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The Validity of Personal Income Tax Deductions: Analyzing Expenses for Children's Education in Private Schools in Moscow

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ABSTRACT

Tax incentives are commonly used to support various sectors and population, and this study delves into the realm of deductions for the personal income tax (known as *NDFL* in Russia). We explore differing perspectives on these deductions, considering them either as investments in human capital for future income growth or as a form of government-initiated financing for specific sectors. Focusing on deductions related to children's education expenses in private schools, the research evaluates the effectiveness of budgetary investments in this sector. Using DEA analysis, the study assesses private schools based on factors like teacher-student ratios, classroom space per student, and access to computers and educational literature. The learning outcomes were measured by the number of high performers in the Unified State Exam and the number of 9th-grade graduates with certificates of distinction. The evaluation of learning outcomes reveals that many private schools in Moscow prioritize comfort over educational standards and the majority of them perform below the average levels in terms of effectiveness. The findings prompt questions about the feasibility of including private school expenses in personal income tax deductions. The proposed approach recommends tying eligibility for these deductions to the effectiveness of private schools, ensuring a more targeted and impactful use of tax benefits.

KEYWORDS

personal income tax, tax deductions, private schools, data envelopment analysis, effectiveness of tax deductions

JEL I22, I26, H22, H31

УДК 336.228

Обоснованность вычетов по индивидуальному подоходному налогу: пример анализа по расходам на образование детей в частных школах г. Москва

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АННОТАЦИЯ

Популярность налоговых льгот как инструмента поддержки населения и отдельных отраслей экономики достаточно высока как в России, так и в других странах. Однако такая популярность требует более выверенного подхода к предоставлению преференций. Нами были рассмотрены налоговые вычеты по индивидуальному подоходному налогу (НДФЛ в России) как такой инструмент поддержки. Мнение исследователей на данный вопрос неоднородно, как

и теоретическое обоснование возможности применения тех или иных налоговых вычетов. Ряд исследователей признают налоговые вычеты только по расходам, которые явно связаны с увеличением дохода в будущем (своего рода инвестиции в свой человеческий капитал, которые в дальнейшем поспособствуют росту заработной платы, доходов). Другие группы исследователей допускают применение налоговых вычетов по подоходному налогу как инициативное финансирование государством определенных отраслей экономики. В статье нами рассматривались вычеты по НДФЛ расходов на обучение детей в частных школах, что подпадает под концепцию инициативного финансирования, а следовательно, требует оценки эффективности вложения бюджетных денег в данную сферу экономики. Для оценки эффективности частных школ нами был использован DEA анализ, где входными факторами были определены ресурсы, необходимые для обучения школьников (количество учителей на ученика, площадь учебных помещений на ученика, обеспеченность компьютерами и учебной литературой). Выходными результатами обучения рассматривались количество «высокобальников» по единому государственному экзамену и количество выпускников 9 класса, имеющих аттестаты с отличием. Мы оценили эффективность большинства частных школ ниже среднего уровня, что свидетельствует о неэффективности используемых ресурсов. Многие частные школы предоставляют только повышенный уровень комфорта, а не высокие стандарты обучения. Данный аспект ставит под вопрос целесообразность включения расходов на частные школы в состав вычетов по НДФЛ. В статье сформулировано предложение увязать возможность применения вычетов по НДФЛ по расходам на частные школы с эффективностью таких школ.

КЛЮЧЕВЫЕ СЛОВА
налог на доходы физических лиц, налоговые вычеты, частные школы, анализ среды функционирования, эффективность налоговых вычетов

1. Introduction

In Russia, like in many other countries, tax legislation undergoes frequent and substantial changes [1]. The COVID-19 pandemic and economic challenges compelled national governments to extend financial aid to both the general population and diverse sectors of the economy. A prevalent component of this support takes the form of tax preferences. In 2023, Russia had 377 nationwide tax preferences – a notable increase from the figure of 269 recorded in 2019[1].

As the number of preferences is growing, it raises questions about their economic meaning and fairness, which creates the need for a more solid theoretical foundation and an analysis of how well they align with the current tax system concept.

One of the most debated issues is the application of tax deductions for individual income tax (personal income tax in Russia known as *NDFL*). Many authors [2] raise concerns about the social justice implications of specific tax deductions tied to expenses, particularly those favored by individuals with high income levels (charitable contributions being one of their most prominent examples).

In Russia, the market for educational services is evolving rapidly, including the private school education sector. This situation is most clearly seen in Moscow, where the number of private general education schools is quite significant. It is worth noting that this refers only to schools that are licensed for educational activities and have the right to issue state-approved certificates. Payment for the services of such schools may qualify for a personal income tax deduction.

Research question: Is it justifiable to apply personal income tax deductions for expenses on children's education in private schools within the context of income taxation principles or frameworks?

Based on the case of Moscow, we will assess private school education in terms

[1] https://minfin.gov.ru/ru/perfomance/budget/policy/raskhod/rf

of its effectiveness compared to municipal and public schools, employing Data Envelopment Analysis (DEA). The data will help us decide if private school education is seen as improving education overall or merely providing a more comfortable ("privileged") learning experience. Thus, we will be able to assess the feasibility of personal income tax deductions to users of such a service.

The *purpose of this research* is to evaluate the feasibility of applying personal income tax deductions for children's education expenses in private schools in Moscow by examining the effectiveness of these schools.

Hypotheses:

H1: The outcomes of private education for children over 11 years of schooling and over 9 years of schooling should correlate with each other.

H2: For tax deductions on private school expenses to be aligned with the concept of government-initiated financing, private schools should be able to deliver high-quality education.

The *article structure* is as follows: the first part establishes the study's relevance; the second part analyzes concepts related to the justification of tax deductions from the government's perspective; the third part outlines the methodology for analyzing the effectiveness of private education; the fourth part scrutinizes the results of the effectiveness assessment; the fifth part discusses the findings and offers recommendations on aligning deductions with school performance indicators. The conclusion summarizes the key research findings.

2. Literature review

The personal income tax plays a significant role in shaping regional and local budgets. Tax deductions and tax credits are instrumental in calculating the final amount of tax obligations, thus impacting tax revenue to the budget.

Baake et al. [3] demonstrate that the fundamental difference between tax deductions and tax credits lies in the fact that a tax credit is fixed in amount, whereas a tax deduction can vary depending on the rate at which income is taxed. In the situation of a flat tax rate, a tax deduction can be to a certain extent conceptualized as a fixed amount, but under a progressive tax rate, the monetary value of a tax deduction fluctuates.

2.1. Rationale for including individual expenses in the list of deductions

Even though there are various models of tax deductions and tax credits, only a limited number of approaches define the list of expenses that are subtracted from the taxable income base for income tax purposes.

According to Givati [4], in the early 1960s, the idea of tax deductions as a tool for co-financing certain individual expenses became increasingly popular. Within this concept, income taxation was divided into general tax conditions (the "ordinary income tax"), which include elements such as the tax rate, tax-exempt minimum, and tax payment deadlines, and the "personal preferences" allocated to each income taxpayer. The set of preferences includes two elements: expenses related to supporting a particular industry and "special" expenses associated with specific taxpayer expenditures (such as medical expenses, etc.).

Thuronyi [5] contends that this approach suggests viewing the income tax as the payment of the "ordinary income tax», with the subsequent provision of a government subsidy as compensation for specific individual expenses. In other words, according to this approach, personalized deductions should be regarded as direct subsidies for specific taxpayer expenses, limited by the size of their tax payments to the budget.

Surrey [6] pointed out a significant aspect of this approach by categorizing deductions into two types: voluntary subsidies that impact taxpayer behavior and change consumption patterns, and subsidies specifically intended to aid taxpayers facing difficult situations such as the deduction of medical expenses from the taxable base.

Andrews [7] argues that the concept of deductions as a tool for co-financing

individual expenses is not based on the notions of social justice and the correlation of taxation with an individual's level of prosperity. However, there are also approaches attempting to incorporate the dependency of tax obligations on the level of prosperity.

The starting point for the concept of the tax base as the sum of expenditures related or unrelated to income is the diversity of the taxpayer's spending. The concept strives for fair taxation of individuals; however, certain expenditures are not easily categorized as directly related or unrelated to income, which makes the whole task more challenging. This in particular concerns expenses related to medical services, which cannot be definitively categorized into a specific group. Nevertheless, medical expenses are considered eligible for tax deductions on the grounds that they level the possibilities between individuals who have incurred medical costs and those who have remained healthy throughout the entire tax period.

The eligibility of certain expenses for tax deductions, even when they are not directly linked to income, requires certain "imputed income" associated with these expenses. Imputed incomes are extremely difficult to express in monetary terms. In other words, they can be referred to as non-monetary incomes and include activities such as household work. It is this imputed income that provides the basis for incorporating numerous expense categories into tax deductions – a concept that we usually associate with deductions from the taxable base.

Implementing taxation on imputed incomes is a challenging task because it is difficult to evaluate their monetary value and exercise their tax administration.

In our view, this justification somewhat goes beyond the concept of tax fairness associated with the taxpayer's level of prosperity. However, it serves as an intermediate step for another concept described by Bittker [8], which does not recognize imputed income as part of the tax base and, consequently, does not accept deductions that are not directly related to the receipt of taxable income.

Griffith [9] highlights that the primary rationale behind excluding imputed income is the intricacy involved in overseeing non-monetary forms of income and services, especially self-provided services. This contrast in approaches becomes particularly evident when examining a married couple's situation where one spouse is not employed and manages the household. The divergence in approaches results in a doubling of both personal tax deductions and tax brackets. Moreover, it raises questions about the eligibility of the non-working spouse for deductions.

In any of the concepts described above, deductions are an essential element of the structure of income taxation. It should also be noted that tax deductions significantly impact the budget, various sectors of the economy, and different aspects of life related to deductible expenses from the taxable base.

When considering specific types of deductible expenses, it is necessary to start with one of the largest types of expenses, namely, expenses related to acquisition of housing (mortgage interest).

According to Binner & Day [10], one of the most illustrative examples of the positive impact of such deductions is the increase in the homeownership rate in the United States by 23.1 percentage points over almost 90 years of applying these deductions, starting from 1913.

Melnikova & Tikhonova [11] demonstrated the positive impact of such deductions in Russia, pointing out their distinct social orientation.

Deductions related to expenses for medical treatment, or the acquisition of additional health insurance are also commonly applied. In this scenario, researchers differ in their approaches depending on how such a deduction is provided (whether it's the exclusion of employer-provided insurance from the taxable base or a deduction from the taxable base for expenses related to acquiring insurance or direct medical services) and the specific details of the medical insurance or service.

2.2. The negative impact of deductions on social justice

While the eligibility for deducting various expenses can be conceptualized differently, there is a consensus that the use of deductions can contribute to social injustice by favoring wealthier individuals and households.

The main point of contention in the discussion on the unfairness of tax deductions revolves around progressive income taxation, resulting in a higher marginal income tax rate for wealthier taxpayers. The reduction of the taxable base leads to a higher net deduction, expressed in monetary terms, for individuals with high income compared to less affluent individuals.

This discussion has engendered various perspectives on tax deductions. For instance, Saez [12], using the example of a deduction from the income tax for charitable contributions, argued that there is a need to apply deductions to a lesser extent than the taxed amount with the excluded tax base.

There are ongoing disputes regarding expenses that directly or indirectly increase the taxpayer's income. For instance, Baldry [13] highlights the inconsistency in the Australian income tax deduction system, where expenses for professional education within a profession are acknowledged as directly influencing the taxpayer's income. According to the deductibility concept, only expenses related to generating taxable income are considered eligible for deduction, whereas similar expenses for education outside the current profession are not recognized as deductible from the taxable base.

A more common example of different interpretations of expenditures in various countries is commuting expenses. Wrede [14] noted that such expenses are considered income-related and, accordingly, deductible from the tax base in Germany and Scandinavian countries while in the United States and the United Kingdom, these expenses do not reduce the income tax base.

Such a varied approach to the categorization of expenses into related or unrelated to income growth perfectly illustrates, on the one hand, the complexity of establishing the correlation between income and incurred expenses, and on the other hand, the challenges in assessing the actual cost of such expenses and the portion eligible for deduction.

Criticism of tax deductions can be summarized as follows:

1. They contribute to social injustice, where more affluent individuals derive greater benefits from the application of tax deductions.

2. It is difficult to distinguish between types of expenses as eligible or ineligible for deduction.

3. It is also difficult to determine the fair portion of expenses that are allowed to be taken as a reduction in the income tax base.

Dreier [15] suggests addressing social injustice in tax deductions by replacing them with a tax credit – an alternative proposed by many researchers for a more direct and potentially fairer alleviation of financial burdens for individuals.

Green & Vandell [16] point out that in a progressive tax system, there are indeed two questions to consider: how to determine the credit amount and how to establish the base upon which the tax credit will be computed.

The effectiveness of the tax credit system has been discussed by various studies. Bierbrauer & Boyer [17] and Bastian [18] proposed addressing current deficiencies in the system by replacing deductions with tax credits for enhanced performance.

Among the above-mentioned issues, the most thoroughly explored is the challenge of classifying expenses as deductible. Stiglitz [19] and Christiansen [20] specifically point out that a key feature of deductible expenses is their ability to be quantified in monetary terms and their connection, even if indirect, to the income-generating process.

Within a broader approach, expenses may qualify for deductions if they help save time and thus create opportunities for additional income generation (Kleven [21]).

In academic literature, there is no agreement on how much of the deducted expenses can be used to lower the tax amount: for example, Doerrenberg et al. [22] argue that increased tax burden leads individuals to seek ways to minimize the amount of taxes they pay by reducing their work activity, using deductions, or resorting to illegal methods. In this case, tax deductions appear to be a healthier alternative in comparison with the other two options (reducing the amount of work and concealing tax bases) while restricting or standardizing the amounts of these deductions is impractical.

However, not all researchers support this conclusion. Saez [12] presents an alternative viewpoint, arguing that deductions for charitable contributions need not necessarily align with the full amount spent. Hence, to justify a partial deduction for charitable contributions, it is necessary to create methods for determining coefficients and evaluating effectiveness and social justice.

The application of tax deductions is an important element of personal income taxation, regardless of how the legitimacy of deductions is conceptualized. Impediments to a more effective application of tax deductions stem primarily from the heterogeneity of taxpayers, especially in terms of income levels, and the diverse ways individuals respond to similar expenses that reduce the taxable base for income tax.

While in some countries tax deductions are replaced with tax credits, we believe that the former hold greater potential, irrespective of the type of income tax system. In other words, tax deductions can be effective in both proportional and progressive systems.

2.3. Recognition of expenses for private school education as deductions

The inclusion of private school tuition expenses in income tax deductions raises many questions. While some countries, like the USA, offer tax credits for education expenses, some researchers argue that these expenditures should be considered for deductions in the tax system.

Samwick [23] points out that self-payment for school education reduces the burden on public schools, which also decreases budgetary allocations for education. Therefore, such behavior is socially beneficial and may be rewarded with tax preferences.

Yet, not all researchers view tax preferences for private education expenses as a form of social support or socially significant behavior. For example, Smart [24] contends that tax compensation for the choices made by parents regarding a particular educational model is a debatable issue, especially concerning schools associated with religious communities.

Boyer [25] supports the idea of offering tax preferences for private education expenses on the grounds that it fosters competition between private and public schools, leading to improved educational service quality.

Tikhonova [26] proposes viewing private education expenses as an investment in human capital development. She highlights that the effectiveness of education is influenced by various factors, including age, occupation, financial status, and the type of educational services (school education, higher education, additional professional education).

The diversity of perspectives on the effectiveness of tax preferences for expenses on private school education is connected, in part, to differences in the reasons for choosing private schools.

On the one hand, parents opt for private schools seeking more comfortable and privileged learning conditions for their children. On the other hand, the choice in favor of a non-government school may be driven by objective circumstances, such as the need for more attention to children with special needs or the lack of available space (overcrowding) in nearby public schools.

A separate category is private education obtained in “religious” schools – in this case the choice is driven by parents’ desire to uphold specific religious rituals and traditions in their child’s education.

2.4. Private education expenses in the light of two tax deduction approaches

2.4.1. The concept of deductions for expenses directly tied to income

Let us investigate the expenses related to private school education. The analysis will be conducted by considering different concepts or perspectives on how these expenses can be accounted for as deductions from the taxable income base when calculating income tax.

Graetz et al. [27], Bradford [28], and Richter [29] argue that deductions should apply to expenses directly linked to income generation, viewing tax deductions as a means of determining the net income subject to taxation. However, in our perspective, this approach doesn't accommodate deductions related to private school education. This is because the user of such deductions is typically a parent who doesn't directly derive additional income from these specific expenses.

The above-described approach does not allow us to determine how effective deductions for private school education would be. According to Richter [30], to assess effectiveness, we need to assign a value to the expected increase in future income from these deductions. It makes more sense to speak of the potential rise in the household's income, not just the parents, because the child, who is expected to earn income later, is seen as a separate entity.

Bittker [31] notes that when it comes to households, it is more practical to operate with other instruments (tax allowances), for example, modify tax schedules or apply exemptions from taxable bases (untaxed minimum, etc.). Another debatable issue, according to the same author [32], is the question of classifying an adult working child as part of their parents' household.

Therefore, we are not going to apply the concept of deducting expenses directly related to income generation when considering deductions for private school education for children.

2.4.2. The concept of financing specific economic sectors through government-initiated expense deductions

Budgetary subsidization of expenses for private schools, to a certain extent, can be attributed to government-initiated financing, as the state's goal is to ensure the necessary level of school education accessibility. The social aspect of such subsidization can only be realized if there is a sufficient number of private schools offering conditions suitable for children with special needs.

Government-initiated (indirect) financing may be used to support private schools, thus benefiting society by improving knowledge. The impact of this measure can be gauged by analyzing graduation exam statistics.

An important thing to keep in mind is the fact that the Russian private schools are not equivalent to the private schools in the U.S. Instead, they correspond more closely to the so-called "charter schools", which are non-governmental institutions partially funded from the budget depending on the number of students. We believe that tax deductions for children's education in private schools can also be classified as indirect financing for Russian private schools.

In most studies, the effectiveness of private schools has been examined from the perspective of enhancing the level of education in a city or district. In their analysis of the academic achievements of students in private schools in Michigan, USA, Eberts & Hollenbeck [33] found higher scores on final exams for students in public schools.

Hollenbeck & Nelson [34] conducted a similar analysis of academic achievements among students in private schools in Arizona (USA) and obtained completely opposite results – higher scores for students in private schools.

Bettinger [35] investigated the improvement of the overall level of education in private schools through their competition with public schools.

Our results, however, do not confirm the improvement of the education level through competition; they only in-

dicate that private schools tend to establish themselves in areas where there is no competition from public schools.

Clark et al. [36] and Bifulco & Ladd [37] also did not find any statistically significant growth in the level of education associated with school competition. Moreover, they demonstrated that if the number of private schools is high, it may result in financial losses to the public education sector.

Ladd & Singleton [38] divided the funding for the education of one student into fixed and variable costs. They showed that an increase in the number of private schools raises the proportion of fixed costs (such as school buildings, etc.) and makes the education of one student in a public school more expensive, considering the need for co-financing education in private schools.

Looking at prior research, it is clear that there are mixed results when it comes to evaluating how well students perform in private schools. The majority of studies argue against any positive impact of educating children in private schools on the overall secondary education system.

Table 1 summarizes the research evidence mentioned in this article, including data sources and statistical methods used for data assessment.

Table 1 illustrates the modern approach to assessing the level of education overall and with a breakdown into public and private schools. This approach focuses on how well the resources invested in education align with the learning outcomes, as indicated by students' grades.

Comparison of the level of education in private schools with public ones will help reveal the essence of fee-based school education: Does it merely serve as a "fee for comfort in education", or does it contribute to the improvement of the education level? By answering this question, we will be able to determine if these expenses qualify for tax deductions under the government-initiated financing concept.

3. Methodology

To assess the level of education in private schools in Moscow, we chose the Data Envelopment Analysis (DEA) method [39], which has been extensively tested before in evaluating the effectiveness of schools [40; 41] and universities [42].

This method assumes the efficiency of using "input" resources to generate "output" resources. The mathematical model of DEA analysis is represented by the following formulas:

$$\max_{v_i u_i} \left(e_k = \frac{\sum_{i=1}^{M} u_i y_{ik}}{\sum_{j=1}^{N} v_j x_{jk}} \right); \quad (1)$$

Table 1. Summarized information on research of school education levels

Authors	Assessment of the quality of education	Methods
Eberts R.W., Hollenbeck K. [33]	MEAP test, categorizing students based on the quality of education	Statistical analysis of the MEAP test scores, indicators characterizing the school environment and the quality of teaching
Hollenbeck K., Nelson C. [34]	SAT test (test for admission to higher education institutions)	Linear regression of SAT test results on variables (several sets characterizing the school and student)
Bettinger E.P. [35]	Michigan's standardized testing program	Statistical analysis of test scores on variables (several sets characterizing the school and student)
Clark M.A. et al. [36]	Tests in mathematics and reading	Linear regression of test results against variables (multiple sets characterizing both the school and the student)
Robert Bifulco, Helen F. Ladd [37]	Tests in mathematics and reading	Linear regression of test results against variables (multiple sets characterizing both the school and the student)

$$\begin{cases} e_k \le 1,\ k = 1,\ ...,\ R \\ u_i > 0 \forall i \\ v_j > 0 \forall j \end{cases}, \quad (2)$$

where e_k is the effectiveness of the *k-th* object; v_j, u_i are weight coefficients indicating the contribution of each parameter; x_{jk} are input parameters; y_{ik} are output parameters; M is the number of input parameters; and N is the number of output parameters.

The "classical" model assumes constant returns to scale (CRS), which involves the hypothesis of a constant increase in the output measure when increasing input factors.

In our view, a more flexible model is the variable return to scale (VRS), which rejects the hypothesis of constant increase in the output measure when increasing input factors.

To build our model, we used the following "input" variables:

– student-teacher ratio;
– numbers of computers per student;
– classroom area per student;
– floor area of the school per student.

These variables were selected because it is necessary to consider the maximum number of material and labor resources allocated to education. To reduce the number of variables, we used indicators per student, thus excluding data on the school's total enrollment, number of classes, etc. Certain constraints were imposed by limited information required for disclosure in self-assessment reports and the absence of even these data in reports from a significant number of schools.

For Model 1 we chose the indicator "number of students scoring above 220 points on the Unified State Exam in three subjects" as the output parameter, while for Model 2, it was the "number of certificates with honors upon completion of the 9th grade".

Model 1 evaluates the performance of 11th-grade students who achieve high scores (above 220) in the Unified State Exam across three specific subjects chosen by the students. Model 1, primarily, describes the graduation of the most prepared students who have completed their full secondary education and will subsequently have greater value for the economy. However, Model 1 overlooks a significant number of students who complete their education in schools after the 9th grade while it is precisely the 9-year school education that is truly mass-oriented and much more accurately reflects the potential of schools in educating children.

For a more comprehensive assessment, it was decided to use an indicator related to the number of high-performing 9th-grade graduates in Model 2. It should be noted that according to the hypothesis *H1*, the performance levels of schools based on 11 years of education and 9 years of education should correlate with each other.

The data were manually collected from self-assessment reports for 2022, published on the official websites of Moscow schools. It should be noted that despite the requirement to publish certain indicators, not all schools make this information publicly available in their self-assessment reports.

To measure the effectiveness of schools, we used specialized software RStudio, in conjunction with the Benchmarking library (R programming language). In total, we processed the data on 292 schools (43% of the total number of schools in Moscow), including 234 public schools and 58 private schools.

4. Results

As a result of modeling, the following results of school performance were obtained (Table 2 and 3).

The distribution of schools according to their performance is shown in Table 3.

As seen in Table 3, effectiveness indicators based on the CRS and VRS methods show significant deviations from each other. In our opinion, this illustrates the fact that a direct increase in input factors alone cannot ensure a qualitative growth in the output indicator. Therefore, for a more effective evaluation, we have chosen the VRS method.

According to the results of the DEA analysis using the VRS method, below-average effectiveness values are observed in

52.74% of schools (47% public schools and 72.41% private schools), while the segment of highest-performing schools comprises 11.99% of schools (11.11% public schools and 15.52% private schools). The distribution of schools based on their performance in Model 1 (11th grade) is shown in Figure 1.

As seen in Figure 1, the distribution of schools, including public schools, looks normal, while private schools show distinct segmentation in both low and high-effectiveness zones. In the average range of effectiveness, the number of private schools is very limited.

Table 2. Key modelling indicators

Indicators	Model 1 (11th grade)		Model 2 (9th grade)	
	CRS	VRS	CRS	VRS
1. Mean	0.21	0.598	0.259	0.585
2. Minimum	0.045	0.08	0.05	0.08
3. Median	0.138	0.588	0.183	0.563
4. Number of effective schools	12	25	14	27
Including				
private schools	5	8	5	9
municipal schools	7	17	9	18

Table 3. Values of effectiveness indicators for private and public schools in Model 1

Effectiveness	Model 1					
	All schools, %		Municipal schools, %		Private schools, %	
	CRS	VRS	CRS	VRS	CRS	VRS
0.1–0.2	61.64	3.42	55.13	1.28	87.93	12.07
0.2–0.3	17.12	7.88	20.51	2.99	3.45	27.59
0.3–0.4	6.51	8.56	8.12	5.98	0.00	18.97
0.4–0.5	6.16	12.33	7.69	14.10	0.00	5.17
0.5–0.6	1.71	20.55	2.14	23.50	0.00	8.62
0.6–0.7	1.37	17.47	1.71	21.37	0.00	1.72
0.7–0.8	0.68	9.59	0.85	10.68	0.00	5.17
0.8–0.9	0.34	8.22	0.43	8.97	0.00	5.17
0.9–1.0	4.45	11.99	3.42	11.11	8.62	15.52
Total	**100**	**100**	**100**	**100**	**100**	**100**

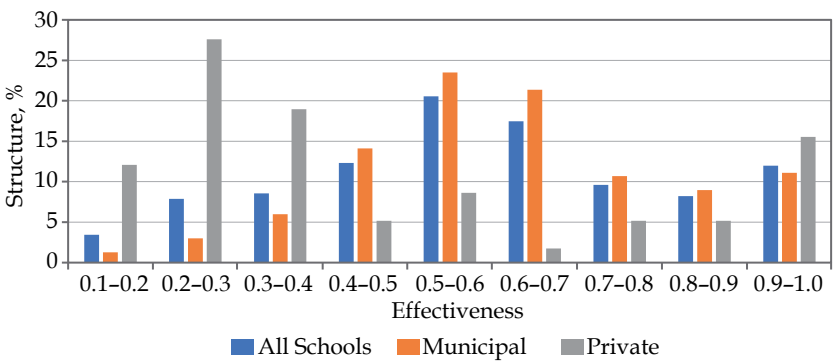

Figure 1. Effectiveness structure according to the VRS method in Model 1

It should be noted that 39.66% of private schools and only 4.27% of public schools fall within the range of extremely low effectiveness levels (from 0.1 to 0.3).

Let us now consider the distribution indicators for schools in Model 2.

As in Model 1, in Model 2, there is a significant deviation between the effectiveness indicators using CRS and VRS methodologies.

According to the results of the DEA analysis in Model 2 using the VRS methodology, 56.85% of schools have below-average effectiveness (53% of which are public schools and 72.41% are private schools), while 12.33% of schools fall into the highest effectiveness segment (11.11% of which are public schools and 17.24% are private schools).

It should be noted that there is a high level of comparability in the effectiveness assessment results of schools between Model 1 and Model 2, which confirms the initial hypothesis of this study.

The distribution of schools according to their effectiveness in Model 2 (9th grade) is also presented in Figure 2.

The distribution of effectiveness in Model 2 has the same characteristics as in Model 1. It should be noted that 41.38% of private schools and only 4.27% of public schools can be considered low-performing (their results fall within the range from 0.1 to 0.3).

The final results from both models strongly correlate with each other. The majority of school ratings align in both Model 1 and Model 2, which, in our view, indicates the high reliability of results describing schools' potential to prepare top-tier students, both based on the results of basic education (9 years) and secondary education (11 years).

Table 4. Values of effectiveness indicators for private and public schools in Model 2

Effectiveness	Model 2					
	All schools, %		Municipal schools, %		Private schools, %	
	CRS	VRS	CRS	VRS	CRS	VRS
0.1–0.2	53.42	3.42	46.58	1.28	81.03	12.07
0.2–0.3	11.99	8.22	13.68	2.99	5.17	29.31
0.3–0.4	12.67	9.25	15.81	7.69	0.00	15.52
0.4–0.5	6.16	15.75	7.69	17.95	0.00	6.90
0.5–0.6	4.79	20.21	5.13	23.08	3.45	8.62
0.6–0.7	4.11	13.70	5.13	16.67	0.00	1.72
0.7–0.8	1.03	11.64	1.28	13.25	0.00	5.17
0.8–0.9	0.00	5.48	0.00	5.98	0.00	3.45
0.9–1.0	5.82	12.33	4.70	11.11	10.34	17.24
Total	**100**	**100**	**100**	**100**	**100**	**100**

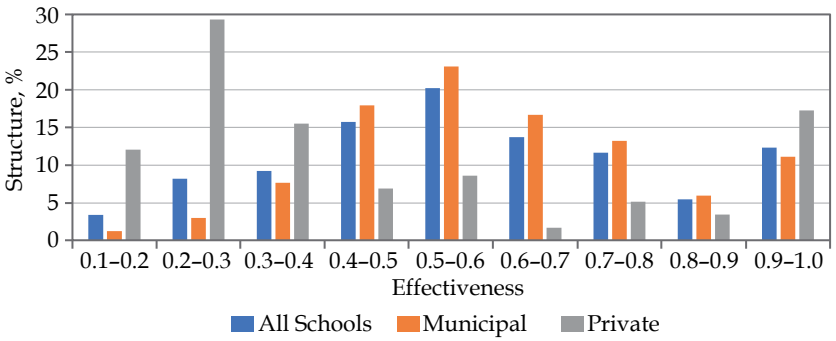

Figure 2. Effectiveness structure according to the VRS method in Model 2

As the results are comparable, we deem Model 2 as the foundation for assessing the quality of education for the majority of school graduates.

5. Discussion

Since Models 1 and 2 yield comparable results concerning school performance, we can consider the hypothesis *H1*, which posits a correlation between the effectiveness of children's education in private schools after 11 years of schooling and 9 years of schooling, as confirmed.

Earlier, we established that tax deductions as a form of budgetary support for private schools can be considered a type of government-initiated financing. In this case, tax deductions for education in private schools should be directly linked to the improvement of the average level of education in private schools. However, the research results do not support this as the majority of private schools (72.41%) perform below both the median and mean levels. It should be noted, however, that 17.24% of private schools are highly effective. Interestingly, there are virtually no private schools with average effectiveness levels.

Thus, the hypothesis *H2* about the need for highly effective private schools to consider parents' expenses justified has found only partial confirmation.

Based on these results, private schools can be roughly divided into those that mainly prioritize "creating comfort for students" (schools with low effectiveness) and those that are "focused on high academic achievements" (schools with high effectiveness).

The limited effectiveness of many private schools can be attributed to the fact that their resources are mainly directed towards creating a more comfortable atmosphere, while lacking specific academic performance indicators. The existence of highly effective private schools shows, however, that it is possible to achieve strong results with substantial resources, if there is a high standard of education.

The Russian tax deduction system currently does not provide a ranking mechanism for assessing private schools based on their academic success and learning comfort. In this scenario, it is clear that private schools emphasizing comfort, or the prestige of education do not align with the criteria of the government-initiated financing concept. Consequently, providing tax deductions for education in such schools is unjustified and, overall, is detrimental to education funding at the municipal level.

Potential budget losses can be easily calculated by using the number of students in private schools and the limit for tax deductions for education (110,000 rubles per child, Subparagraph 2, Paragraph 1, Article 219 of the Russian Tax Code). Taking into account the fact that there are 46,939 students attending private schools in Moscow, potential budget losses (inefficient spending) for the city of Moscow (as a subject of the Russian Federation) in 2023 ranged from 671.2 million rubles to 774.5 million rubles (calculated at rates of 13% and 15%, respectively).

We describe these amounts as losses because government-initiated funding is primarily directed towards underperforming schools, thereby reducing the overall budget volume that could potentially be allocated to public schools.

Considering the reviewed academic literature on income tax deductions and the analysis of DEA efficiency results for schools, we can conclude that offering tax deductions for expenses related to children's education in private schools contradicts the intended nature of these deductions. However, it is crucial not to discourage high-performing private schools.

We suggest tying the eligibility for deductions to the effectiveness levels of private schools. This way we can exclude private schools from budget co-funding if they provide "privileged" learning conditions without demonstrating a high level of training. To this end, the following mechanism can be proposed (Figure 3).

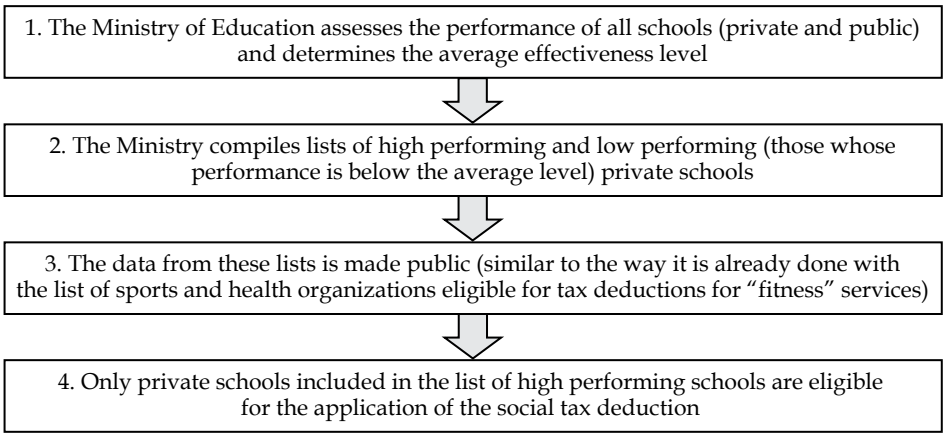

Figure 3. Scheme of income tax deductions based on private schools' performance

6. Conclusion

In this study, our main focus has been on exploring various approaches to determining tax deductions for individual income tax. Our literature review has shown that deductions for private school tuition align with the concept of government-initiated financing. However, it is important to note that this support should only happen if there is evidence of positive impacts or beneficial outcomes from such financial assistance.

The majority of private schools in Moscow (72.41%) perform below the median and mean levels of effectiveness, and only 17.24% of private schools perform above these levels.

Our results confirm the hypothesis that there is a correlation between the effectiveness ratings of children's education in private schools based on 11 and 9 years of schooling.

The study has partially confirmed the hypothesis that ensuring high effectiveness in private school education justifies parents' expenses on these schools.

The above-described situation raises concerns about the potential efficiency of providing income tax deductions of up to 774.5 million rubles from the Moscow budget. In addition, the majority of private schools significantly lag behind in effectiveness even compared to average public schools that have not demonstrated outstanding results.

Granting tax deductions for expenses on private education, without assessing the effectiveness of government-initiated financing, goes against the theoretical principles of income tax.

The proposed mechanism involves regular monitoring of private schools' performance and establishing a registry of effective private schools, thereby qualifying them for tax deductions on related expenses.

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