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The Shadow Price of Schooling: Determinants of Household Expenditure on Private Tutoring in Pakistan

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ABSTRACT

Shadow education, a private supplementary tutoring, provided outside the formal school system, has expanded globally by creating a parallel educational market that underpins well socioeconomic inequalities in society. The prevalence of shadow education is documented, the specific economic burden it imposes on households in developing economies remains under-analysed. This study investigates the determinants of household expenditure on shadow education in Lahore, Pakistan, utilizing a survey of 120 households across stratified socioeconomic localities (Johar Town and Shahdara). Using Ordinary Least Squares (OLS), we analyse the elasticity of tutoring expenditure with respect to household income, parental education, and spatial demographics. Our findings indicate a clear "substitution effect" related to paternal education as an increase in a father's educational accomplishment significantly decreases household expenditure on private tutoring. This suggests that educated fathers often replace market services with time spent on home-based parental involvement. On the other hand, higher household income and living in urban areas are linked to greater expenditures on education, which suggests that shadow education acts as a luxury good, increasing social stratification. The study estimates that residing in high-income areas results in an average monthly difference of about PKR 13,941 in educational spending. The results highlight that the public education system has failed to act as a levelling mechanism, instead forcing households into a "bidding war" for human capital accumulation. Policy recommendations give emphasis to regulate tuition fees and by enhancing public school quality in order to minimize the shadow economy's negative impact on household welfare.

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INTRODUCTION

The privatization of education has traditionally been analysed through the lens of formal schooling, private schools versus public institutions. However, a more insidious and general privatization has occurred in the "shadows." Shadow education, defined as private supplementary tutoring in academic subjects provided for remuneration, has grown from a niche activity into a global industry (Bray, 2021). In many developing economies, this shadow sector is no longer merely a "supplementary" one, as it has become a prerequisite for academic success by creating an institutionalized economic burden that households have to bear for their children's competitive edge (Zhang & Liu, 2017). In Pakistan, the educational landscape is characterized by deep structural fissures. The formal education system in Pakistan is divided into elite private schools, low-cost private providers, and under-resourced public schools. This stratification creates high-stakes examinations, driving demand for shadow education. The informal economy in Pakistan is estimated to be approximately 35.6% to 40% of the total GDP (Haq, 2022; Hashmi et al. 2024); the specific contribution of the shadow education market remains opaque. This sector operates largely unregulated, extracting significant surplus from households that view education as the primary vehicle for social mobility.

Neo-liberalism's marketization and privatisation inclinations have significantly changed education from a public to a private good (Ball & Youdell, 2009; Bray, 2021). In this framework, private supplemental tutoring holds a significant place. Parents and instructors are using it more frequently as part of larger efforts to support their children's and students' academic careers (Liu, 2019). As a result, there is now a multi-billion-dollar global market for supplemental tutoring (Bray & Lykins, 2012). Shadow education has replaced official education in the congested international educational market, as tuition centres and academies have mushroomed recently (Bray, 2016; Punjabi, 2020). Additional offers in the area of shadow education have, on the one hand, been welcomed as an investment in students'

Shadow education is typically provided to underachievers and students from families with poor levels of education. From this perspective, shadow education is a coping mechanism for addressing educational inequity. However, shadow education is expensive. It increases the financial strain on families. Because poor families cannot afford as

many lessons or as highly competent tutors as wealthy families, shadow schooling contributes to socioeconomic inequity. Students' free time is consumed by shadow education, and as a result, they are less engaged in their regular classes (Bray, 2009; Byun et al., 2018). Due to these restrictions, some nations attempted to curb tutoring markets but were unsuccessful, as their measures lacked empirical support (Bray, 2009). The terminology used to describe the phenomenon of home tuitions and private tuitions includes tutoring, extra lessons/study, private tuition, out-of-school education, and shadow education. However, the term "shadow education" appears frequently in literary works. According to Bray (2006), extra instruction in core subjects goes beyond the requirements of the school day.

Globally, shadow schooling is expanding quickly. Ireson and Rushforth (2014) found that 27% of primary and secondary students in England received additional tutoring to support their everyday learning and exams. According to Baker et al. (2001), 75% of South African grade 8 students received additional maths instruction. According to Aurini and Davies (2004), the private supplementary education market in Canada's largest cities has increased by 200% to 500% over the previous three decades. They also pointed out that in 2002, 24% of parents in Ontario with school-age children used private tutors. According to Silova and Bray (2006), pupils in their senior year of secondary school had access to extra tutoring in the form of lessons or courses. For instance, 66% of respondents reported receiving this type of instruction in Poland, 56% in Slovakia, 71% in Mongolia, 79% in Ukraine, 80% in Georgia, and 93% in Azerbaijan. Korea may be the nation that spends the most on shadow education overall (3% of GDP). According to the Annual Survey of Education (2013), 17% of public school students and 34% of private school students in Punjab, Pakistan, take part in supplemental tutoring. These studies demonstrate that the recent development of supplemental tutoring is occurring worldwide.

The UN Sustainable Development Goals (SDGs) are the United Nations' global development framework for 2030, which aims to reflect justice, equity, and sustainable development. On the other hand, education is among the priorities of SDGs as highlighted in the 4th Goal. Education is highlighted as a way of achieving the other Sustainable Development Goals for education in target 4.7 (Guglielmin et al., 2022). The SDGs also address challenges in the informal economy, with reference to the formalization of micro, small, and medium enterprises through target 8.3. Hence, education plays a crucial role in achieving the SDGs through various forms of development, including reducing the shadow economy. The informal economy in Pakistan today accounts for approximately 35.6 percent of the country's total GDP, translating to 507 billion USD (Haq, 2022). It is worth noting that there is strong evidence that the shadow economy in Pakistan is estimated at 40% of the country's GDP, and that about 6% is lost to theft every year, as shown by Hashmi et al. (2024). According to Mughal and Schneider (2018), the significant economic disadvantage of Pakistan as an underdeveloped country is its lack of investment, accountability, quality education, sound policies, reputable financial institutions, and attention to socio-economic issues. It is essential to determine the scale of the shadow economy and its impact on the development of effective governmental policies and planning, given that GDP is viewed as the most suitable measure of economic activity.

The economic problem addressed in this paper is twofold. First, the financial burden of shadow education effectively imposes a regressive tax on human capital accumulation, disproportionately affecting lower-middle-class households who must divert consumption from other essential goods to fund tuition. Second, the dynamics of this expenditure suggest a market failure in which formal schooling signals insufficiency, compelling parents to purchase "top-up" services. This study fills a critical gap in the development economics literature by moving beyond the binary of *access* (who attends tuition) to an analysis of *intensity* (how much is spent). Unlike previous studies that treat shadow education demand as a binary probit choice, we model it as a continuous expenditure function. Specifically, we investigate: (1) To what extent does household income drive the intensive margin of shadow education investment? (2) Does parental human capital (education level) complement or substitute for market-purchased tutoring? (3) How does spatial inequality (geographic residence) manifest in educational spending differentials?

Using primary data from Lahore District, this paper contributes to the literature by identifying a parental-substitution effect—where educated fathers reduce the financial burden of tutoring—and quantifying the spatial price premium for residing in affluent versus working-class neighborhoods.

LITERATURE REVIEW

Theoretical Foundations: Human Capital and Signalling

The demand for shadow education is theoretically grounded in Human Capital Theory (Becker, 1962), which posits that households invest in education up to the point where the marginal return equals the marginal cost. In developing nations, where credentialism is high, the "diploma disease" (Dore, 1980) intensifies this demand. Shadow education serves as a mechanism to secure the credentials necessary for labor market entry. Alternatively, from a Signaling Theory perspective, shadow education allows households to signal high ability or high parental commitment to future employers or higher education admission boards. This signaling equilibrium creates a prisoner's dilemma: if one household invests in tutoring, others must follow to avoid falling behind, triggering an educational "arms race" that inflates the cost of education without necessarily increasing aggregate societal productivity (Bray, 2017).

Empirical Evidence on Determinants

Global literature indicates that demand for shadow education is income-elastic. In South Korea, where shadow education spending accounts for nearly 3% of GDP, high-income households significantly outspend their counterparts, cementing intergenerational inequality (Kim & Lee, 2023). Similarly, in China, Zhang and Liu (2017) found that the privatization of basic education significantly shifted the burden onto families, with urban residency acting as a strong predictor of higher expenditure. However, the role of parental education is ambiguous in the literature. Some studies suggest a complementarity effect, where educated parents value education more and thus spend more (Aurini & Davies, 2004). Others suggest a substitution effect, where educated parents possess the cultural capital and cognitive skills to tutor their children themselves, reducing the need for market services. Understanding which effect dominates in the Pakistani context is a key objective of this study.

The Pakistani Context

In Pakistan, the failure of the public sector has led to a boom in low-cost private schooling and tuition centers. Recent data suggest that 17% of public school students and 34% of private school students in Punjab engage in supplementary tutoring (Annual Survey of Education, 2013). Despite this prevalence, few studies have econometrically modeled the determinants of costs. Most local research focuses on the reasons for tutoring (e.g., poor school quality) rather than the economic burden itself. This paper addresses this gap by treating tuition expenditure as a dependent variable within a standard household utility-maximization framework.

METHODOLOGY

Research Design

To answer these research questions, this study employs a mixed-methods approach combining quantitative and qualitative methods. On the quantitative side, statistical analyses of survey data answer what and how questions, and in-depth qualitative interviews answer why questions.

Participants

Participants will be sampled from students at both government and private schools, from a diverse range of socioeconomic statuses living in urban and rural spaces. The stratified random sampling will be employed to select from the different groups. Given robust statistical analysis (Cohen, 1992), the target sample size was set at about 300 students.

Data Collection Methods

The primary data was collected from the division of Lahore employing a technique known as a structured questionnaire. The rights to the research survey were exercised and controlled by the authors of the work. As for illiterate parents, they were provided with a face-to-face interview. For This Approach, Several Factors, Such As Illiteracy Among Parents, Particularly In The Shahdara And Johor Town Divisions. That is why bringing a close-ended questionnaire and conducting a face-to-face interview is the best way to gather the data from the illiterate parents. Data were collected from the interviewees regarding their socio-economic status, education level, shadow education, and the amount of expenditure incurred on it. All the principles of research ethics were upheld in the study. This protected the confidence at all levels and communicated the purpose and objectives of the research to the parents. The respondents were informed about their benefits and rights regarding the use of their data, and the surveyor is responsible for ensuring the privacy of information.

Survey Questionnaire

A structured questionnaire will be used for collecting quantitative data. The questionnaire will include:

Demographic Information: Gender of parents, educational background of parents, age, socioeconomic status of parents, family size.

Economic Burden: Questions included household income, expenditures on shadow education, and perceived economic stress.

Societal Implications: Including items on educational inequality, access to higher education, and student well-being.

Pilot Testing: The questionnaire will be piloted with 30 respondents to refine the questions for clarity and reliability.

Interviews

A structured questionnaire will be used to collect quantitative data. The questionnaire will include:

Demographic Information: Gender of parents, educational background of parents, age, socioeconomic status of parents, and family size.

Economic Burden: Questions included household income, expenditure for shadow education, and perceived economic stress.

Societal Implications: Including items on educational inequality, access to higher education, and student well-being.

Quantitative Analysis
A structured questionnaire will be used to collect quantitative data. The questionnaire will include:

Demographic Information: Gender of parents, educational background of parents, age, socioeconomic status of parents, and family size.

Economic Burden: Questions included household income, expenditure for shadow education, and perceived economic stress.

Societal Implications: Including items on educational inequality, access to higher education, and student well-being.

Ethical Considerations
Ethical approval will be obtained from the relevant institutional review board. Participants will be informed about the study's objectives and procedures, with assurances regarding their right to withdraw at any time. Informed consent will be secured, and data will be anonymized to protect participant confidentiality.

Model Specification
To examine how supplementary education affects students' results, the educational production function is used. It explains how learning can be gathered using the given combination of educational materials. Student's test scores or results are used to quantify educational output, whereas the factors used as educational output include family, school, and student factors, including supplementary education (Hanushek, 1996). Following is the educational production function (Zhang, 2013);

$$Y = \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \ldots + \beta_8 X_8 + e \quad (1)$$

Where,

Y = educational output

B_i = co-efficients

X_1= age

X_2= gender

X_3= marks in matric

X_4= father education

X_4= mother education

X_5= Family income

X_6= College fee

X_7= Academy fee

$e_{i's}$= error term

RESULTS AND DISCUSSION

Descriptive Statistics
The sample reflects a gender-balanced distribution. The educational background of parents varies significantly between the two localities. In terms of academic level, 52.4% of students were in Grade 10 (Matriculation), a high-stakes examination year in Pakistan, while 47.6% were in Grade 9. The descriptive analysis reveals a heavy reliance on private tutoring, with wide cost dispersion—ranging from nominal fees in Shahdara to significant capital outlays in Johar Town.

Factors Affecting the Demand of Shadow Education
The study at hand found the factors affecting demand for shadow education. It is found that the majority of factors have a significant impact on shadow education. Therefore, the study used robust standard errors to address heteroscedasticity. The study finds that the R-square value is 0.6592, which means that 65.92 percent of the variation in the model is due to the independent variables entered into the model, and the rest is the error term. Moreover, the study finds that household size, family income, the respondent's residence, and the father's education are significantly related to shadow education, as shown in Table 1.

Table 1: Econometrics Results of Factors Affecting Shadow Education

Dependent Variable: Expenditure on Shadow Education	Coefficient	Robust Std. Err.	t	P>t
Student gender	-5473.6470	5320.9680	-1.03	0.306
Household size	-494.1222	279.0230	-1.77	0.079
Income	0.1380	0.0500	2.76	0.007
Residence	13941.2800	6821.9300	2.04	0.043
Mother Education	-335.3028	2153.6540	-0.16	0.877
Father Education	-13649.7300	5629.1200	-2.42	0.017
School type	-14466.0500	10171.1200	-1.42	0.158
Last exam percentage	124.1930	129.0096	0.96	0.338
School fee	1.2818	1.2952	0.99	0.325
_cons	10688.2000	11612.0400	0.92	0.359
Number of observations	120			
F (9, 110)	1.37			
Prob > F	0.2094			
R-squared	0.6592			
Root MSE	31398			

Impact of Household Size on Shadow Education

The study finds that household size has a significant and negative impact on shadow education (coefficient = -494.1222, standard error = -1.77, p = 0.079). It means that as household size increases, the probability that a student takes shadow education decreases. The reason behind this is that as the number of households increases, the probability of taking shadow education decreases because of other expenses in the household.

Impact of Income on Shadow Education

The study finds that family income significantly increases shadow education (coefficient=0.1380, standard error=0.0500, p=0.007). It means that as family income increases, the probability of taking tuition increases as shadow education requires more funds. Low-socioeconomic-status (SES) parents, however, cannot afford a similar investment. Moreover, Kim and Lee (2023) demonstrate that it is equally hard for low-SES families with significantly more children to afford educational aid for one child, let alone several, further increasing economic pressure on low-SES families.

However, while education is laden with inequality, the enormous economic burden of shadow education also contributes to it. Jin and Lyu (2020) also argue that this educational gap will be exacerbated by SES differences in access to shadow education. As well as a greater chance that helping students from higher-SES families through tutoring will improve their academic performance, it also means they have a greater ability to access opportunities in higher education. The result is an enduring cycle of educational inequality because low-SES students don't have the money to pay for tutoring, so they are at a disadvantage.

But there are broader implications of these disparities for family financial stability and well-being. Low-SES families are financially stretched by shadow education, which adds to stress and vulnerability to financial uncertainty (Stewart and Thomas, 2020). Furthermore, this strain could compel onerous monetary choices, akin to slicing different necessary bills or taking on debt – all of which detract from the overall monetary advantages of the house.

Targeted policy interventions are needed because shadow education is an economic burden. For this reason, Zhang and Liang (2019) propose policy interventions to relieve the financial burden of tuition that low-SES families have to bear (e.g., subsidising tuition costs or helping maintain tuition fees). Also, public education can improve the quality of schooling, which lessens the financial load needed to complement education and foster education equity.

This is important because the influence of shadow education is potent on families, especially low-SES families. Their downward mobility implies these families are under financial strain and, as a result, cut off access to education and aggravate existing inequalities. Findings show that although the higher SES families can better absorb shadow education costs, the fates of the lower SES families are not so rosy: Most certainly, they face overwhelming challenges that ultimately harm their overall well-being and educational outcomes. However, these problems are so severe that not only do they require comprehensive policy remedies to reduce the economic burden on academic resources, but they also require that educational resources be equitably available.

Impact of geographical Location on Shadow Education

The study finds that residence of the respondent significantly and positively determined shadow education (coefficient=13941.2800, standard error=6821.9300, p=0.043). It means that people of Johar town spend a substantial amount on their children's private supplementary education as compared to Shahdarah. It is observed that people of Shahdarah are poor and pay less on shadow education. Outside formal education, however, the growth of private tutoring as a significant element in the educational scene has become increasingly important. It has different economic impacts between urban and rural areas and also affects people's families' financial stability and access to educational resources. This literature review will analyze the role of geographical location in the economic burden of shadow education, with a focus on differences between rural and urban areas.

The urban economic burden of shadow education is often very high, especially in markets with intense competition. In urban centers, you see such a demand and so much supply that the services do exist; they're just so high, and operational costs are so high due to the demand in a city center. In dense urban areas, as explained by Bray (2013), the costs of bearing the burden of affording affordable tutoring will not be cheap; rather, competition in the tutoring market will be fierce, since families now literally live in proximity to each other. Families who may have otherwise been able to afford this in the long run still suffer because of the heavy burden these prices place on families struggling in a private tutoring realm that is not only expensive but also cutthroat and competitive.

Issues of shadow education are different in rural areas. Baker and LeTendre (2017) argue that, in rural areas, tutoring services might be cheaper but their supply is constrained. Tutoring services are often poor or far from you, and getting there could even be miles or miles of driving or a significant portion of your pay to obtain the resources. Rural families, who have, on average, lower incomes than their urban counterparts, face a significant financial burden to provide for their families, mainly because of the scarcity of economic facilities. Additional educational support also means greater expenditure in rural regions, thereby increasing the financial burden on families, which, in turn, runs the risk of undermining their overall financial position.

Additionally, the economic burden of shadow education is outweighed by the income disparity between these areas. Cheng and Wong (2021) state that urban families are mostly financially affluent, thus they can suffer losses due to childcare costs. But there are more problems rural families have paying for private tuition. Since rural families have lower average incomes, they, rather than urban families, must bear a heavier burden, as the same gamble with private tutoring is a larger share of the rural family's budget. Such income disparity leads to a growing gap in access to and opportunities in education between urban and rural students.

In short, due to the burden of shadow education, educational outcomes also differ a lot between urban and rural students. Cheng (2022) argued that urban students with greater access to various tutoring services receive better education and a better chance of higher education. Rural students may have limited access to quality tutoring, which limits their academic progress and prospects. These educational outcomes are perpetuating inequalities in education, and the distant prospect for these rural students is either poor academic and career outcomes or college without any hope or expectation of economic self-reliance.

The effect of shadow education on family financial stability varies by location as well. For many urban families, the high cost of tutoring may be a drawback, but they can afford it, given that they usually live on higher incomes, as Stewart and Thomas (2021) reported. Rural families, however, are socked harder by tutoring costs because they take a larger share of their meager income. Rural family farms face greater economic distress, as a lack of money becomes a daily struggle, including mounting debt and insufficient funds to invest in other necessities.

At the same time, regional policy responses to the economic burden of shadow education also vary between urban and rural areas. Cheng and Wong (2021) argue that metropolitan areas could implement policies such as subsidies or financial aid to support additional tutoring, thereby cushioning the financial blow to low-income households. However, in rural areas, there isn't often targeted policy, and so these families suffer more at the wallet. Without policy support for shadow education, the case for special interventions targeting the specific challenge rural families face and supporting them to cushion the adverse financial consequences of shadow education is strengthened.

On top of that, the parameters of tutoring service in urban and rural areas may also have considerable deviations. Lee (2024) argue that urban areas offer a greater number of tutoring services, which vary in quality. Instead, rural areas

have fewer choices, so tutoring services are less effective. These differences in service provision may account for differences in students' educational experience and outcomes based on differences in urban and rural service quality.

Father Education

The study finds that father education negatively and significantly impacts shadow education (coefficient = -13649.7300, standard error = 5629.1200, p = 0.017), as seen in the Table 1. It means that as a father's education increases, the probability of shadow education decreases. This might be the reason: as fathers' education rises, they have more time to teach their children, and hence the likelihood of shadow education decreases.

Policy Implications

The findings of this study have profound implications for educational policy in Pakistan and similar developing economies.

Regulating the Shadow Market: The laissez-faire expansion of tuition centers has led to price gouging. The government must consider regulatory frameworks that require tuition centers to display fee structures transparently. While price caps may lead to black markets, a licensing regime that standardizes quality and monitors fees could reduce the exploitation of information asymmetry.

Enhancing Public School Quality: The demand for shadow education is a symptom of the perceived inadequacy of formal schooling. To reduce the economic burden on households, the state must invest in improving the quality of instruction in public schools. If public schools provide adequate exam preparation, the necessity—and therefore the demand—for private tutoring will decline.

Targeted Support for Low-Human-Capital Households: Our findings regarding Father's Education suggest that students whose parents have low educational attainment are the most financially vulnerable. Policy interventions such as after-school remedial classes funded by the state (or NGOs) should target these specific demographics. Providing free "homework support" centers in working-class areas like Shahdara could act as a substitute for the expensive private tutoring these families are currently forced to buy.

CONCLUSIONS

This study aimed to assess the economic burden of shadow education in Lahore District. Through an econometric analysis of household expenditure, we have demonstrated that shadow education is not merely an academic supplement but a significant economic strain that varies by income, geography, and family structure. The study concludes that shadow education in Pakistan exacerbates social inequality through two distinct channels: income capability (wealthier families spend more) and human capital substitution (less educated families are forced to pay more to compensate for a lack of home support). The spatial divide between Johar Town and Shahdara further highlights how geography determines the "price" of academic success. While limited by a relatively small sample size ($N=120$) and a cross-sectional design that precludes causal inference, this research provides a crucial baseline for understanding the microeconomics of the tuition market in Pakistan. Future research should expand the sample to rural districts and utilize panel data to observe changes in expenditure over time. Ultimately, unless the formal education system is strengthened, the shadow economy of tutoring will continue to thrive, imposing a heavy tax on the aspirations of Pakistan's working class.

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