in the following table.

Table 20. Rural coefficients in Estonian allocation formula in 2004

Municipality type	Number of students	Coefficient
City	More than 700	0,9
	Less than 700	1
Rural municipality	More than 500	1
	Between 350 and 500	1,1
	Between 250 and 350	1,2
	Between 180 and 250	1,3
	Between 120 and 180	1,4
		1,5

Since 2008, these coefficients have been used together with additional component, called *class fulfillment capability*. This meant that for schools with very few students in initial classes, the allocation formula assumed a normative size of the initial classes, and allocated funds to the *missing students* (as if there were more students enrolled than in reality). In a sense, this was return to per class financing (Santiago et al. 2016), and created perverse incentive to organize small classes in schools (and receive the allocation for missing students). This component of course increased the allocation to rural municipalities, but also reduced incentives to consolidate network of basic schools. In 2014, Estonia re-introduced a true per student formula. It decided to freeze the effective coefficients, composed of the rural coefficients listed in Table 20, and of the additional allocation for missing students. These frozen coefficients are still used today. The freezing of coefficients removed the perverse incentive, because if classes become smaller, no new missing students will be added.

It is natural that components of the basic per student amounts for study materials, for professional development and for lunches are not multiplied by the rural coefficients, in contrast to component for teacher salaries. However, it is somewhat surprising that the rural multipliers do not apply to the component for salaries of directors. This means that the funds for school directors allow to finance fewer positions in smaller schools.

To verify this, we perform the calculation for the model urban basic school and urban gymnasium, as was done above in the calculation of basic amount for teacher salaries.

- According to EACEA (2016), actual average gross salaries of teachers and school directors in Estonia do not differ between the school levels, and on average director salaries are 1,25 higher than teacher salaries. Taking into the current minimum teacher salary of 958 Euro, we find that the minimum net monthly salary of school director is 1 245 Euro.

- Let us recall that per student amount for director salaries is equal to 92 Euro (see Table 19). Since model urban basic school has 648 students and model urban gymnasium has 480 students, allocation for school directors becomes 59,62 thousand Euro in basic school and 44,16 thousand Euro in gymnasium.

- Considering the taxes and social contributions at the level of 33,8% and dividing by 12 we obtain net monthly allocation of 3 317 Euro in urban basic school and 2 750 Euro in urban gymnasium.

- This means that in model urban basic school there are 3,1 positions for school director and her/his deputies, and in urban gymnasium there are 2,3 director positions.

- Allocation for small rural schools is much less. For example, if a school has 100 students, the allocation gives only a half FTE position of school director.

This last finding should be put into national Estonian context, however. In Estonia, unlike in many other countries, teacher salaries are regulated nationally but director salaries are negotiated individually by the candidates with school owner, in the case of public schools with municipalities (EACEA 2016). Poor rural municipalities may propose lower salaries for their school directors. They may also insist that the school director is employed at 50% of full time or even less as director, and working as a teacher in the remaining time (this last solution is also often used in rural municipalities in Poland).

Estonian education finance system is stable and functions well. Similarly to Poland, Estonian students showed great improvement in PISA scores. It is worth reflecting what specific Estonian conditions made it possible to derive the normative per student amount rather easily. These conditions include the following:

- Very flat teacher salaries. Unlike Poland, where minimum teacher salaries for teachers at different levels of professional advancement may differ by a factor of 2,25, in Estonia they are much more uniform. They are also the same in basic schools and in gymnasiums (in this respect they are to Poland, but quite unlike many OECD countries).

Therefore, it is not necessary to consider variation of teacher salaries when assessing basic per student amount.

- Simple standard curriculum. There are no major differences in the number of lessons between different basic schools and between different gymnasia.

- The same student teacher ratio in basic schools and in gymnasia. Estonian experts insist on keeping the same per student amount for basic schools and for gymnasia. To achieve this, it is necessary to appropriately define the normative class size in line with curriculum norms.

- Flexibility in determining the number of school director positions and of their salaries. There are no legally mandates director salaries and the municipality is free to determine how many director positions there are in each municipal school. This allowed to simplify the component for director salaries in the allocation formula.

- Long experience and stability of using rural coefficients. The previous system of rural coefficients was in operation for a long time, and after some adjustments generated consensus. It was therefore relatively easy to freeze those coefficients and to assume that this consensus is the basis for current allocation formula.

- Clear division of financial responsibilities in the country. For such a consensus to emerge, it is necessary that Estonian municipalities have sufficient resources to pay for school maintenance and the salaries of administrative and technical staff. They also have the powers to determine required employment levels of these categories of school staff.

4.3 Non-administrative factors for small rural classes

However different the Polish and Estonian allocation formulas are, they nevertheless share an important element, namely they use *administrative* criterion of school location for allocating more funds to students of rural schools.

The administrative criterion is easy to use, because historically the legal distinction between urban and rural areas is very well established. However, such a criterion has several limitations. One is that there are only two

categories of schools, urban and rural, which make it quite inflexible. Indeed, in transition countries both the cities and the villages are quite differentiated, so using only two values may be insufficient. Interestingly, in Ukraine the administrative criterion allows for more flexibility, since it distinguishes four administrative locations: cities of oblast significance, cities in rayons, settlements of urban type and villages (see chapter 5).

The second limitation of the administrative approach is that there is often a gap between real character of a settlement and its administrative type. For example, in Poland there are sub-metropolitan villages, located close to large cities, with completely urban constructions, high population density, and a few thousand inhabitants. Class sizes in these villages are the same as in the cities, but per student allocation of education subvention is much higher, without a good reason. Therefore, the use of rural weight for these municipalities leads to an inefficient allocation of education funds.

To overcome these limitations, several approaches using non-administrative factors have been used in transition countries to reflect lower class sizes in rural schools. We describe briefly four such approaches.

- Additional geographical factors.

  Apart from the rural-urban criterion, several transition countries used additional criteria based on geographical location. One is to allocate more funds to mountain schools, or to schools located at a higher altitude above the sea level than a defined threshold. Another relevant factor is distance from large urban centers. In some countries, proximity to the state border was used as a reason for allocation of more funds per student. Each of these approaches assumes that mountain or distant schools, or schools close to the border, are smaller and must organize smaller classes. Location in the mountains and close to the state border was used at different times in the allocation process in Georgia. Distance from an urban center was used in the allocation formula in Bulgaria.

- Lump sum approach.

  Lump sum approach consists of allocation two components of education subvention for a municipality: a constant amount, equal for all municipalities ("the lump sum"), and a per student component, namely a per student amount multiplied by the number of students in the given municipality. This approach assumes that rural municipalities are often very small. The lump sum is relevant for small municipalities, that is for poor, rural local governments, and becomes insignificant for large ones. In practice, the use of the lump sum is a simple approach to support the execution of education functions in small municipalities. If

applied with sufficient caution, this approach may considerably simplify the formulas used in the allocation process. On the other hand, it is important to stress that it is not possible to justify the use of or the value of the lump sum used in the allocation based on some education or legal arguments. The lump sum approach is used in the allocation formula in Macedonia.

- Population density.

  Population density is relevant for the education finance because in sparsely populated areas of the country it is more difficult to create large schools with larger classes. While this need not be universally true, it has been confirmed in several transition countries. Therefore, it is feasible to allocate the education using population density, with higher allocation for less densely populated local governments. However, there are also many cases where despite low population density the class size is reasonably high, due to the network of settlements (namely in cases where the settlements are not too small, but located far from each other). Moreover, similarly to the lump sum approach, there are no direct education reasons for assessing the coefficients based on density. The population density is used in the allocation formula in Macedonia.

- Size of municipality.

  It is natural to expect that in small municipalities, that is in municipalities with a small number of inhabitants and small number of students, it is more difficult to organize and manage large schools with large classes. At the same time, size of the municipality, as measured by the number of inhabitants or by the number of students in municipal schools, is often easy to assess using administrative data. Thus, it is possible to conduct an analysis of the relationship between municipality size and its average class size, and to use resulting link as a rule for setting normative class sizes for all municipalities. Like population density, this approach needs verification, because there may be large but sparsely populated municipalities, where school consolidation is difficult. As a minimum, good road network will be required to use this factor in the allocation formula. The size of municipality was used until 2008 in Estonia.

- School size.

  There is a rather strong statistical correlation between school size and class size. This means that small schools will in general have quite small classes. Therefore, instead of using directly the class size in the formula,

it is possible to use the school size. Such coefficients may be easily justified by the problems of internal organization of schools. On the other hand, the use of this factor in the allocation formula creates a perverse incentive to decrease the school size through artificial division of large school into smaller units. To prevent this behavior at the local level, it is necessary to very carefully adjust the value of different coefficients, so that the increased unit (per student) costs of a school divided into two or more units are not fully – but only partially – offset by increased allocation from the national budget. The school size is used in the allocation formula in Lithuania.

Finally, one may ask what is the reason for using, in the allocation formulas, of criteria such as rurality or school size instead of simply using the actual class sizes (for example, averaged over all the schools owned by the municipality). This more direct approach was indeed the case of 2016 formula used in Ukraine (see the following chapter 5). The answer lies with the motivational function of the allocation formula. It should be assumed that when local governments review the subvention they receive and compare it with their education subvention, they will consider both the ways to decrease their costs and to increase their allocation. Therefore, if the allocation formula depends on the actual class size, the motivation of local governments to rationalize their school network is reduced. To avoid this effect the formula should use only so called objective factors, that is factors which cannot be influenced by local education policies

5. | REVIEW OF THE 2016 ALLOCATION FORMULA FOR EDUCATION SUBVENTION

Education subvention has been introduced in Ukraine in December 2014 with the reform of the Budget Code. The reform created a modern system of local government finance in Ukraine, with a fixed list of revenues of local governments, including shared taxes, own revenues, subventions (targeted, conditional transfers) and dotations (general, non-conditional transfers), each with its own allocation rules. This system of specific revenue streams replaced a previous, much more complex set of formulas encompassing both the planned expenditures and the planned revenues of rayons (so called "gap filling calculation", to assess and cover for all individual rayons and cities the gap between foreseen revenues and foreseen expenditures), introduced in Ukrainian Budget Code in 2000 and used with some changes until 2014.

Two subventions in the education sector are foreseen in the Budget Code, namely *education subvention* to finance general secondary schools to rayons and amalgamated gromadas, and *subvention for preparation of working cadres* for oblasts to finance vocational education. The present chapter focuses on education subvention only[13].

By law, the allocation formula for education subvention is approved by the Cabinet of Ministers following a proposal submitted by the Ministry of Education and

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13 The subvention for preparation of working cadres was used in 2015 and was discontinued in 2016. There are also discussions about possible introduction of a separate subvention for textbook, but no concrete proposals have been presented.

Science and reviewed by the Ministry of Finance. In 2015, the first year of functioning of education subvention, the allocation formula was included already in the Budget Law, adopted by the Parliament. It was understood that MES had no time and experience to propose an allocation formula of its own. This formula was in fact the education expenditure component of the gap-filling calculation mentioned above. For fiscal year 2016 MES proposed the same formula, without any changes. This 2016 allocation formula is the topic of the present chapter. Its goal is to discuss how it works and what are its strengths and limitations. We try to provide a clear explanatory presentation of this formula for all Ukrainian education stakeholders.

5.1 Overall structure of the 2016 allocation formula

The allocation formula for education subvention used in 2016 is a pure per student formula, similar in its structure to the Polish allocation formula (see section 4.1). This means that education subvention is allocated to rayons and amalgamated gromadas[14] only on the basis of the number of students belonging to different groups with different weights associated to them, and no other factors are being used. This is important to stress, because many education allocation formulas in transition countries use some additional factors, such as composition of teacher workforce or lump sum allocation in addition to per student allocation (see chapter 4).

Ukrainian allocation formula is a top-down formula. This means that with each group of students, for example students in some types of sanatorium schools, the formula associates a specific *coefficient* or *weight*, which reflects different relative costs of providing education to this group of students. For each rayon, the number of weighted students is calculated by summing up over all the groups of students defined in the formula, with the number of students in the group multiplied by the appropriate weight. The allocation of education subvention to rayons is proportional to the number of weighted students calculated for every rayon. In other words, the total pool of funds given to education subvention is divided by the total number of weighted students in the country, and the resulting amount is per *student*

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14 In 2015, general secondary schools were managed and financed by rayons. As of January 2016, 159 newly established amalgamated gromadas manage and finance schools located on their territory. Whenever below we refer to rayons, this reference includes also the amalgamated gromadas.

standard (or standard of budget need, to use Ukrainian terminology). Each rayon receives the amount of education subvention equal to its number of weighted students multiplied by the per student standard. This is very similar to the Polish allocation formula (section 4.1), but quite different from the Lithuanian or Estonian formula (which calculates per student normatives on the basis of programmatic and salary indicators, section 4.2). On the other hand, unlike in the Polish formula, groups of students to whom different weights are applied are mutually exclusive (the weights are not additive, see below).

There are altogether 32 weights used in the 2016 allocation formula, see Table 21 below. With one exception, the weights are applied to students of different school types taking into account school location. This has an important implication: to each student in Ukrainian school system only one weight is applied. This is unlike some allocation formulas in transition countries. For example, Polish formula may associate a number of different weights to one student, for example if she attends a gymnasium school (first weight) located in the rural area (second weight) and belongs to a national minority (third weight), and then all these weights are added. In Ukrainian formula weights are associated with school types, with one weight for each school type, broken by school location (same type of schools, located differently, for example in mountains and not in mountains, have different weights).

The one exception to this rule is the very high weight for students without parental support (and therefore in need of full support from the state, including dormitories, food, cloths, school supplies and other living expenses, see weight 32 in Table 21). This weight is applied independently of the school where these students are enrolled (see comment under Table 21). It is important to note that if a student without parental support attends a school with dormitory, only one weight is associated with this student, namely this exceptional one. Thus for students in schools with dormitories with parental support there is a different weight if the school is located in the mountains or not, but the same uniform weight is applied for students without parental support. We note that also for these students only one weight is applied (no adding of weights).

As noted, with one exception weights are applied to types of school, in some cases taking into account its location. Weights are assigned to the following types of schools: general secondary schools, special schools, schools with dormitories. A specific separate type of school is "Olympic reserve school" for especially gifted students (sport schools, IT and science schools, and similar, weight 24 in Table 21). This weight is very high, because it also includes costs of dormitories.

There are three criteria regarding school location used in the allocation formula:

1. Whether the school is located in urban or rural areas.

2. Whether the school is located in the area recognized as mountain or not.

3. Whether the school is located on the territory of city of oblast significance or in a rayon.

Thus, for example, there are four locations for urban schools (see weights 1 to 4 in Table 21). A separate location category are small mining towns and mono-functional cities with small average class sizes (see weight 15 in Table 21 below).

The third school location criterion is administrative and is related to who is the school founder: a city of oblast significance or a rayon. The category of cities of oblast significance includes 171 large cities with specific administrative status (although recently several smaller cities also received this status). It should be remembered that these administrative units often include some areas around actual main cities, and these areas can be both rural (villages, sela) and urban (urban type settlements, selishta miskogo tipu). Thus there are rural schools in cities of oblast significance, enrolling across the country about 6 thousand students in 2015. This indicates that schools located in cities of oblast significance may be both rural and urban.

Furthermore, of cities of oblast significance, two are fully located in the mountains (Yaremche and Bolehiv, Ivanofrankovsk oblast), and one which is not fully located in the mountains, but does include a mountainous urban settlement (settlement Skhidnitsa, city of oblast significance Borislav, Lviv oblast). This indicates that schools in cities of oblast significance may be either mountain schools or non-mountain schools. It is to the very few students of mountain schools located in the three towns listed that weight 3 in Table 21 applies.

5.2 Details of the 2016 formula

The following Table 21 lists all the weights, provides the number of students to whom the weights apply, number of weighted students (equal to the number of physical students multiplied by the weight), as well as percentage of the overall sum of education subvention. In this way the table provides an estimate of how important different weights are in the allocation process. The order of the weights in the table was chosen to facilitate analysis and

does not correspond to order in official Ukrainian documents (decree of Cabinet of Ministers of Ukraine Nr. 435 of 25.06.2015).

Table 21. Weights used in 2015 together with the number of students

	Definition of group of students		Weight	Students	Weighted students	Share of sub-vention
1	Students of general secondary schools located in non-mountain areas, small or in mining cities, students in inclusive (integrated) classes or in special classes in general secondary schools urban areas – city		0,841	1 954 838	1 644 019	33,85%
2	Students of general secondary schools located in non-mountain areas, small or in mining cities, students in inclusive (integrated) classes or in special classes in general secondary schools urban areas – rayon		0,926	618 491	572 723	11,79%
3	Students of general secondary schools located in mountain areas urban areas – city		0,968	2 943	2 849	0,06%
4	Students of general secondary schools located in mountain areas urban areas – rayon		1,064	24 607	26 182	0,54%
5	Students of general secondary schools located in non-mountain areas, small or in mining cities, students in inclusive (integrated) classes or in special classes in general secondary schools rural areas	Over 22,2	1,010			
6		17,8 – 22,2	1,178	74 798	88 112	1,81%
7		14,8 – 17,8	1,305	199 878	260 841	5,37%
8		11,7 – 14,8	1,431	325 072	465 178	9,58%
9		Under 11,7	1,751	529 385	926 953	19,09%

10	Students of general secondary schools which has a status of mountain schools - rural areas	Over 22,2	1,162			
11		17,8 – 22,2	1,355	13 654	18 501	0,38%
12		14,8 – 17,8	1,500	31 799	47 699	0,98%
13		11,7 – 14,8	1,645	20 883	34 353	0,71%
14		Under 11,7	1,936	5 733	11 099	0,23%
15	Students of underfilled general secondary schools in small or mining cities and mono-functional cities with class sizes, not above 11,7 students		1,751	11 512	20 158	0,42%
16	Students of evening schools – city		0,430	30 995	13 328	0,27%
17	Students of evening schools – rayon		0,290	19 093	5 537	0,11%
18	Students in special schools		2,500	2 084	5 210	0,11%
19	Students with physical and mental correction needs and studing in inclusive (integrated) classes (without students of special schools (boarding schools)) urban areas		2,500	3 370	8 425	0,17%
20	Students with physical and mental correction needs and studing in inclusive (integrated) classes (without students of special schools (boarding schools)) rural areas		2,500	848	2 120	0,04%
21	Students with physical and mental correction needs and studing in special classes		2,500	5 478	13 695	0,28%
22	Foster children in sanatory boarding schools		5,400	14 036	75 794	1,56%
23	Foster children in boarding schools with in-depth military training		6,500	4 761	30 947	0,64%

24	Students in olympic reserve schools	8,400	3 855	32 382	0,67%
25	Foster children in general secondary boarding schools (without schools located in mountain areas, schools with in-depth military training and olympic reserve schools, physical training colleges, sanatory boarding schools)	5,000	27 387	136 935	2,82%
26	Besides students coming to study in boarding schools (without schools located in mountain areas, schools with in-depth military training and olympic reserve schools, physical training colleges, sanatory schools for orphans)	1,000	8 258	8 258	0,17%
27	Foster children in general secondary boarding schools of mountain areas	5,700	2 679	15 270	0,31%
28	Besides students coming to study in boarding schools in mountain areas	1,100	432	475	0,01%
29	Foster children in special boarding schools with disabilities	6,600	32 155	212 223	4,37%
30	Besides students who coming to study in boarding schools with disabilities	2,500	1 479	3 698	0,08%
31	Foster children in special boarding schools with disabilities in mountain areas.	7,500	606	4 545	0,09%
32	orphans and orphanages	12,020	14 068	169 097	3,48%
Total			3 985 177	4 856 604	100,00%

Overall, for 3.98 million physical students covered by the education subvention, there are 4.8 million weighted students (average weight equal to 1,2187).

The first four weights in Table 21 apply to students in mainstream general secondary schools urban schools[15], according to four school locations defined by location criteria listed in the previous section 5.1:

1. Weights 1 and 3 are for cities of oblast significance, weights 2 and 4 for rayons.

2. Weights 1 and 2 are for non-mountain schools, weights 3 and 4 for mountain schools.

Weights 5 to 14 in Table 21 correspond to students in rural schools. Weights 5 to 9 are applied to students of mainstream schools in rural areas, and weights 10 to 14 to mainstream schools located in rural areas in the mountains[16]. For both non-mountain and mountain rural schools, rayons are divided into 5 categories depending on the actual average class size. The first category (with the largest class sizes, above 22,2 students, weights 5 and 10 in Table 21) does not apply to any students, because there are no rayons with rural schools with such large average class sizes. Nevertheless, the weights are defined for them anyway, and historically there were rayons falling into this category (see Table 26). For this reason we include these "empty weights", stating that the number of both physical and weighted students in these categories is zero. Thus there are in fact 8 categories of rural schools, with different allocation weights. This provides for considerable flexibility in the allocation process (in contrast, the Polish formula uses one weight for all rural schools, see chapter 4).

Some weights are lower than 1. This is the case of students enrolled in evening schools (weights 16 and 17 in Table 21), and reflects the relatively reduced teaching effort in those schools. Interestingly and importantly, also the weights for two largest groups of students, namely for urban general secondary schools located in non-mountain areas (weight 1 in Table 21) and in the mountains (weight 2), are less than 1[17].

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15 By mainstream general secondary school here we mean all day general secondary schools, except those located in small or in mining cities, and excluding special schools, schools with boarding houses, students in inclusive (integrated) classes or in special classes in general secondary schools.

16 Unlike for urban schools, same weights apply to students of rural schools irrespective of whether they are located within the city of oblast significance or in the rayon.

17 These two groups of students comprise 65% of all secondary school students in Ukraine and only 46% of all weighted students.

This distinguishes Ukrainian allocation formula from many formulas in transition countries, where a "reference" student, typically a student in basic education in the city, has weight 1 (for example, see Polish and Estonian formulas discussed in chapter 4). In Ukraine formula for 2016, no such "reference" student may be identified. This is, of course, a matter of choice. We note here that by multiplying all the weights by an appropriate amount it is possible to make weight 1 in Table 21 equal to 1 without affecting in any way the allocation of the subvention. Moreover, this would make Table 21 somewhat easier to read for non-specialists.

Finally, we observe that the highest weight (weight 32) is associated with orphan students, who not only attend schools, but also need to be provided with appropriate additional support (dormitories, food, school materials, other living expenses). These students attend different types of schools with dormitories (in parenthesis we list the number of orphans in that school type): general secondary schools (2874), special schools (4622), schools with in-depth military training (160), Olympic reserve schools (59), schools for orphans and orphanages (6353).

5.3 Review of the formula

The most important issue of education finance in Ukraine concerns the level of funding of mainstream urban and rural schools. As noted in the previous section 5.2, there are 2 categories of cities (cities of oblast significance, cities in the rayons) and 4 categories of rayons. For mainstream schools, without schools located in the mountains, the formula uses weights 1, 2 and 5 to 9 (see Table 21, we address the mountain schools below). The different coefficients used in the formula reflect different per student costs in these schools, mainly due to different average class sizes.

The following Table 22 provides overall allocation to mainstream secondary schools not located in mountains (this includes general secondary schools excluding special and inclusive classes). Please note that the number of administrative units refers separately to rural and urban parts of rayons, and excludes rayons wholly located in the mountains.

Table 22. Administrative units, students and classes
for non-mountain urban and rural schools

Students of general secondary schools without mountain areas, mining and mono-functional cities, students in inclusive (integrated) classes or in special classes		Admi-nistrative units	Students (thou-sand)	Classes (thou-sand)
Urban areas	city	169	1 954,8	78,2
	rayon	435	618,5	30,7
Rural areas	17,8 – 22,2	13	74,8	3,9
	14,8 – 17,8	44	199,9	12,3
	11,7 – 14,8	108	325,1	24,9
	Under 11,7	324	529,4	54,5

Of the urban school students, about 76% attend schools in cities of oblast significance, and under 25% attend schools in small cities in the rayons. This is expected, because large cities have very large student population. However, the distribution of students among the 4 categories of rural rayons is somewhat surprising. The fourth category, with the highest weight, comprises 46,9% of all students in non-mountain rural schools, while the first category, with the lowest coefficient, comprises only 6,6% of them.

To better assess the functioning of the formula, in the following Table 23 we provide the weights (as in Table 21 above), average class size and average weighted class size (that is the class size multiplied by the applicable weight).

Table 23. Weights, class sizes and weighted class sizes
for non-mountain urban and rural schools

Students of general secondary schools without mountain areas, mining and mono-functional cities, students in inclusive (integrated) classes or in special classes		Formula weight	Class size	Weighted class size
Urban areas	city	0,841	25,13	21,13
	rayon	0,926	20,64	19,11
Rural areas	17,8 – 22,2	1,178	17,62	20,75
	14,8 – 17,8	1,305	16,90	22,06
	11,7 – 14,8	1,431	13,09	18,74
	Under 11,7	1,751	10,10	17,68

We note that the system of weights to some extent equalizes allocation per class, as it is intended to. The discrepancy in class size between urban and rural schools is very much reduced after application of the weights, especially for the cities of oblast significance. The discrepancies in class size of rural schools in different groups of rayons, however, were reduced only partially. In particular, even after the use of weights the difference of per class allocation for rayons with average class size 14,8 – 17,8 and with average class size under 11,7 remain significant. The first of these two groups of rayons is probably relatively overfunded, the second is probably relatively underfunded. We note that this last group of rayons covers almost a half of all rural students in Ukraine.

We now turn to mainstream city and rural schools located in the mountains (weights 3, 4 and 10 to 15 in Table 21Table 21). We know already from Table 21 that there are far fewer schools located in the mountains than non-mountain schools. The following Table 24 provides number of administrative units, students and classes for six groups of mountain general secondary schools.

Table 24. Administrative units, students and classes for mountain urban and rural schools

Students of general secondary schools which has a status of mountain schools		Admi-nistrative units	Students (thousand)	Classes (thousand)
Urban areas	city	3	2,9	0,14
	rayon	16	24,6	1,13
Rural areas	17,8 – 22,2	3	13,7	0,74
	14,8 – 17,8	11	31,8	2,15
	11,7 – 14,8	9	20,9	1,17
	Under 11,7	4	5,7	0,52

As for non-mountain schools, in the following Table 25 we provide the weights, average class size and average weighted class size (that is the class size multiplied by the applicable weight).

Again, we note that the effect of using weights is as expected, namely huge variation of actual class size has been reduced. However, while the schools in rayons with mountain class size under 11,7 seems to have been quite precisely compensated, urban schools in rayons and especially rural schools in rayons with class size over 17,8 seem to have been compensated excessively.

Table 25. Weights, class sizes and weighted class sizes for mountain urban and rural schools

Students of general secondary schools which has a status of mountain schools		Formula weight	Class size	Weighted class size
Urban areas	city	0,968	21,48	20,79
	rayon	1,064	21,80	23,19
Rural areas	17,8 – 22,2	1,355	18,38	24,90
	14,8 – 17,8	1,500	14,80	22,21
	11,7 – 14,8	1,645	12,47	20,51
	Under 11,7	1,936	11,09	21,47

It is also useful to compare directly weighted class sizes, provided in last columns in Table 23 and Table 25 above. For urban schools in cities of oblast significance and for rural school with class sizes between 14,8 and 17,8 mountain and non-mountain schools are treated in the same manner. For urban schools in the rayons, rural schools in rayons with class size over 17,8 and with class size under 11,7 mountain schools have per class allocation about 20% higher than non-mountain schools. In the remaining category, rural schools in rayons with class size between 11,7 and 14,8, mountain schools have allocation about 10% higher than non-mountain schools. Thus we can conclude that in general, the system of weights gives some preference to mountain general secondary schools, both urban and rural. This is due to the mandatory add-on to teacher salaries of mountain schools (the add-on is equal to 25% of basic salary).

In order to better understand the allocation described in Table 22 and Table 23, it is useful to compare these data with information from 2003, available in Войтов (2003). The following table provides the number of administrative units, and students for mainstream non-mountain rural secondary schools (unfortunately data in this article do not include urban schools nor mountain schools, so complete historical comparison is not possible).

We note that in 2003 the distribution of administrative units and especially of students was very different: the extreme categories of rayons included very few rayons, schools and students. We also note that the number of students in mainstream rural schools declined considerably between 2003 and 2015: it fell from 2,06 million to 1,13 million, a decline of 45%. The following Graph 11 shows this difference more clearly (to discount for overall decline of the number of students we display the percentages only).

Graph 11. Distribution of students between groups of rayons in 2003 and 2015
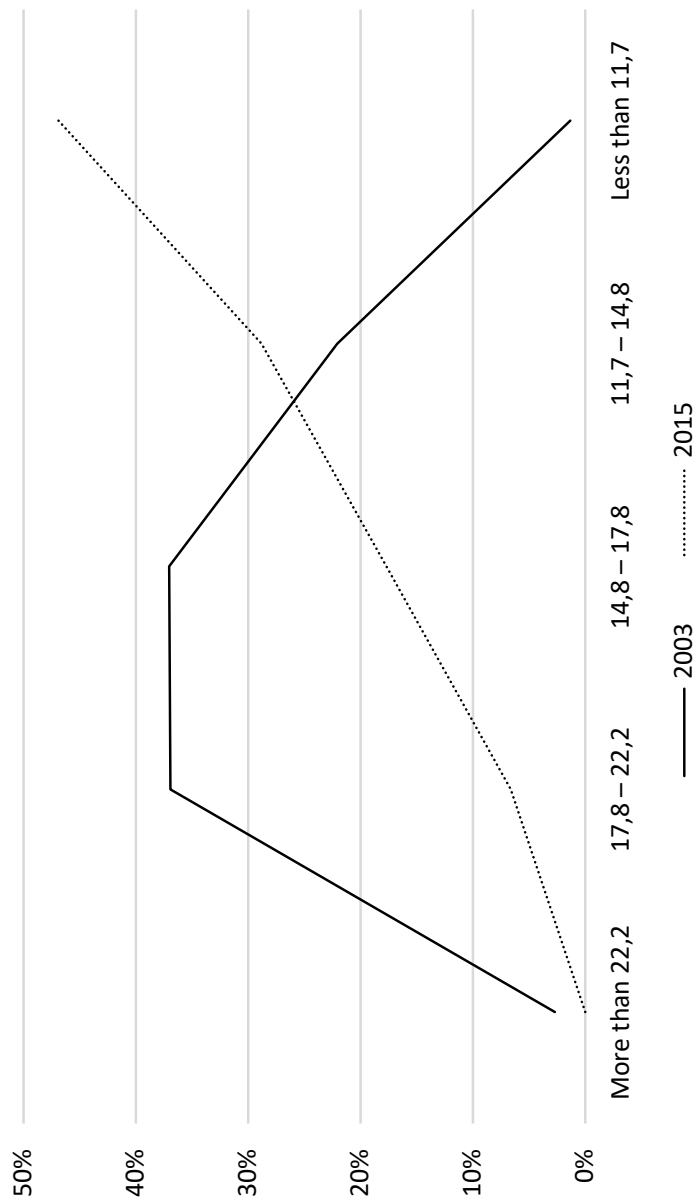
Table 26. Administrative units, students, class sizes
for non-mountain rural schools (2003)

Students of general secondary schools without mountain areas, mining and small cities, students in inclusive (integrated) classes or in special classes		Admi-nistrative units	Students (thousand)
rural areas	Over 22,2	8	55,3
	17,8 – 22,2	116	759,3
	14,8 – 17,8	203	761,2
	11,7 – 14,8	148	453,7
	Under 11,7	13	26,8

What has happened over the intervening 12 years was a steady loss of efficiency of Ukrainian rural education. Year after year, the rayons were reclassified as belonging to category with smaller class sizes, until the first category became emply, and the last one became the largest. Graph 1 illustrates the drammatic effects of this process.

It is worth reviewing class sizes in 2003. As in above Table 23 and Table 25, we provide both actual class sizes and weighted class sizes.

Table 27. Administrative units, students, class sizes
for non-mountain urban, rural schools (2003)

Students of general secondary schools without mountain areas, mining and small cities, students in inclusive (integrated) classes or in special classes		Allocation weight	Class size	Weighted class size
rural areas	Over 22,2	1,010	23,0	23,2
	17,8 – 22,2	1,178	19,5	23,0
	14,8 – 17,8	1,305	16,0	20,9
	11,7 – 14,8	1,431	13,7	19,6
	Under 11,7	1,684	11,0	18,5

Similarly to Table 23, we note also that in 2003 the use of weights contributed to a reduction of class size discrepancies between different groups of rayons, but even then they were not entirely reduced.

We should also point out that the coefficients used in 2003 were almost fully the same as the coefficients used in 2015 (the formula used in 2002 is provided in Войтов 2003). In this period the coefficient for rural non-mountain schools with class size under 11,7 has changed[18]. This coefficient was increased from 1,684 in 2003 to 1,751 in 2015.

There are very good reasons why out of 5 coefficients for mainstream rural non-mountain schools (weights 5 to 9 in Table 21) only the last one was changed. Indeed the first category of rayons became empty, and the others are defined by both a lower bound and an upper bound of actual class size. This means that average class size cannot change in such a group of rayons. If in a particular rayon due to demographic decline actual class size falls below the lower bound, that rayon will automatically be moved to the next category of rayons, without affecting much the average class size. The last category, however, is defined only using an upper bound on the class size (namely 11,7), so with the demographic decline and without network optimization the average class size will also decline. This effect can be seen by comparing Table 23 and Table 26. The appropriate coefficient was increased in order to compensate for this loss of efficiency. This certainly indicates that experts in the Ministry of Finance were monitoring the situation very closely and were able to respond adequately. We do not have the data to review why the analogous coefficient for mountain schools was not adjusted.

Table 28. Relative weights for city and rayons schools in Table 11

School type	City of oblast significance	Rayon	% difference
Students of general secondary schools without mountain areas, mining and small cities, students in inclusive (integrated) classes or in special classes urban areas	0,841	0,926	10%
Students of general secondary schools in mountain areas urban areas	0,968	1,064	10%
Students of evening schools	0,430	0,290	-33%

Finally, we return to the allocation formula presented in Table 21 and address two specific issues. Recall that there are three "pairs" of weights, one for schools in cities of oblast significance, one for cities in rayons. It is worth noting these pairs and the difference between the relevant weights.

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18   A few other coefficients have also been changed, and some coefficients have changed the way they are applied in the formula.

The following Table 28 provides the list of these pairs of weights, the two values depending on the school location, and the percentage of rural weight in relation to urban weight.

Interestingly, the weights for students in schools located in rayons for urban general secondary schools, both in non-mountain areas and in mountains, are higher than corresponding weights for cities of oblast significance school by 10%, but for evening schools they are one third lower. This suggests that evening schools outside of cities of oblast significance have for some reason larger classes, unlike day general schools.

There are also three pairs of weights for schools with dormitories, applying to resident students and incoming students[19]. Weights for resident students are higher, and the difference is used to cover the costs of accommodation and food. The comparison of those weights is provided in the table below.

Table 29. Relative weights for resident and incoming students in schools-dormitories in Table 11

Type of school with dormitory	Resident	Incoming	Difference
Mainstream general education school with dormitories	6,6	2,5	4,1
Mainstream school with dormitories in the mountains	5,0	1,0	4,0
Special school with dormitories	5,7	1,1	4,6

Table 29 indicates that the cost of dormitory per student are assumed to be roughly the same in different types of schools with dormitories.

5.4 Strengths and weaknesses of 2016 allocation formula

The allocation formula used in 2015 and 2016 in Ukraine has been in operation for over 15 years, initially as a part of gap-filling calculation,

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19 Incoming students only attend the lessons, but do not use the dormitory itself.

and for the last two years as a stand-alone formula allocating education subvention. It is therefore well established, and in particular there are tested procedures necessary for the yearly collection of all necessary data. Thanks to this experience it was relatively easy for the Ministry of Finance to implement new education subvention in December 2014.

We can identify the following strong points of the formula:

1. The formula is a pure per student formula allocating education subvention in a transparent, publicly known and predictable manner.

2. The formula addresses the differences in average class sizes to compensate higher per student expenditures of schools in rural rayons. Moreover, the formula allows flexibility in treating different rural rayons differently.

3. MF has been able to address changes in the efficiency of Ukrainian education by adequately adjusting a number of coefficients 9for example the coefficient for rural non-mountain schools with class sizes under 11,7).

4. The development of the formula shows some flexibility in the application of the coefficients. For example, the coefficient for students without family support became independent of the school type (in 2003 it was tied to schools with dormitories for orphans).

5. The consistency of difference between weights for resident and incoming students in schools with dormitories will make it quite easy to separate funding of schools from funding of dormitories.

At the same time, Ukrainian formula has a number of weaknesses. We list below the main ones:

1. By using actual (empirical) class sizes, the formula does not put pressure on optimization of school networks. Indeed, the effort put into optimization results in increasing average class size, and therefore leads to a reduction of education subvention allocated. This is clearly evident in the movement of rayons across the 5 categories (see Graph 1).

2. Analysis reveals that different groups of schools are not treated in a similar way. Many rural schools are relatively underfunded, while many mountain schools are relatively overfunded.

3. It is very difficult to assess whether the level of funding allocated through education subvention is sufficient. Neither MES nor MF conduct systematic calculations addressing the problem of adequacy, therefore they cannot respond to criticism that the funds are insufficient.

4. Ukrainian local governments assume that education subvention should cover all education expenditures, because the legislation does

not specify for which specific types (budget lines) of expenditures it is allocated. This means that any shortfall is attributed to insufficient allocation from the national budget, and not to inefficient organization of school networks at the local level.

5. In theory the system of coefficients can be used to flexibly adjust allocation to the changing needs of different groups of municipalities. However, in practice there has been remarkably little change in the values of coefficients in 15 years of the operation of the formula. This indicates the difficulties inherent in reviewing and changing the allocation formula.

The present chapter did not consider the relationship between the allocation of education subvention and actual expenditures of Ukrainian local governments on secondary education. This is an important topic which requires more data for analysis (see forthcoming analysis by SKL expert Tony Levitas). It seems that there are some types of local governments, such as large cities or rich rayons, who systematically add their own resources to education subvention they receive. Moreover, local governments cover preschool expenditures from their own revenues (there is no specific subvention for preschool education, and education subvention cannot be used for preschools). Thus, local governments in Ukraine play a very active role in education finance.

6. PROPOSED STRUCTURE OF ALLOCATION FORMULA FOR EDUCATION SUBVENTION

Allocation formula for education subvention is one of key responsibilities of the Ministry of Education and Science of Ukraine assigned to it in the decentralization process through amendments to the Budget Code of Ukraine passed in December 2014. This is quite new for MES, because until now the allocation of funds for education to rayons was the exclusive responsibility of the Ministry of Finance. That's why this responsibility requires the Ministry to develop new capacities, procedures and data collection mechanisms.

The goal of the present chapter is to discuss a possible general structure of an allocation formula for education subvention. The subvention will be allocated to cities, rayons and – beginning with 2016 – also to amalgamated gromadas, which have been assessed as "capable" by MF and therefore will take over education functions, and thus at the same time will become the recipients of education subvention. We begin with the discussion of two key issues which the formula should address (section 6.1), and on the basis of this discussion we propose a general form of the formula (section 6.2). We then describe possible methodology for calculation of the factors that appear in the proposed form of the formula (section 6.3) and discuss open issues.

It is necessary to stress that the present chapter does not propose a formula as such and does not discuss possible values of coefficients. Instead, it discusses a general approach, the structure of the possible formula and methodological problems of designing it. For this reason, no simulations of the new formula were conducted as yet and their results are not presented here.

6.1 Two main problems which the formula should address

There are two main challenges of financing education in Ukraine today. The *first challenge* is related to fragmented local school networks, with many small rural schools. These schools have very small classes and very few students per full time equivalent teacher (stavka), which makes their per student costs extremely high (see chapter 2). Indeed, according to World Bank studies Ukrainian education is among the least efficient in Europe. This is very problematic for relatively poor country.

The responsibility for optimizing school networks in Ukraine rests upon local governments, amalgamated gromadas and rayons (in the areas where the decentralization process is not yet completed). The ministry in Kiev does not have legal competencies nor institutional capacities to conduct this process across the country (see chapter 3). However, in allocating education subvention to local governments MES should be able to tell them that if their schools are not operating in a rational manner, any additional necessary funds should be coming from other revenues of local governments. In other words, MES should be able to state what it considers to be rational school network and to guarantee that education subvention will be sufficient to fund the costs of rational school networks. One way of stating this *criterion of rationality* is to set, for each and every rayon, the expected – or normative – class size. This normative class size should be used in the allocation process of education subvention. Certainly, normative class sizes will depend on the location of the school. They may be expected to quite high in large cities and somewhat smaller in smaller cities, but the definition of normative class sizes of urban schools should not be controversial, because these schools tend to be quite large.

It will be however very difficult for MES to define normative class sizes for rural schools in Ukraine. In part this difficulty stems from current, irrational and fragmented school networks. Because actual class sizes are not rational, they cannot be used to assess what class sizes can be considered rational. A sufficiently sound methodology for assessment of normative class sizes is therefore needed. This methodology must recognize that local conditions in different Ukrainian rayons vary enormously, and that normative class size in some mountain or sparsely populated rayons of necessity is smaller than in some rural rayons close to a large city. Thus we encounter what can be considered a *technical difficulty*.

A different type of difficulty comes from the fact that most likely in only a few rural schools actual class sizes are close to the normative class sizes.

It can be expected that in most rural rayons normative class sizes will be larger than actual classes, and therefore that most rayons and amalgamated gromadas will be obliged to optimize their school networks. This should be, indeed, one of the goals of the allocation formula. Some rayons and amalgamated gromadas in different oblasts of Ukraine seem to be ready to undertake this rather difficult task. Some will however claim that they operate in special conditions, that they have some specific difficulties such as lack of good roads or large distances between villages, which make optimization impossible. We can call this *political difficulty.*

The technical and political difficulties may persuade reformers to abandon the task of defining normative class sizes. However, it is very important to note that in the absence of normative class sizes the central government will be forced to finance existing school networks as they are, without taking into account objective differences between rayons. This would lead to further perpetuation of the current situation. Setting excessively simple normative class sizes will not be a good solution either. For example, an assumption that urban schools should have classes of (for example) 30 students, and rural schools should have classes of (for example) 15 students will provoke much stronger – and much better justified – protests. In other words, it seems that without some form of normative class sizes it will be very difficult to address the problem of low efficiency of Ukrainian education.

The *second major challenge* of allocation of education subvention is related to the actions of local governments in Ukraine (particularly the cities). In 2015, with the introduction of new system of financing of local governments, cities and rayons received increased overall allocation. This was particularly significant in large cities. Some cities, indeed, decided to spend on education more than the received education subvention. However, some of them did not increase allocation to their schools beyond the subvention, which often was sufficient to cover only salaries and basic communal expenditures. In many cases it was expected that the parents will contribute the missing funds, as they did in previous years. The cities have used the increased overall budgetary allocation not for education, but for other purposes, such as investments.

The reason for this behavior of the cities may be explained by the fact the Ukrainian legislation does not specify school expenditures which should be financed from the education subvention. It is therefore assumed by all education stakeholders that education subvention should cover all school expenditures, and that the cities are under no obligation to provide additional funds above the subvention. This is probably also the reasoning why parents agree to contribute to the operating costs of the schools. However, this is not a good situation and it undermines the guarantee of free general secondary education, enshrined in Ukrainian constitution.

This is the basis for the following suggestion: the Ukrainian legislation should clearly define education functions which will be covered by the education subvention, and the types of expenditures which should be financed from local budget. Such an approach is used in a number of post-Soviet republics, notably in Lithuania (see, for example, Herczyński 2011a) and in Estonia (see chapter 4). We therefore propose to divide all school expenditures into two components, the *pedagogical process*, which includes areas normatively regulated by MES (such as teaching plan and teacher salaries), and *school environment*, which includes expenditures related to maintenance of school building. The precise definition of both components will have to be discussed and agreed, but the following clarifies the proposed approach:

- Pedagogical process will include the salaries of the teaching staff, administration and pedagogical support staff, teacher development costs, textbooks, and teaching aids.

- School environment will include salaries of technical staff (including kitchen, canteen, medical and accounting staff), heating, electricity, gas and other communal expenditures.

After an agreement on such a division of responsibilities is reached, it should be clearly stated in the law what are the responsibilities of the central budget (through education subvention) and of the local budgets. It is hoped that the proposed approach, by clearly communicating this to all education stakeholders, will support a change in parental and societal expectations and will thus contribute to change of practices.

Finally, it is also worth adding that among the Ukrainian education community there is expectation that the allocation formula will be based on "education standards", and not merely on different coefficients indicating relative costs of different schools, as is done in the formula used in 2016. As the "education standards" we should take the current regulations of school functioning, such as teaching program, teacher salaries and similar.

Altogether, the proposal outlined here would make Ukrainian approach to education finance much closer to the "Estonian model" and quite different from the "Polish model" (see chapter 4).

We also note that the change to the Budget Code approved in December 2016 restricted the use of education subvention to the salaries of pedagogical staff. This is similar, but nevertheless somewhat different from the proposal of the present chapter, or from the Estonian model (see chapter 4).

6.2 Proposed structure of the formula

It is proposed to base the allocation formula on the following factors:

1. Teaching plan TP is the average number of lessons per week offered for the given group of students. Of course, TP depends on the grade.

2. Teacher workload TW is the weekly number of lessons conducted by a full time equivalent teacher (stavka). TW is equal to 20 for initial grade teachers and 18 for upper grade teachers.

3. Teacher salary TS is the average yearly salary of full time equivalent teacher, including social contributions paid by the school.

4. Administrative and support component ASC is used to assess total costs of the pedagogical process on the basis of teaching costs. If we assume that total costs of pedagogical process consist of teaching costs (conducting lessons) and non-teaching costs (administrative and support costs), then ASC is defined as non-teaching costs divided by the teaching costs.

5. Normative class size NCS is the stipulated number of students in a class in compulsory education for given rayon or given amalgamated gromada.

Using these factors, per student normative allocation N (or normative of budget need, to use Ukrainian terminology) can be defined using the following simple formula Using these factors, per student normative allocation N (or normative of budget need, to use Ukrainian terminology) can be defined using the following simple formula:

$$N = TP * \frac{1}{TW} * TS * (1 + ASC) * \frac{1}{NCS}$$

The meaning of this formula is as follows. Teaching plan divided by teaching workload $TP * \dfrac{1}{TW}$ equal to the number of full time equivalent teachers required to teach given class. After multiplication by teacher salaries we obtain $TP * \dfrac{1}{TW} * TS$, which represent yearly costs of teaching given class. If these costs are multiplied by 1+*ASC*, we obtain total costs of the national component (pedagogical process) per class. Division by the normative number of students in the class gives us the per student normative *N*.

It is worth reviewing the groups of students, for whom the normative *N* will be separately assessed and will have different values:

- Students enrolled in different grades will have different teaching plan *TP*. To avoid excessive number of normatives, it may be proposed to define separate *TP* for initial grades (1-4), basic grades (5-9) and upper grades (10-11) of general secondary school.

- Teacher workload *TW* is similarly dependent on grade.

- For the value of teacher salaries *TS* it may be possible to use the national average. If it is decided to take into account some specific groups of teachers, for example if teachers of mountain schools will receive some systemic bonuses (see chapter 5), this should be included in the formula.

- The value of administrative and support component *ASC* for mainstream schools should likewise be based on the national average. For some specific groups of schools, for example for schools with boarding houses, the value of *ASC* will be of course significantly higher.

- The normative class size will depend on school location, urban or rural, and for rural schools may depend on additional factors such as population density (see following section 6.3). If it is assumed that education subvention will also cover some special schools, it will be necessary to adopt for them specific, much smaller *NCS*.

The above points indicate that although the proposed structure of the formula is very simple and intuitive, it does allow for considerable flexibility to reflect – to some, regulated extent – existing variation of Ukrainian education.

We note finally in what way the proposed structure of the formula addresses two main challenges identified in the previous section 6.1.

- The formula assumes that education subvention will cover only the pedagogical process in Ukrainian schools, leaving the responsibility for school environment to local governments. This is achieved by using the coefficient *ASC*, which allows to assess total costs of the pedagogical process on the basis of direct teaching costs.

- The formula directly uses the normative class size *NCS*. It is immediately clear that if average class size in the schools maintained by the rayon or the amalgamated gromada are smaller than the normative class sizes assumed for this administrative-territorial unit, then the education subvention will not be enough to pay for full costs of the pedagogical process, and the shortfall will have to be covered from the funds of

the school owner. If on the other hand, good management of school network will lead to class sizes higher than *NCS*, then school owner will have a comfortable financial situation and will be able to use the funds to further improve school conditions.

The proposed structure of the formula also responds to the expectation that it will be based on education standards, such as teaching plans and nationally regulated teacher wages.

6.3 Methodical problems related to assessment of main factors of the proposed formula

We separately discuss the four main elements of the proposed formula, namely the teaching program *TP*, teacher salaries *TS*, administrative and support component *ASC* and normative class sizes *NCS*.

- Teaching program.
  By the teaching program we mean the number of lessons per week offered to the class. Clearly, the teaching program should be assessed separately for different levels of general secondary education: initial grades (1-4), basic grades (5-9) and upper grades (10-11). Of course, teaching programs need to be based on actual teaching plans used in Ukrainian schools. There are however quite many of these teaching plans, so it is necessary to adopt a methodology for averaging purposes. It will be also necessary to identify which parts of the teaching plan are obligatory and should be covered by education subvention, and which non-obligatory, additional parts may be entrusted for financing by school founders.

- Teacher salaries.
  Like teaching plans, teacher salaries are quite differentiated for different groups of teachers, and depend on teacher qualifications, work experience, and on additional tasks assigned to the teacher. Teacher salaries in Ukraine consist of a basic salary (posadovii oklad) plus many increases (pidvishshenya), add-ons (doplati) and bonuses (nadbavki, altogether over 30 components, many of them exceedingly small). Some methodology for averaging will be therefore required. However, also the teachers employed in each rayon and amalgamated gromada are differentiated, and each of these administrative units maintains a few of schools with many teachers. Therefore using an average salary

in the allocation process to rayons and to amalgamated gromadas is justified. Of course, some statistical checks will be required to assess whether there are systematic differences in teaching workforce between regions and rayons of Ukraine.

• Administration and support component.
The first step of this analysis will be to agree on type of education functions should be covered by this component. School directors and administrative staff should be included, together with the school secretary. The same applies to support pedagogical staff (speech therapist, librarian[20], psychologist etc.) and to funds for class tutorship. Technical and cleaning staff most probably should not be included, and likewise kitchen staff. In the second step, expenditures on the selected staff should be assessed in a number of schools. It will be necessary to calculate, what proportion of teacher salaries in the school is comprised by these administration and support expenditures. Similarly to previous element of the formula, statistical checks will be required to review how this proportion varies between individual schools, between school types and between urban and rural schools.

• Normative class sizes.

Assessment of normative class sizes is perhaps the most difficult element of the preparation of the formula along the lines proposed in section 6.2. This is due to the fact that actual class sizes in rural rayons of Ukraine today are very far from rational, due to specific managerial models used in the last 25 years (no school could be closed by the rayon authority without the approval of the village, which however did not have any financial responsibility for the school). So a methodology will be required to assess what can be the normative class sizes. For urban schools this is not difficult (although a problem might arise for small urban settlements in the rayons). For rural schools this can be achieved in two steps.

The first step consists of performing an Excel-based "model optimization" of school network, based on a few parameters, such as maximum distance of two schools which will be joined, maximum number of students in a school which may be moved to another school and similar. This can be performed for rayons for which detailed number of students in each grade in each school, and all the distances between schools, are known. The result of such "model optimization" will be the "model average class size" (certainly higher than the current,

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20 In Ukraine, the librarians are traditionally not considered to be pedagogical staff. However, in most European countries school librarians perform many pedagogical tasks.

actual class size). The second step consists of comparing the model class size with some objective factors characterizing local conditions for management of school networks (such comparison is typically conducted using econometric regression). Available factors (variables) are limited by what data population is presently accessible in Ukraine, but include average size of the village in the rayon, population density in rural part of the rayon, and percentage of urban population in the rayon. As the demographical data available from State Statistical Office are not fully reliable, an alternative approach proposed by the Ministry of Finance uses instead number of students of general secondary schools (school students per square km). The goal is to obtain a formula which will "explain" model class size using these objective factors on the sample of rayons for which detailed data is available, and thus allow to define normative class sizes for all rayons in Ukraine.

For simplicity, normative class sizes should be uniform for all grades (even if in fact there are some differences in actual class sizes for different grades).

6.4 Concluding remarks

The present chapter discusses a new structure of the allocation formula for education subvention and outlines some methodological issues of assessing its various elements. Still, a number of open questions remain and will need to be addressed during further work. We formulate some of these.

- How many types of schools will be distinguished in the formula (with separate per student normatives defined and assessed for each of these types). This is a complex issue which in part will require resolution of some outstanding issues of allocation of responsibilities within a decentralized education system, such as who will manage special and evening schools.

- How to address possible drastic change in the level of allocation of education subvention to individual rayons from year to year. There are various mechanisms to limit such year-to-year variation (called buffers or hold-harmless clauses); the use of these mechanisms and the degree of protection they should provide requires in-depth discussions.

- How the normative class sizes assessed for rayons should be adjusted to much smaller amalgamated gromadas. This is an important technical and political issues, since already in the first wave of voluntary amalgamation in 2015 some exceedingly small amalgamated gromadas have been approved.

- What non-financial policies should be developed to facilitate optimization of local school networks. Certainly, no formula can work well in an environment of very fragmented networks. Optimization may be facilitated, for example, by introduction of hub schools or of simpler organization of small initial schools (grades 1 to 4, see chapter 3).

7. | SETTING BUDGETS OF INDIVIDUAL SCHOOLS

As Ukraine begins to define the main goals and instruments of education reform, there is no doubt that decentralization will become one of key elements of systemic changes of Ukrainian education. The decentralization process in Ukraine will not be a successive transfer of managerial and financial responsibilities from the central to local level, as had happened in a number of countries, such as Poland or Macedonia (Levitas, Herczyński 2002, Herczyński 2011b). This is in part due to Soviet tradition, under which local state administrations at different levels had been heavily involved in the management and financing of Ukrainian schools, and have acquired expertise, procedures and documentation necessary to perform these tasks. The important level of governance involved in financing and managing schools were the cities of oblast significance and rayons. It is therefore natural to use those capacities and experience in any new system of management of Ukrainian education.

At the same time, in a radical departure from the inherited Soviet model, Ukraine has embarked on a difficult path towards creating strong, democratic and economically viable local governments meeting the requirements of the European Charter of Local Governments. In fact, prior to the decentralization process which started in 2015, only the cities of oblast significance, of which there are 177 in the country, had democratically elected councils with subordinated executive apparatus and adopted

own, independent budgets. The new Ukrainian local governments, the amalgamated gromadas, extend this important democratic principle to rural areas of Ukraine, with much expected impact on education.

The inclusion of the education sector in the decentralization process in Ukraine raises important questions regarding how the schools will be financed. At the national level, the reforms enacted in December 2014 and already fully implemented have introduced a modern system of local government finance, with clearly defined revenues streams (including transfers, shared taxes and own revenues) and expenditure responsibilities. A categorical (targeted) transfer for education, called education subvention, is a part of this new system (see chapter 5). The responsibility for defining and maintaining the per student allocation formula for education subvention rests with the Ukrainian Ministry of Education and Science. This allocation formula expresses the concept money follows the student to the level of local governments only, namely to individual amalgamated gromadas, rayons and oblasts. The only budgetary regulation regarding the actual use of the funds received by local governments through education subvention is that they have to be spent on education functions (of course, the financing of schools is heavily regulated by various sectoral regulations, rules and procedures, including teaching plans and nationally set teacher pay-scale). Moreover, beginning in January 2017 education subvention may be used only for the salaries of pedagogical staff. Many Ukrainian experts, fearing nepotism or corruption, see this as insufficient guarantee of just and efficient use of funds for education by the cities and by amalgamated gromadas. They call for a stricter regulation of how budgets (financial plans) of individual schools are discussed, defined, executed and reported. In particular, they demand that MES defines financial standards in education, and that these standards are used to define school budgets. Some Ukrainian experts postulate to use school vouchers, that is per student amounts transferred directly to the school, as an instrument of financing education, which will exclude potential nepotism and favoritism of local administrations.

In the present chapter we discuss different models used by transition countries to regulate setting of budgets (financial plans) of individual schools. The chapter discusses these models without directly recommending which one of them is suitable for Ukraine. Rather, we attempt to provide some general principles and examples to facilitate Ukrainian discussions of this important issue. There is no doubt that Ukrainian experts are best equipped to analyze strong and weak points of different models in specific Ukrainian conditions. The last section of the chapter, section 7.4, is only an invitation to these discussions.

7.1 Good procedures of education finance at the local level

The budget process at the local level is an important instrument of local governments to set and achieve their policy priorities, in line with needs and expectations of their electorate (population). While there is no place in the present chapter for an overall discussion of the local budget process, we discuss good budgeting procedures in the education sector (see Filas 2012).

The primary goal of managing education budget process at the local level is to ensure the following goals:

1. Adequacy.

    Schools must have funds sufficient to perform their main functions. The requirement of adequacy goes beyond so called "safeguarded budget lines" ("zashchischennie stat'yi") of salaries. To provide good education, school staff needs to be remunerated, school facilities need to meet hygienic and safety conditions, school equipment must be available to students and teachers, and sufficient maintenance must be provided. In particular, in conditions of fiscal constraints, it becomes difficult to ensure adequacy without optimizing fragmented school networks.

2. Stability.

    Schools need stability to plan their work and conduct teaching. Thus local governments as school owners ("zasnovniki shkil") should provide financial and institutional stability to their schools. Budget stability in the education sector is especially difficult to ensure because the school year and the budget year do not coincide. When local budget is adopted towards the end of preceding budget year, school owner has incomplete information about the number of students and classes, and also about the needs for teachers for the last four months of the current year. Thus a review of budget allocation at the start of the new school year, for the period September to December, should be a part of budget procedures.

3. Effectiveness.

    The funds for education should be used as effectively as possible. This means that local governments should review how their limited resources are used and should adjust the budget allocation in line with their priorities. Possible sources of inefficiency of local school

expenditures include: maintenance of small classes (often typical for small rural schools), excessive employment in schools (especially of non-teaching staff), unmonitored costs of some specific expenditures (such as electricity, water, travel), doubling of tasks (for example accounting procedures for different areas of school finance split between different units), insufficient monitoring of the use of resources, and allocation of funds for next budget periods on the basis of past expenditures (historical costs) rather than on the basis of evolving needs. Good budget procedures should ensure that local governments as school owners are able to identify and correct inefficiencies of their school networks.

4. Transparency.

    Transparency of education finance at the local level is a key condition for participatory management of education. By making available to all local stakeholders – including parents and teachers – basic information about the school networks, their management and financing, local governments promote dialogue and public discussions, necessary for reviewing all available policy options and for taking optimal decisions. Individual budgets of all schools should be included in public presentation. It is very important to note that the information needs to be made public in appropriate form, easy to understand by non-specialists and sufficient to build informed judgements. This means, in particular, that the publication of budget data should avoid using categories of budget classification, and that budget data should be presented together with other information about the schools (including enrollment and employment data).

We conclude by remarking that decisions regarding individual school budgets are very closely related to decisions on optimization of school networks. Small schools with small classes are of necessity more expensive on a per student basis than larger schools. Thus protection of small schools reduces funds available to all remaining schools and, through maintenance of small classes, reduces also efficiency of education expenditures. If school owners are unable to close a specific rural school, for example due to legal restrictions or to public opposition to such decisions, they are forced to continue to finance its operations. In such situations they often reduce all non-essential expenditures in those schools, other than teacher salaries. Thus small rural schools often have inadequate or non-existent allocation for school equipment, teaching materials, extracurricular activities and similar. It also becomes very difficult to employ support staff, such as speech therapists or school psychologists. As the share of teacher salaries in small schools becomes very high, education quality is likely to decline.

On the other hand, school closure typically creates the need for student transportation, which also requires compensatory funding by local government. Sometimes there are needs for minor investments in the consolidated schools, for example for school furniture or for facilities where students can stay before the school bus arrives to take them home. Sometimes more significant investments may be required, for example local roads connecting remote villages with the school.

7.2 Current situation in Ukraine

Today, the process of setting budgets of individual schools in Ukraine is governed by two procedures inherited from the Soviet Union, called *complectation* and *tarrification*.

Complectation consists establishing within the school the network of classes (through assigning individual students to classes or class-groups) and assigning teachers of different subjects to each class according to the curriculum. Division of students into classes is a serious decision only in grade 1 (for newly enrolled students) and in grade 10 (when the number of students is decreased after some of them left the general secondary school to attend vocational schools). For other grades, this covers individual cases of new students in the school, rarely two classes in the same grade are combined into one, even if the number of students becomes small. Assignment of teachers to classes results in setting, for each teacher, the number of weekly lessons to be taught. The responsibility for performing complectation rests with the school director, although this is monitored and controlled by education department. Non-teaching staff are typically employed according to national norms, such as administrative staff (including the number of deputy school directors) or technical staff (for example, cleaning personnel is established by norms of square meters to be cleaned by one person).

Following the complectation, salaries are established through the tarrification process. Each staff employed in the school has his or her salary calculated according to detailed rules. For teachers, the basis of these calculations are teacher's qualification levels, working experience (stazh), number of weekly lessons taught, plus many additional minor factors (including, for example, number of student copybooks to be verified by the teacher). There are also many add-ons to the basic teacher salary. Similar

though simpler procedures apply to salaries of non-pedagogical staff. Due to the complicated nature of this process, tarrification is typically performed by the education department (often using accounting software).

In theory, both complectation and tarrification are performed according to national standards and should lead to similar results if the schools are similar. In practice, there is significant variation due to different degrees of freedom available at the local level. These degrees of freedom include:

- Ability to form smaller or larger classes.
- Right to split larger classes into groups for specific subjects.
- Right to assign the lessons to more or fewer teachers, giving them less or more lesson to teach per week. This is especially relevant to employing retired teachers for a fraction of full-time equivalent (stavka).

Indeed, the analysis of education in Lviv conducted in 2001[21] revealed that 5 city rayons have quite differentiated policies with regard to management and financing of their schools, although their per student expenditures are remarkably similar. This indicates that the processes of complectation and tarrification, although defined uniformly for all schools across the country, do allow for different approaches.

At the same time, current Ukrainian local budgeting process in education has the effect of hiding the very difficult decisions of allocating limited budget resources to schools behind a rather bureaucratic processes of complectation and tarrification. At no point in time is there a discussion between the school director and the education department regarding overall budget envelope of the school for the coming financial year, or regarding how this available envelope should be most rationally used. In this sense, the school budget as such is not a clearly defined element of the budgeting process. What the Ukrainian budget documents formally identify and monitor are the education budgets of local public administrations, not of individual schools.

It is useful to note that current budgetary procedure in Ukraine leads to separate considerations of two parts of the budget, namely salaries and non-salary expenditures. The first of these are considered "protected" expenditures, the others are "not-protected". This distinction has budgetary consequences. If local budget is adopted and during the budget year the revenues turn out to be insufficient to cover planned expenditures, "not-protected" budget lines may be reduced to balance the budget, but "protected" budget lines cannot. Introduction of "protected" budget lines certainly served useful purpose in turbulent 90'ies, when there were frequent budget shortages and teachers were not paid their due salaries over the

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21 See Levitas, Herczyński (2001).

periods of many months. Today, this type of difficulties is no longer present in Ukraine education. Instead, such fragmentation of school finance may today lead to inefficient use of budget funds. In many cases in Ukrainian schools, for example regarding technical staff in small rural schools, salary expenditures should be rationalized and reduced, not protected.

Ukrainian budgetary procedures also lead to very different treatment of two part of the school budget, the so called "general funds" and "special funds", the later consisting of own revenues of schools and of donations (the meaning of general and special funds for budgets of local governments is quite different). While "general funds" are regulated by law and controlled and monitored by local governments, schools are free to use the "special funds" in any way they see fit. Thus school director is tightly monitored in the use of general fund, but is free to spend the school revenues (for example, from rent of facilities during the weekends) on items such as small investments, renovation, or add-ons to salaries, without asking for permission and without excessive reporting obligations. Like any rigid division of the budget, also this distinction leads to inefficiencies. For example, school owners may refuse to include maintenance expenditures in the adopted school budgets, requesting the schools to find own revenues to cover these needs. However, there is never full certainty that own revenues of schools will actually be realized, and even if they are realized, the school director may be under staff pressure to spend these revenues on remuneration. As a result, necessary school expenditures may be delayed or even not financed at all. Similarly, if "special funds" of one school are for some reason much higher than "special funds" of another one (for example because of the school location or because of different availability of school space for rent), the school owner cannot take this into account and reduce "general funds" accordingly. In this way the use of "special funds" by different schools may be not efficient.

Yet another fragmentation of school budgets in Ukraine concerns budget funding versus parental contributions. Typically, parental contributions take the form of informal payments by individual parents, collected by class tutors, or the form of subsidies from charitable foundations established for that purpose alongside many secondary schools in the country, especially in the cities. These parental contributions are not officially reported and it is therefore very difficult to assess their volume and their actual use in the schools. Parents assume that because budget allocation is often insufficient for proper functioning of schools, and they may feel obliged to provide this additional support. Often this additional support is used for small maintenance of schools (for example, for preparation of the school for the new school year) and for basic school purchases (such as chalk or cleaning materials). However, the lack of any obligatory reporting of these revenues (as well as expenditures) of schools, and the lack of any oversight

by school owners, create serious risks for proper and effective use of these funds.

The triple fragmentation of budgets of Ukrainian schools ("protected" versus non-protected budget lines, "general funds" versus "special funds", budget funds versus parental contributions) weakens the ability of school owners to plan and manage efficient use of resources for education.

Finally, we briefly review current Ukrainian budgetary practice at the local level from the point of view of four principles discussed in the previous section 7.1.

1. Adequacy.

   It is generally assumed in Ukraine that financing of schools is not adequate to for their needs. Thus in many cases both schools and parents assume that it is "natural" that school budgets as determined by cities and rayons are insufficient, and in consequence that schools are "justified" to expect additional funding from parents. This in turn allows many local governments to claim that they are not obliged to add own funding to the education subvention received from the central budget, because the schools are able to obtain additional resources which they need for day-to-day operations. In practice, this leads to increasing financial responsibility of parents for schools attended by their children. With no-one in charge of managing and monitoring this process, actual autonomy of school director is much larger then that prescribed by legislation. At the same time, local governments feel "justified" to demand additional allocation of funds from the central budget as end of the budget year nears and as budget deficit becomes more pressing. This further undermines low budget discipline in Ukraine.

2. Stability.

   3Given the overall inadequacy of education finance in Ukraine and weak budget discipline, it is not surprising to see regular requests of local governments for additional budget allocation from the central budget, often supported by deputies of the Parliament. These requests are reviewed and granted or not granted by the Ministry of Finance. With the very difficult overall financial situation of the country, the available reserves are very limited, but on the other hand there is considerable political pressure to provide at least a part of the requested additional funds. This creates instability and competition for the small reserves of the national budget. This instability is especially visible in the period from September to December, when a new school year coincides with end-of-year budget execution, that is with problems of finding sufficient funds for recurrent expenditures of schools.

3. Effectiveness.

   As described above, local budgeting procedures in Ukraine are based on multiple forms of fragmentation. There is no single agent responsible for making budget decisions, that is for planning and executing school expenditures within available budget envelope. This leads to serious inefficiencies of education finance. In particular, no-one is responsible for compare and streamline the financing of all schools belonging to a single local administration (city, rayon or amalgamated gromada). At the same time, motivation to optimize school networks is reduced due to weak budget disc9ipline and general expectations.

4. Transparency.

   Ukrainian education finance is highly non-transparent. Local public administrations rarely see full financial situation of their schools, because they cannot monitor significant school resources such as parental contributions, and have limited control over own revenues of schools ("special funds"). Even information about the funds allocated to individual schools from the local budget is not easily obtainable (separate accounting of salaries and of communal expenditures), so is rarely published. Access of higher level officials, including MES, to information about education finance is very limited, in part because traditionally MES is in direct contact only with oblasts (regional level governance). Public transparency is even more limited, and official school budgets, that is budget allocation from "general funds", are not available to parents and to local media.

It seems fair to say that current budgetary procedures at the local level in Ukraine need serious analysis and reform. The examples provided in the following section 7.3, drawn from a few transition countries, may be helpful in this analysis.

7.3 Examples of regulations of local school finance in selected transition countries

Transition countries have adopted very different approaches to legal regulation of local school finance. The main differences concern the level of autonomy of local governments in the budgeting process leading to

determination of the budgets of individual schools. This crucially depends on the level of trust in local governments' ability to properly and honestly manage their school networks.

At the extreme ends, we note the complete distrust of local governments in Georgia and far reaching trust in local governments in Poland. Accordingly, Georgian reformers excluded local governments from any decisions regarding school budgets, and introduced a national formula for all individual schools (school vouchers). In this way complete political and financial responsibility for each school in the country has been placed on the Ministry of Education and Sciences in Tbilisi. In cases of any problems, such as insufficiency of funds, schools turn directly to the Ministry. On the other hand, Polish reformers trust local governments to such an extent that there are no specific regulations on how funds for education should be used, other than sectoral norms (such as curricula or nationally regulated teacher salaries). The responsibility for financing of all schools belonging to a given local government rests fully with this local government, and the Ministry of National Education in Warsaw is not involved in the conduct of local budgeting procedures or in the resolution of local conflicts.

Below for illustrative purpose we briefly describe 4 examples of regulations of local school finance in transition countries. Ordering the case studies according to increasing level of trust in local governments, we discuss Georgia, Bulgaria, Lithuania and Poland. The reports on which these brief discussions are based are listed in the references.

GEORGIA:
Autonomous schools and school vouchers[22]

Reformist Georgian government, which gained power following the "tulip revolution" of 2003, came with a justified distrust of local governments, which were generally considered corrupt and undemocratic. The key element of the reform of education management consisted therefore of radical reduction of any influence of local governments on education (parallel to analogous reduction in other social sectors), and of making schools independent institutions. This meant that schools obtained the status of legal persona, had own budgets and became responsible only to the school boards, elected by the community of parents.

In a parallel move, Georgian reformers decided that financing of education should also bypass the local governments and flow directly from the state

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22   The present section is based on Herczyński (2001), Herczyński, Durglishvili (2011).

budget to schools. Georgian reformers thus needed an allocation formula to allocate funds to all schools across the country, and decided to fund schools using *school vouchers*.

School voucher is a system of financing of schools, in which the school budget is proportional to the number of enrolled students (physical voucher in paper form are very rarely used, and are absent in Georgia). Thus an increase or a decrease of the number of students by 10% leads to the corresponding increase or decrease of the allocation. In the case of Georgia, the adopted system was not pure vouchers, because the value of the voucher depends on school location. The system includes three vouchers: urban vouchers (lowest), rural (140% of the urban voucher), and mountain (170% of the urban voucher). For example, if a student of a mountain school would move to an urban school, money would still follow him to the new school, but with a reduced amount.

By introducing vouchers, Georgian reformers wanted to stimulate competition between schools. This was only partially successful. In the villages there was no real completion, because in most villages there was at most one school (nothing to choose from by the students). By contrast, in the cities some the most "attractive" schools were functioning above full capacity, with very large classes and working with two or three shifts, thus increasing the number of students – and their revenues – as much as possible. Indeed, some elite schools in Tbilisi are teaching up to 2000 students in overcrowded classes.

Vouchers implement the idea that money *follows student to the school*. They provide transparency and simplicity, so that all parents and teachers understand the system very easily. Detailed school budgets, that is allocation of the sum of money given by vouchers to specific types of expenditures, such as teacher salaries, other salaries, material expenditures, maintenance and similar, are decided by parental school boards. This ensures, at least in theory, that the budget process is fully under the control of the school community.

At the same time, there are a number of serious problems with Georgian vouchers. We discuss a few most pressing of them. The first is that voucher allocation to many small schools, especially in the rural areas, is insufficient. These so called "deficit schools" every month request, and almost always receive, additional funding from the Ministry of Education. Their number varies from year to year, for example in 2007 it was about 30% of all schools, teaching about 5% of all students.

The second problem is related to the fact that some elite urban schools are funded excessively, especially if they are able to organize large classes. Interestingly, these schools do not raise teacher salaries, because there is

significant teacher unemployment and there are many available teachers willing to work for the minimum teacher salary. On the other hand, the salaries of school directors are set to be quite high in those schools. Since the school is responsible only to its school boards, there is no available information how these excessive funds are used.

Thirdly, the functioning of the school board is less transparent and effective than anticipated. In most cases, school board members are not experts in budgeting procedures or in school management, so they tend to depend on the opinions of the school director. This refers to the acceptance of the budget proposed by the school director, employment of school staff and also resolution of conflicts arising in the school. Thus in practice the autonomy of the school director is very much strengthened. Moreover, the school board members do not always communicate their decisions and their planning with the wider parental community. This is in part due to how they were selected at the parental meetings, where often they were in fact volunteers for the unpaid and time-consuming positions, rather than actual representatives of parents.

BULGARIA:
Delegated budgets and local allocation formulas[23]

Introduction of so called *delegated budgets* of schools in Bulgaria was a long process, which started in pilot municipalities in mid-90's and which was concluded in 2008. Delegated budget is a system of school finance, in which envelopes of school budgets were determined using a formula (initially, a national formula adopted with minor corrections by each municipality to suit their specific needs), and the school has the authority to define detailed budget lines, within the legal limits. After a few years of experimenting, the delegated budgets covered a small part of Bulgarian education system and for a long time there was little movement to expand the system and to include all the remaining schools.

This was changed in 2008, when suddenly the system was extended to cover all Bulgaria through a determined action of the Ministry of Finance together with the Ministry of Education in Sofia. In part, the reason for this action was the frustration of central government with decreasing efficiency of local school networks (primarily measured by the decreasing class sizes). Because of the decentralized system of education governance, Ministries had no instrument to optimize school networks and had to rely on the

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23 The present section is based on Herczyński, Herbst (2008), Herczyński, Herbst (2009), Danchev, Ivanov (2009).

actions of local governments, which for many years were not sufficient. As a historical comment, it may be of interest to add that national roll-out of delegated budgets was not accepted by the school community in Bulgaria and teacher trade unions organized a national school strike to stop it. The strike closed all schools across the country for nearly three months. After intensive negotiations, trade unions gained some minor concessions, but the delegated budgets remained in the legislation. In the years since 2008, Bulgaria witnessed some improvement of school efficiency.

In order to motivate Bulgarian local governments to enforce greater discipline on their schools, the Government introduced the requirements for each local government to adopt its own local allocation formula, which should define the budget of every school in the municipality. Local allocation formulas had to be publicly announced and should apply in the same manner to all schools owned by the given local government. The formulas defined the budget envelope (total pool of funds allocated to each school for the coming budget year). Detailed school budgets, that is the division of this budget envelope between different budget lines, became the responsibility of the school director, who had increased powers to structure the school staff. The intention was to stimulate optimization of network of classes within schools. Thus strengthening the position and authority of school directors was an important part of this reform.

At the same time, the regulations severely limited the freedom of local governments in the design of the local formulas. Thus at least 80% of the allocation was required to be based purely according to the number of students in the school (voucher-like component of the formula). The factors which could be used in the local formulas were also listed in the legislation. This limited the autonomy of local governments. As a result, local allocation formulas in different municipalities were indeed rather similar to each other.

What is interesting about the Bulgarian experience is that the reformers assumed that local governments can be trusted with the selection and application of the formulas, but cannot be trusted with the setting of individual school budgets. In other words, municipalities were not allowed to decide that specific schools had specific budget needs and thus had the right to appropriately increased budgetary allocation compared to other schools, which they perceived as less in need. Instead, all differences between the budgets of specific schools had to be based on the factors (and coefficients) of the local formula. Thus, for example, appearance of many students from socially disadvantaged social groups could not be the grounds for allocating an additional psychologist to the school. This type of decisions was left entirely at the discretion of school directors.

LITHUANIA:
Student basket and reallocation within the national allocation formula[24]

Lithuania introduced its national allocation formula, called the *student basket*, in 2002. This reform included the following new elements of education finance:

- Division of all education responsibilities into two components, the *education process* and the *education environment*[25].

  The education process includes teacher salaries, in-service training of teachers, salaries of administration and of support pedagogical staff (psychologists, speech therapists and similar), teaching aids and similar. In this way education process includes the elements of education finance which are centrally regulated, such as curriculum and teacher salaries. The education environment includes the expenditures necessary to conduct the education process, that is school heating and electricity and salaries of technical staff. These elements of school finance are not regulated in Lithuanian legislation and vary from municipality to municipality.

- Introduction of new grant from the state budget to local budgets.

  This transfer, called student basket, was designed to cover all the expenditures listed under the education process. The student basket grant assures that municipalities receive sufficient funds for all expenditures which are nationally regulated. If teacher salaries are increased, for example, the amount of the student basket should grow appropriately.

- Assignment of responsibility for school environment to local budgets.

  This means that all expenditures which are not regulated by education legislation, such as costs of electricity and heating fuels, student transportation, or salaries of cleaners and cooks, should be covered from the general revenues of municipalities (other than student basket).

The division of expenditures between the student basket (central component) and education environment (municipal component) was not immediately clear and caused some controversies. For example, initially expenditures on computers and on computer program licenses

24 The present section is based on Herczyński (2011a), Shewbridge et al. (2016).

25 This approach may be compared with the Estonian approach, see chapter 4.

were included in the student basket, but after a few years were transferred to education environment. Similarly, there were discussions about paper and the costs of copying, which finally were also included in education environment.

The formula for allocation of student basket in Lithuania is very complicated and is based on the school size. Schools are divided into 4 size categories and different per student amounts are calculated for these size categories and for 3 levels of secondary education. The student basket grant to the municipality is obtained as a sum of the calculated amounts for all schools owned by that municipality. This is a categorical grant.

A very important part of the reforms was the regulation of how municipalities should set the budgets of their individual schools. By law, when the total student basket grant was calculated for the municipality, the Ministry of Education informed municipality not only about this total sum, but also about amounts calculated for each of its school. Municipality has the obligation to allocate roughly the same amounts to each school, with some limited freedom: it is allowed to reallocate up to 10% of the student basket between the schools as it decides.

This reallocation rule is very important, because it allows the municipality to protect small rural schools, for which the formula-based allocation is typically insufficient. If the municipality reallocates for example 5% of the budget of a large school to a small school, this is a minor change for the large school but massive budget increase for the small school. It is quite clear that student basket formula, even complex one, cannot take into account all the specific details of organization of pedagogical process in small schools, such as individual teaching, very small class sizes, much smaller student teacher ratio. The reallocation rule provides the needed flexibility without the need to make the national formula even more complex. At the same time, the reallocation is limited by law to 10%, so that municipality cannot deviate too much from the funds allocated to the large schools.

It is also very important to realize that by assigning this responsibility to municipalities, Lithuanian reformers gave them real political influence over the financing of local school networks. In cases of local conflicts, municipality cannot put all the blame on the Ministry and tell school directors and parents of student that "we are doing only what we were told to do". Instead, they have to explain publicly how they decided on the reallocation of student basket funds between their schools and on what grounds they took these decisions.

POLAND:
Allocation algorithm and dependence on sectoral norms and standards[26]

Local governments in Poland receive from the central budget education subvention, which is allocated between local budgets according to a per student formula called *algorithm*, devised and updated by the Ministry of National Education. The formula applies to all schools and other education institutions on the territory of given local government, including the schools not owned and managed by the local government (see chapter 4). The received education subvention is a major revenue of local governments.

Education expenditures of local governments are set in their yearly budgets, adopted by local government council. By law, Polish schools are not legal entities and in fact do not have their own budgets (with revenues and expenditures), but only financial plans adopted by the local governments. Both the budget envelope and the detailed division of the financial plan into budget categories are decided by the local government as it adopts its budget (school financial plans are a specific part of local budget). An important administrative tool in the budget process in education are *organizational charts* of schools. The organizational charts describe the staffing levels of the school and assign teachers to teach specific subjects in specific classes. They are proposed by the school director before the beginning of the new school year (often in June) and submitted for approval to local governments, who often negotiate them individually with school directors. Adoption of the organizational chart represents the commitment of the school owner to finance the salaries of all staff included in the chart and in this way has major implications for the financial plan of the school and for the education budget for the next year, usually adopted in December.

Legal obligations of local governments for financing individual schools depend on who is the owner of these schools:

- If the local government is the owner of the school, then it is obliged to finance it in such a way that the curriculum and teaching plans are fulfilled, school staff (especially teaching staff) have the required level of education, the school documentation is maintained according to prescribed standards, teacher salaries meet the national legal requirements, and the school facilities are in accordance to hygienic and other norms.

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26 The present section is based on Levitas, Herczyński (2002), Levačić (2011b), Filas (2012), Herbst (2012a).

- If the local government is not the owner of the school, then it is obliged to transfer to the school owner the amounts received under education subvention for the students of this school (according to the number of students).

Thus there is very significant freedom in how Polish local governments use the funds receive through the education subvention. In fact, they are not even obliged to spend all of education subvention on the education functions, because Polish education subvention is a non-categorical grant (indeed, every year there are a small number of gminas who spend on education less than they receive in education subvention). The only requirement is the fulfillment of education norms defined in the legislation.

It is not surprising, therefore, that there is great variation in how local governments in Poland organize their budgeting process in education. This variety may be organized into four different simplified models.

- Historical budgeting.

    Many local governments set the budgets of their schools on a historical basis, with some adjustments made every year. Indeed, typically from year to year there are typically only small changes in the number of students and classes, and similarly there are only limited changes in the maintenance costs of schools. Thus basing the next year budget on the current year budget is often a safe procedure. Deviations from the historical budget are typically made in case of sudden change of the number of students, recognized need for additional teaching staff (or recognized need that the teaching staff may be reduced), after some investments made in the school (for example new gym may require new staff or increased maintenance), or if there are some changes in school profile (introduction of advanced sport classes, changes in teaching of foreign language etc.).

- Structured budgeting process.

    Some local governments organize their budgeting process in a more structured way, and ask the directors of their schools to propose school financial plans for the next year together with additional explanatory data to support their budget requests (this is often done in October and November). Thus for example school directors may have to compare financial plan proposed for the next year with the plan of their school for the current year, provide the number of students in successive school years, analyze the execution of the financial plan (to identify areas in the financial plan in which the school overspent or underspent in comparison to adopted plan), and similar. The additional explanatory data are provided by all schools in uniform format (adopted by the

local government for all schools belonging to it), which allows for easy comparison and review. It is quite also common to conduct these discussions not separately with each school director, but together, so that all school directors involved may comment on the proposed financial plans of their colleagues. A common agreed opinion of school directors may become a strong argument in the budget process, especially if it is unanimous.

- Administrative vouchers.

  There are some local governments, mostly large cities, which use what is called an administrative voucher. Administrative voucher is a formula which allocates to schools, on the basis of their student enrollment, the number of staff positions, but not the funds to pay for their salaries (the actual salaries typically depend on education level or work experience of school staff, and not just on the number of students). Sometimes administrative voucher covers only teaching positions, sometimes it covers all positions in school. In general, the formulas defining administrative vouchers may be quite complex. For non-salary expenditures these local governments typically use one of the two approaches described above.

- School vouchers.

  A small number of local governments (typically small cities) used voucher scheme to finance their schools. This means that each year school budget is set to be proportional to the number of students. Thus local government adopts a specific formula (very simple one) to allocate funds to its schools. This approach is an internal rule, adopted by a given local government and used during the budget process, that is during the adoption of the local budget and the setting of financial plans of schools (as in all local governments). The local government may, in order to increase the factual autonomy of schools, give the school director the right to propose the financial plan, but it still has to adopt this financial plan as a part of its budget. However, the formulas involving school vouchers are typically very simple.

Overall, Polish local governments are seen as responsible school owners and are given great authority in how they conduct the budgeting process in education (Levitas, Herczyński 2002, 2012). This creates flexibility and diversity. They may adopt very simple or quite complex local formulas to set school financial plans, but may also decide to conduct individual negotiations with each school. They may give much autonomy to the school director in this process, but may also decide that this function should be exercised by local government alone and that school director should be

responsible only for the teaching process and management of the school staff. Local governments may also decide whether they adopt centralized accounting procedures (with all accountants employed in the municipal office, the typical solution), or distributed accounting, with each school employing their own accountant (with the accountant salary part of school financial plan). The assessment of whether their management of education is successful or not comes every 4 years, during local elections.

7.4 Implications for Ukraine

The regulation of the process of setting budgets of individual schools is an important issue for education reformers in Ukraine and is the subject of public debate in the country. As the four examples discussed in the previous section 7.3 show, the exact regulations adopted in different transition countries depend on many specific features of each country, but an important underlying factor is the degree of trust in local governments, in their ability to independently and professionally manage local school networks and take strategic decisions on budgets (or financial plans) of schools.

The context of education reform in Ukraine, including the context of local public administrations, is far from easy. There are three types of local administrations who are responsible for general secondary schools:

- Cities of oblast significance, which have enjoyed both independent budgets and had elected local governments for many years. There are 177 such cities in Ukraine today.

- Amalgamated gromadas, created in 2015 through a process of voluntary amalgamation, with local councils elected for the first time in October 2015. Initially, there were 159 amalgamated gromadas, today their number grew to 413 (as opposed to almost 12 thousand of un-amalgamated ones).

- Rayons, local state administrations running rural and small city schools since the Soviet times, still partially reporting to the oblast and national authorities. There are about 470 rayons in Ukraine today.

When assessing the position of rayons, it is important to remember that many of them govern the territory with "holes", namely the territory of

the rayon without the territories of newly created amalgamated gromadas located there. The "holes" sometimes are big enough for another planned amalgamated gromada, but in some cases they are just too small, and include some small rural school which no neighboring amalgamated gromada wanted to manage. In other cases, the rayon territory is completely covered by the amalgamated gromadas. This creates a different type of problem, with the administrations of rayon and of the overlapping amalgamated gromada competing for the same functions. The law is very unclear about the relationship between the two local administrations, in part because it was originally assumed that the rayons will disappear and be replaced by new tier of "powits" (which are still not legally defined).

Whenever an amalgamated gromada is formed on the territory of a rayon, it should take over from rayon administration the responsibility for financing and managing all municipal schools located on its territory, and the part of the education subvention calculated for those schools will be allocated to the amalgamated gromadas instead of to the original rayon. Presumably, this should also mean taking over of the relevant documentation in paper and electronic form, but this procedure is not regulated in legislation.

The process of decentralization as designed by Ukrainian reformers assumes that over time, all gromadas across the country will amalgamate, and as a result the rayon authorities will lose their all current responsibilities in education. However, this process is still at its beginning and no final date has been proposed. In theory, most local education experts should migrate from rayon authorities to gromadas as this process continues, but this transfer of expertise has not been planned and is not yet happening.

The local experience of management of education varies between the three listed types of local administration.

- Cities of oblast significance have inherited their education departments from Soviet times and have managed and financed their schools in an autonomous manner since then. This means that they have acquired huge experience and are fully able to undertake new tasks.

- Amalgamated gromadas have only started building their education administration, collecting documentation and establishing management systems. Although there are some indicators that education offices of amalgamated gromadas are eager to take over the management of schools and to start consolidating school networks, this is just a beginning.

- Rayons, similar to cities of oblast significance, have a long history of financing schools, have acquired experience and have complete school

documentation. However, their managerial independence was always limited by oblast education departments and by legislation.

The unequal experience, capacities and readiness of different types of local administrations in Ukraine, especially the large difference between cities of oblast significance and amalgamated gromadas, create a difficult challenge for Ukrainian reformers. It may be argued that assigning to cities and gromadas the same degree of authority and autonomy in the education decision making process, especially in education budgeting, is not justified or reasonable. On the other hand, limiting the authorities of amalgamated gromadas through legislation will delay the process through which they become responsible owners of school networks.

It is up to Ukrainian experts and reformers to propose and discuss specific possible regulation of local budgeting process in education. We conclude the present section with a list of issues which should be the subject of these discussions.

- Should Ukrainian budgeting laws define the budgets of individual schools, and how those budgets should be reported.

- How should the process of budget planning be defined, in other words who should propose budget envelopes for individual schools, draft first versions of the school budgets, review these versions, adjust them to funds available for education in the local budget.

- What should be the degree of autonomy of schools in the budgeting process, and how should local public administrations monitor the execution of the school budgets.

- Should budget envelopes of individual schools be defined by allocation formulas or by negotiations, and if formulas are used, who should set and monitor them.

- Should all three types of local public administrations responsible for education be subject to the same regulation of the local budgeting process, and how strong this regulation should be.

MES, as the key architect of educational reforms in Ukraine, should propose some directions for change and initiate public discussions. Hopefully, these discussions will lead to the emergence of a consensus, which is very much needed for such sensitive reforms.

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Dr. Jan Herczyński is senior researcher at Institute of Educational Research in Warsaw, Poland, and serves as Education Consultant for the Swedish-Ukrainian project "Support to Decentralization in Ukraine" (SDU), financed by the Swedish International Development Cooperation Agency SIDA and conducted in Kiev by SKL International. Dr. Herczyński has 18 years of experience in education finance, in education policy and in formulation and analysis of education strategy. Between 1999 and 2001, he advised the Polish Ministry of National Education on the problems of education finance and education decentralization, developed and helped implement the new per student algorithm for the allocation of education subvention to local governments. Between 2002 and 2007 Dr. Herczyński was advising the Macedonian Ministry of Education and Science on strategic issues of education decentralization and finance, including preparation and implementation of a per student allocation formula for categorical and block grants for education. Between 2010 and 2012 Dr. Herczyński coordinated a 3-year project on strengthening strategic capacities of Polish local governments in the education sector, and edited 7-volume Library of Local Government Education (2012). Dr. Herczyński participated in the capacity of consultant and report author in many short-term projects in education finance, strategy and management in transition countries, including Albania, Belarus, Bulgaria, Czech Republic, Georgia, Kazakhstan, Kosovo, Kyrgyzstan, Lithuania, Macedonia, Moldova, Romania, Serbia, Tajikistan, and Ukraine, as well as his native Poland. Prior to taking up education finance and management Dr. Herczyński worked for 17 years as lecturer and researcher in applied mathematics at Faculty of Mathematics, Warsaw University. Dr. Herczyński holds a Ph.D. in Mathematics.