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Choice and expenditure: A double hurdle model of private tutoring in Qatar

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ABSTRACT

Deciding whether to use private tutoring services is now a common choice many households are facing globally. This paper presents new evidence for Qatar's case to shed light on the demand for private tutoring. The household demand for private tutoring is estimated using the double hurdle model. A sample of 1132 parents of students in the 8th, 9th, 11th, and 12th grade from the 2012 Qatar Education Survey (QES) is used to establish correlates of the use of and expenditure on private tutoring. The Qatar Education Study is a nationally representative study of students, parents, teachers, and administrators. The findings indicate that demographic, socioeconomic, student and school characteristics affect the decision to participate in private tutoring and the amount households spend on private tutoring. Nevertheless, the effect of these characteristics on participation differs between Qataris and non-Qataris. Also, student grade is the only common factor that influences participation and expenditure decisions. Besides, male household heads and males students increase expenditure on private tutoring. These findings suggest the importance of socioeconomic factors, gender, and student grade policy interventions focusing on private tutoring. Relevant policies for different stakeholders in the education sector are discussed.

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1. Introduction

Deciding whether to use private tutoring services is now a common choice many households are facing globally. In many parts of the world, private tutoring, also referred to as the 'shadow education system' (Bray and Kwo, 2014), complements primary and secondary education. Nonetheless, the past couple of decades have experienced steady growth in the demand for private tutoring services. In general, education plays a vital role as a cornerstone for success personally and professionally. At the micro-level, results from a randomized control study indicate that additional education through private tutoring helps improve student achievement (Banerjee et al., 2007).

Furthermore, private tutoring, in particular, when done one-on-one, permits students in need of additional instruction to get it without imposing additional costs on classmates (Cole, 2017). While at the macro-level, when there is equal access to good supplementary education, such as private tutoring education inclusive of resource-poor households, the education system can reduce inequality and poverty (Stiglitz, 1974). Nonetheless, if unaddressed, limited access to good education and supplementary education can further income equality.

Several authors have documented the boom in private tutoring (Banerjee et al., 2007; Dang and Rogers, 2008; Fogarty, 2018). Besides, there is an association between this boom and massive household spending on private tutoring. A

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management-consulting firm, [Global Industry Analysts \(2016\)](#), estimates that global private tutoring services will be worth approximately US\$227 billion in 2022. Given that many households operate within budget constraints, private tutoring imposes a substantial financial burden on many households. Several researchers ([Azam, 2016](#); [Chatterjee, 2018](#); [Foondun, 2002](#); [Liu and Bray, 2017](#)) have conducted studies to understand the demand for private tutoring services.

Nevertheless, empirical studies highlight differences in explanatory variables. For instance, [Davies \(2004\)](#) in Canada found that the use of private tutoring is associated with the desire to enroll children at a private school, parental education level, and age. [Kim and Park \(2010\)](#) in South Korea established that the use of private tutoring is associated with students' academic achievement, household income, and parental education level. On the other hand, in India, living an urban area, attending a private school, and coming from a good economic background promotes private tutoring demand. Additionally, private tutoring demand is inelastic to students' grades. Moreover, evidence of pro-male bias is a common feature regarding private tutoring ([Azam, 2016](#)). In other words, parental demand for private tutoring is more likely to focus on male students.

In Qatar, limited studies focus on the demand for private tutoring services. However, spending additional money on private tutoring is a feature of the education system. In other parts of the Middle East, [Ille and Peacey \(2019\)](#) studied the ways mechanisms of making forced private tutoring unattractive among parents, students, and teachers. To establish factors driving private tutoring demand and whether only well-off households use private tutoring, policymakers need evidence to formulate good policy. Thus, this study seeks to contribute to empirical research on household investments in their children.

The second section of this paper presents the context. Then in the third section, it presents a model of private tutoring in Qatar. The fourth section highlights the results of estimating the model of private tutoring. In the fifth section, the meaning of the estimated parameters of the model is discussed. While lastly, issues associated with the economics of private tutoring in Qatar are discussed, and conclusions about policy evaluation of private tutoring (regulation) proposals are made.

2. Context

Qatar is a rich country with one of the highest GDP per capita, \$110,489 ([UNDP, 2020](#)). The discovery of oil and gas continues to grow the vast amount of wealth the country has accumulated over the past few decades. These riches have lured many expatriates who contribute to the growth side by side with the local Qatari population. Given that education is considered a cornerstone for success, several school types have emerged to meet the needs of Qataris and non-Qataris alike ([Nasser, 2017](#); [Romanowski et al., 2019](#)). Out of the estimated 2.7 million residents in Qatar, 85% are expatriates. In Qatar, schools can be either; Independent International schools, Government schools, International or community schools linked with embassies. In Qatar's education system, public schools are free and universal, while international schools are not free. However, Qatari households with children attending fee-based private schools receive education coupons (Ministry of Development Planning and Statistics ([MDPS, 2014](#))). In other words, the state provides education subsidies. Given the considerable expatriate community, teaching methods tend to be diverse ([Romanowski et al., 2019](#)). Besides, some parents express dissatisfaction with the formal schooling system. As a result, some parents have sought private tutoring to fill this gap.

Nevertheless, the Qatar National Vision 2030 highlights the importance for the State of Qatar to move towards a knowledge-based economy as an enabling element of social and economic progress. Given this backdrop, as part of the Qatar National Vision 2030, which sets goals in sustainable development in all sectors, more funding is being allocated to the Education sector to champion its growth and support reform initiatives. Other key education reforms include the Education for a New Era (EFNE) and the focus on the transformation of Qatar's K-12 education system. [Nasser \(2017\)](#) and [Romanowski et al. \(2019\)](#) note that extensive reports the RAND Corporation produced were critical in developing initiatives to improve the quality of teaching in schools in the country. Overall, while the goal of the EFNE was good, teachers, school leaders, and parents encountered several challenges. Teachers, school leaders, and parents felt that they were not well equipped to deal with the new responsibilities that emerged due to the reforms ([Romanowski et al., 2019](#)). Nevertheless, the State of Qatar is home to a thriving private tutoring sector. A Social and Economic Research Institute (SESRI) study on education reveals that students use private tutoring to access additional instruction in all major subjects. Like other parts of the world ([Joshi, 2019](#)), researchers have highlighted that if unregulated, private tutoring is likely to undermine the positive outcomes associated with Qatar's K-12 education system ([Stepney, 2016](#)). Studies focusing on private tutoring in Qatar are limited. Below factors driving the demand and supply of private tutoring are highlighted.

Over the past decades, Qatar has recorded high incomes and improved standards of living. As the country develops further, Qatar's residents have developed an increase in the demand for quality education. Simultaneously, people now understand that with the backdrop of globalization, a good education is essential for improving the ability to compete in the world. Like many countries, reasons fueling the boom in private tutoring include; intense competition for places in prestigious schools and universities, a mismatch between students' and parents' curricula, peer pressure, better opportunities in the labor market, and in some cases, ineffective teaching methods. Also, related studies highlight unethical behavior, such as teachers' purposeful reduction of teaching effectiveness to stimulate demand for supplementary lessons.

Understanding the supply side of private tutoring services is critical in regulation. The internet and growth in online teaching and learning support private tutoring. In particular, their affordability attracts many households to spend on

online private tutorials. On the other hand, although salaries in Qatar are higher compared to many regions globally, teachers in the mainstream education system perceive their salaries low and are drawn to private tutoring as a means of supplementing their income. Furthermore, teacher reputation is one of the critical private tutoring supply factors. In the mainstream education system, some teachers develop a good reputation for their ability to teach so that their students achieve excellent results. As a result, they create a brand for themselves, and in the process, stimulating parents' willingness to pay for extra hours of instruction through one-on-one private tutoring. Lastly, Foondun (2002) indicates that peer pressure contributes to the supply of private tutoring services. Other teachers in the mainstream education sector may feel pressure to engage in private tutoring when they know colleagues and friends who are private tutors.

3. Conceptual framework

In conceptualizing factors associated with using private tutoring services and the variation in household expenditures on private tutoring, this study uses human capital theory (Becker, 1962, 1981). This study also uses empirical studies on private tutoring demand (Bray et al., 2014; Davies, 2004; Liu and Bray, 2017; Matsuoka, 2018; Pallegedara and Mottaleb, 2018; Tansel and Bircan, 2006). The human capital theory provides a guide for establishing factors associated with private tutoring's choice and expenditure. Becker's (1962) human capital theory assumes that households consider expenditure on children as an investment. Thus, households are willing to invest time and in their children.

Additionally, households are assumed to make rational decisions based on expected net benefits of investments in a child's education (children's future earnings compared to costs incurred). Furthermore, the child's innate ability may influence the household's decision to use private tutoring and the associated expenditure (Becker, 1962; Becker and Tomes, 1986). Given that parents are concerned about their child's ability to succeed in the future and their potential earning ability, expenditure on children's education is an indirect input into their children's human capital (Becker and Tomes, 1986).

3.1. Demographic characteristics

Parents' age may influence expenditure on children's education. As parents grow old, they accumulate broad life experience and work experience. Furthermore, their ability to evaluate the returns on investments in education improves. Households with older parents are more likely to have more financial resources, and in turn, they may be more willing to invest more in their children's human capital.

In Qatar, there is a considerable gap in male and female labor force participation. The UNDP (2020) human development indicators indicate that 99.7% of males participate in the labor force, while 57.4% of women participate in the labor force. This gender differential in labor force participation influences investment in children's human capital investment. The rationale is that participation in the labor force is associated with access to financial capital. Thus, households with male household heads are more likely to use private tutoring and spend more than female-headed households.

3.2. Socioeconomic characteristics

The socioeconomic standing of a household is an essential driver of the demand for goods and services in an economy. A household with highly educated parents is likely to use the parents' returns greater returns on human capital investment as a basis for investing in their children. Previous studies have found that parents' level of education and associated returns on investments in their education may be associated with their willingness to invest in their children's education. In other words, parents with higher education levels are more likely to perceive more significant future benefits or returns on spending on children's education and, thus, possess greater willingness to spend more in anticipation of high future returns for their children (Tansel and Bircan, 2006). Splitting parental education into male and female produces more interesting insights. In Turkey, Tansel and Bircan (2006) found a positive association between the mother's education level and private tutoring. In comparison, an association was found between the father's education and private tutoring.

In general, employment status can be another measure of economic well-being. Income influences household expenditure. Assuming that parents are altruistic, and high levels of schooling and full-time employment increase earnings, there is a high likelihood for employment status and educational attainment to facilitate more significant private tutoring expenditures. Qatar household income and expenditure surveys show that higher incomes are associated with education. While capturing data on income was challenging and therefore excluded in the study, parental education and employment capture the household socioeconomic status.

3.3. Student characteristics

Previous studies have shown the association between the student's gender and resource allocation. Buchmann (2002) highlighted that boys are more likely to receive private tutoring than girls in some contexts. In a recent study, Azam (2016) also found the presence of male-bias in education investment in India. When patriarchy is a feature in society, gender roles and general expectations dictate that males exercise dominance over females. As a result, young males who are more likely to participate in the labor force secure better educational investment support.

In Qatar, similar to many countries, students must sit entrance examinations that influence acceptance in higher learning institutions. In other words, the 12th grade final exam is a form of a high-stakes exam in which most students aim to achieve academic scores that are high enough to gain entrance to a prestigious institution for tertiary studies. Additionally, besides entrance into a highly regarded institution, students also aim to secure entry into highly regarded fields of study (Chi and Qian, 2016; Joshi, 2019). For instance, various fields of engineering and medicine. Thus, in comparison to lower levels of study, there is an expectation that households are more likely to invest more in students in their final year of schooling than otherwise.

Absenteeism, also known as skipping school, drives supplementary private tutoring demand. Notably, in some countries, teachers in the mainstream education system simultaneously offer private tutoring services after school or during the school holiday. As a result, instead of attending school, students depend more on private tutoring, as they perceive them as the setting that they are learning essential content that improves their chances of passing exams. Kwo and Bray (2014) highlight this form of tutoring as more exam preparation driven in comparison to regular classroom activities. In other cases, students skip formal classes to attend private tutoring sessions that focus more on excelling in exams (Hartmann, 2013; Silova, 2010; Tansel and Bircan, 2006). The findings suggest that private tutoring can go beyond being a form of supplementary education but a substitute for the formal education system.

Given that parents' investment in children's education now focuses on creating a competitive edge in many countries, parents are more likely to invest more in private tutoring. Additionally, if a child failed exams and repeated a grade, parents might want to use private tutoring to supplement formal education and reduce the likelihood of failure in the future (Buchmann, 2002). Instead of using private tutoring services, parents may rely on repeating the failed grade to access additional schooling hours that will enable the child to pass future exams. In other words, some parents might use private tutoring as a remedial strategy in the presence of past failures in academic exams.

3.4. School characteristics

In Qatar, there are positive sentiments towards private schools. Findings from a RAND corporation study on Qatar's education system report that more than half of the respondents prefer to send their child to private schools (Brewer et al., 2007). Works of Davies (2004) and Davies and Aurini (2006) indicate that, in Canada, households who desire private education yet cannot afford them use private tutoring as a substitute for private schooling. Davies and Aurini (2006) argue that parents aim to limit the likelihood of inadequate academic performance and boost their children's competitive edge. Thus, parents are also willing to pay for private tutoring services to ensure that their children secure higher education achievement on top of private schooling. Hence, for some households, simultaneously sending their children to private schools and private tutoring may represent some form of reinforcing their investment in human capital development. On the other hand, sending children to international private schools may challenge parents in terms of languages. Given Qatar's diverse community, mismatches in languages of instruction or second languages taught in international private schools are common. Thus, parents may resort to private tutoring.

The geographical area or location of education institutions has direct and indirect influences on access to quality education. The literature on the impact of schools' location mainly focuses on the urban and rural divide (Tansel and Bircan, 2006) and the association with students' academic performance as a measure of school quality (Mottaleb et al., 2019). Locations differ in terms of the availability and accessibility to schools and other complementary services. Complementary services may include; libraries, childcare facilities, and focused educational programs. Therefore advantages or disadvantages for students may emerge due to differences in locations and their unique offerings. Additionally, schools situated in locations perceived as high quality are more likely to attract better academic staff, which improve the quality of education a school offers.

3.5. Hypotheses

The background above leads to the following hypothesis tests in the analysis section.

- Hypothesis 1: Socioeconomic factors influence parental demand for private tutoring.
- Hypothesis 2: The household head's age influences the demand for private tutoring among Qataris.
- Hypothesis 3: The student's gender is associated with the demand for private tutoring.
- Hypothesis 4: The grade of the student is associated with the demand for private tutoring.
- Hypothesis 5: There are differences between Qataris and non-Qataris concerning the drivers of parental demand for private tutoring.

4. Methodology

4.1. Participants

The data used in this study is part of the 2012 Qatar Education Study (QES), a Social and Economic Survey Research Institute (SESRI) series of surveys covering various education topics. Out of the resulting sample of 43 schools, only four

schools refused to participate in the survey. On aggregate, the surveys included more than 4200 participants from 39 schools – notably, 1848 students, 1472 parents, 572 teachers, and 318 administrators. The main objective of the Qatar Education Study (QES) is to gather nationally representative data fit for use in understanding various topics on education in the State of Qatar.

4.2. Research design

This study's sampling frame is based on a comprehensive list of private and public schools in the State of Qatar. Using the list of schools, the Social and Economic Survey Research Institute (SESRI) developed a sampling frame of schools included in the survey. Students were the target population for the survey sampling. In Qatar, schools can be categorized as independent (public) schools, international private schools, Arabic private schools, and community schools that follow particular countries' curricula (Stasz et al., 2007). Hence, school characteristics, including gender, student grade, and school system, were used to create several strata. Then proportionate sampling was applied to generate proportions of students in each stratum to ensure that the distribution between the sampling frame and the sample are equal.

Eventually, students were randomly selected following a two-stage sampling strategy. In the first stage, the school selection was made with probability proportionate to size (PPS). In the second stage, a single class per grade in the school was chosen. Then and all students in the class were included in the survey. In the student survey, grades 8 and 9 were chosen from preparatory schools, while grades 11 and 12 were collected from secondary schools. Data were also collected from the students' parents in the parents' module of the QES survey. Also, data were collected from the lead teachers of the chosen classrooms and the chosen schools' school administrators.

4.3. Instrumentation

Self-administered paper-and-pencil questionnaires were utilized to collect the data needed for this study. After the sampling process, a pilot survey was conducted to test the survey instrument and train the enumerators. Data from the pilot survey are not included in the final dataset. Nevertheless, the pilot survey enabled identifying ambiguities with some of the questions, addressing potential inconsistencies with regard to question wording and the overall data collection protocol. For instance, survey participants were informed about the goal of the study and confidentiality issues. Insights drawn from the pilot study informed the redesign of the final survey. The final questionnaires were distributed in class, and researchers from SESRI supervised questionnaire administration.

4.4. Analytical methods

The analysis considers two dependent variables. First, the use of private tutoring is the dependent variable in the first hurdle or the selection equation. Second, the expenditure on private tutoring, defined as the sum of expenditures on various forms of private tutoring, is the dependent variable in the second hurdle. Table 1 below reports the summary statistics and describes all the variables.

In the parents' module of the 2012 Qatar Education Study, 1472 parents participated in the survey. Additionally, the selection equation uses acquiring private tutoring services as the dependent variable. Nevertheless, given missing data issues on the selection (private tutoring) and outcome (expenditure on private tutoring), the final analysis includes 444 Qataris and 688 Non-Qataris. Table 1 shows that out of all Qatari households, 69.5% did not use private tutoring. While for non-Qataris, 82.98% did not use private tutoring. In other words, the proportion of zero expenditure on private tutoring is high for both groups. Furthermore, there are differences between the two groups regarding demographics, socioeconomic characteristics, student characteristics, and school characteristics. The distributions suggest that non-Qataris had more years of schooling and a higher proportion of males and females working full-time.

Fig. 1 shows the distribution of household expenditure on private tutoring by nationality. The figure illustrates that private tutoring expenditure is right-skewed, and the maximum amount spent on private tutoring is 16,800 Qatari Riyals. The distribution might be evidence of the different spending patterns. For instance, only paying for private tutoring at a particular time of the academic year. Also, variations in pricing, for instance, one-on-one and group private tutoring mechanisms.

Qataris and Non-Qataris mostly use to pass exams and get further guidance on what they think teachers do explain clearly in the classroom. These findings are in line with Joshi (2019), who highlights that in some South Asian countries, the desire and perceived lack of quality education and peer networks drive the demand for private tutoring. Moreover, Fig. 2 suggests that the use of private tutoring services is mostly infrequent, given the high proportion of students indicating that the main reason for using private tutoring is to pass exams. Similar to previous studies on private tutoring expenditure, in this study, several respondents reported zero expenditure. Given that the data is left-censored, other methods besides the ordinary least squares (OLS) regression are better suited for modeling due to the normality assumption's violation. To address this challenge, previous studies have applied the Tobit, Heckman two-step, and Double Hurdle models (Belotti et al., 2015; Duan et al., 1984; Humphreys et al., 2010; Tansel and Bircan, 2006). These limited dependent variable techniques consider a two-part process in decision-making. Firstly, parents decide to participate, that is, parents decide to spend money on private tutoring or not. Then the second decision involves deciding on how much to spend on private tutoring. Given that education is a service, the proportion of zeros, and the reasons shown in Fig. 2, the Cragg (1971) double hurdle model is used in the analysis. Also, the analysis includes the Tobit model for robustness checks.

Table 1
Background characteristics (weighted).

Characteristics	Description	Qataris (N=444) Percent/mean (95% CI)	Non-Qataris (N=688) Percent/mean (95% CI)
PVTUT	pvtut: =1 if Private tutoring is used		
participants		30.5%	17.02%
Non-participants		69.5%	82.98%
COSTPVTUT	Cost of private tutoring in Qatari Riyals (QAR)	5232.53 [4393.14–6071.92]	4919.03 [3854.79–5983.28]
Household head sex	p_male: =1 if Male		
Male		56.1%	69.45%
Female		43.9%	30.55%
AGE	age := Age of the respondent; agesq := Age squared divided by 100	44.07 [43.07–45.07]	44.79 [44.31–45.27]
Education (Father)			
Primary	maleeduc1: =1 if No schooling to preparatory	43.3%	15.8%
Secondary	maleeduc2: =1 if Vocational/Secondary	45.9%	70.0%
Tertiary	maleeduc3: =1 if BA/BCom/BSc	10.8%	14.2%
Education (Mother)			
Primary	femaleeduc1: =1 if No schooling to preparatory	43.7%	21.8%
Secondary	maleeduc2: =1 if Vocational/Secondary	33.1%	42.2%
Tertiary	femaleeduc3: =1 if BA/BCom/BSc	23.2%	36.0%
Employment (Father)			
Full-time	maleedu1: =1 if Working full-time	56.4%	71.8%
Part-time	maleedu2: =1 if Working part-time	12.0%	10.5%
Other	maleedu3: =1 if Unemployed	31.6%	17.8%
Student sex	s_male: =1 if Student is male		
Male		49.4%	62.7%
Female		50.6%	37.3%
Absenteeism	absenteeism:=1 if Skipped school		
Absent		36.4%	19.5%
Never absent		63.6%	80.5%
Repeat grade	regrade:=1 if Student repeated		
Repeated		10.5%	9.16%
Never repeated		89.5%	90.8%
Grade			
Grade 8	grade8:=1 if in 8th grade	21.9%	24.7%
Grade 9	grade9:=1 if in 9th grade	22.8%	28.9%
Grade 11	grade11:=1 if in 11th grade	24.5%	28.0%
Grade 12	grade12:=1 if in 12th grade	30.8%	18.3%
Municipality			
Doha	municipality1:=1 if school in Doha	16.6%	40.3%
Al-Rayyan	municipality2:=1 if school in Al-Rayyan	68.1%	55.1%
Other	municipality3:=1 if school in other area	15.2%	4.61%

4.5. Double hurdle model

Let y be the amount a household spends on private tutoring. We assume that household expenditure on private tutoring is a compound function of a binary choice variable s , that is, use of private tutoring or not, and the continuous choice of a nonnegative amount y^* :

$$y = s \cdot y^* \quad (1)$$

When a household decides to use private tutoring ($s = 1$), a nonnegative amount $y^* = y$ is chosen and then observed. In contrast, choosing not to use private tutoring ($s = 0$), then implies that ($y = 0$) and y^* is not recorded. The probit model is used in the first stage to estimate the binary decision variable s . Also, assuming that a household's willingness to use private tutoring on positive net returns. A similar approach to Wooldridge (2010) is used to model s , the binary decision variable. The vector \mathbf{x}_1 represents attributes that determine the household's willingness to use private tutoring. While the

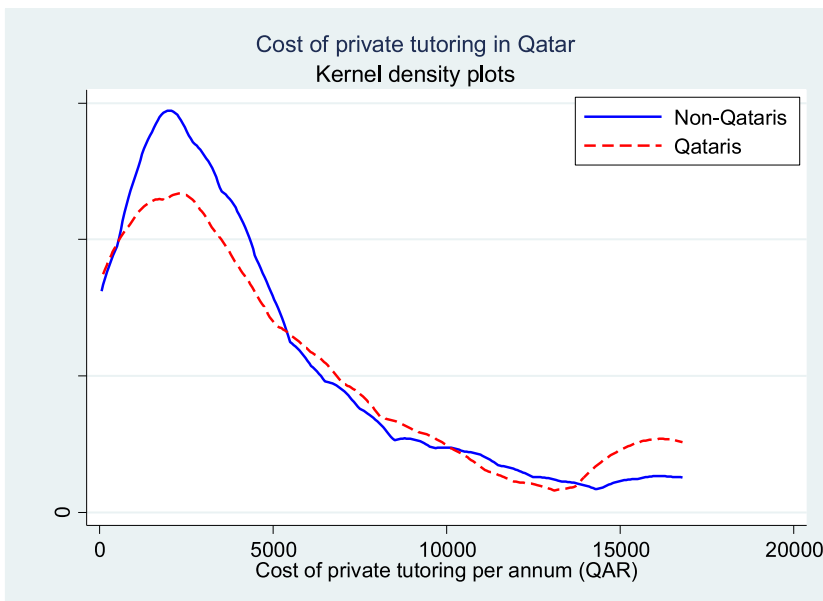


Fig. 1. Private Tutoring Expenditure (QAR) Distribution by Nationality, Qatar, 2012.
Source: Author.

random error term u is assumed to follow a standard normal distribution. Furthermore, \mathbf{x}_1 is independent of the error term, that is, $\text{cov}(\mathbf{x}_1, \mathbf{y}) = 0$:

$$s^* = \mathbf{x}_1 \boldsymbol{\gamma} + v \quad \text{where } v | \mathbf{x}_1 \sim \text{Normal}(0, 1) \tag{2}$$

$$s = \begin{cases} 1 & \text{if } s^* > 0 \\ 0 & \text{if } s^* \leq 0 \end{cases} \tag{3}$$

$$P(s = 1 | \mathbf{x}_1) = E(s | \mathbf{x}_1) = \Phi(\mathbf{x}_1 \boldsymbol{\gamma}) \tag{4}$$

The level of expenditure on private tutoring y^* is observed in the second hurdle and is conditional on the vector \mathbf{x}_2 , which represents attributes that determine the household’s allocation decision. Hence, the expression of the conditional density of y when $y^* > 0$ is shown in Eq. (5). Also, the expenditure on private tutoring is positive and equal to y^* when households choose to use private tutoring and is zero otherwise. The second hurdle equation can be formally expressed as follows:

$$y^* = \exp(\mathbf{x}_1 \boldsymbol{\beta} + u) > 0 \quad u \sim \text{Normal}(0, \sigma^2) \tag{5}$$

$$y = \begin{cases} y^* > 0 & \text{if } s = 1 \\ 0 & \text{otherwise.} \end{cases} \tag{6}$$

Hence, the expression of the conditional density of y when $y^* > 0$ is,

$$f(y | \mathbf{x}_2, y > 0) = \Phi[\log(y) - (\mathbf{x}_2 \boldsymbol{\beta}) / \sigma] / (\sigma y), \quad y > 0. \tag{7}$$

The unconditional density of y given $\mathbf{x}_1, \mathbf{x}_2$ is straightforward by multiplying $P(y > 0 | \mathbf{x}_1) = \Phi(\mathbf{x}_1 \boldsymbol{\gamma})$,

$$f(y | \mathbf{x}_1, \mathbf{x}_2) = [1 - \Phi(\mathbf{x}_1 \boldsymbol{\gamma})]^{1[y=0]} \{ \Phi(\mathbf{x}_1 \boldsymbol{\gamma}) \Phi[\log(y) - (\mathbf{x}_2 \boldsymbol{\beta}) / \sigma] / (\sigma y) \}^{1[y>0]}. \tag{8}$$

For a random household i , the associated log-likelihood function to be estimated is

$$l_i(\boldsymbol{\theta}) = 1[y_i = 0] \log[1 - \Phi(\mathbf{x}_1 \boldsymbol{\gamma} / \sigma)] + 1[y_i > 0] \log[\Phi(\mathbf{x}_1 \boldsymbol{\gamma} / \sigma) + 1[y_i > 0] \{-\log[\Phi(\mathbf{x}_2 \boldsymbol{\beta} / \sigma)] + \log\{\phi[(y - \mathbf{x}_2 \boldsymbol{\beta}) / \sigma]\} - \log(\sigma)\}]. \tag{9}$$

The conditional and unconditional expectations of y then can be derived,

$$E(y | \mathbf{x}_2, y > 0) = E(y^* | \mathbf{x}_2, s = 1) = \mathbf{x}_2 \boldsymbol{\beta} + \sigma \lambda(\mathbf{x}_2 \boldsymbol{\beta} / \sigma). \tag{10}$$

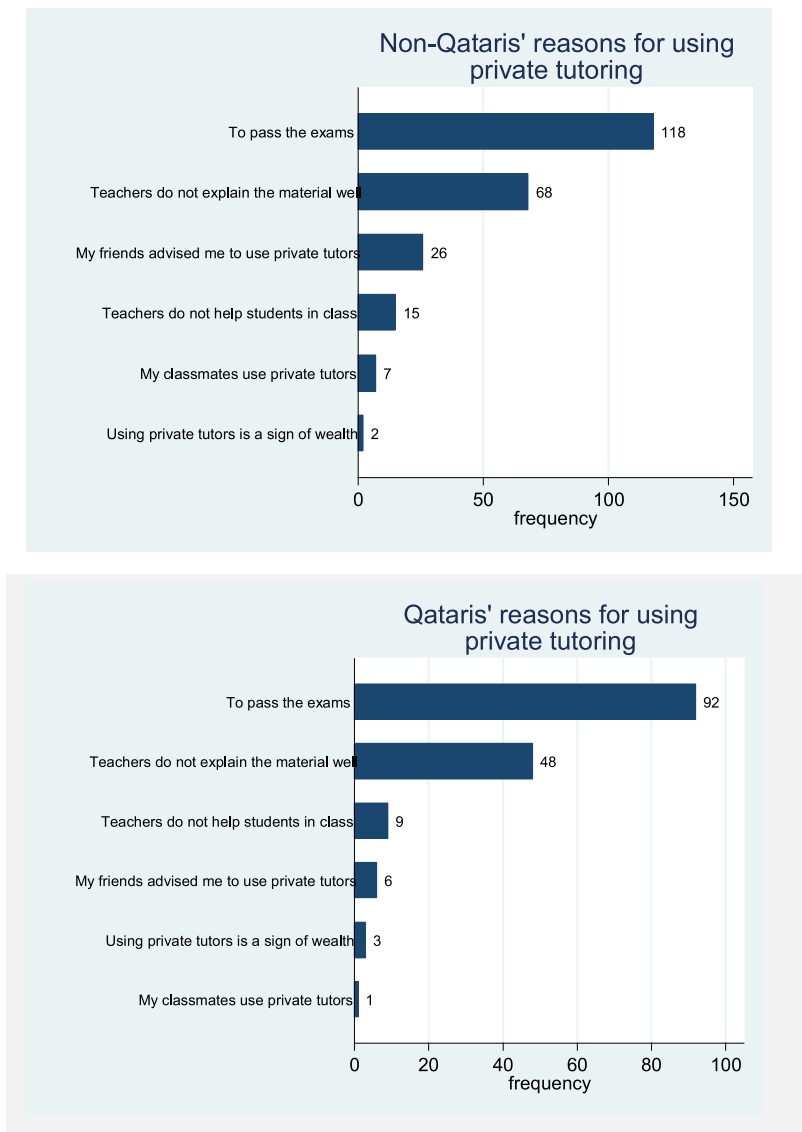


Fig. 2. A comparison of reasons for using private tutoring in Qatar.
 Source: Author.

$$E(y|\mathbf{x}_1, \mathbf{x}_2) = \Phi(\mathbf{x}_1\boldsymbol{\gamma}) [\mathbf{x}_2\boldsymbol{\beta} + \sigma\lambda(\mathbf{x}_2\boldsymbol{\beta}/\sigma)]. \tag{11}$$

where $\lambda(\cdot) = \frac{\phi(\cdot)}{\Phi(\cdot)}$, is the inverse Mills ratio.

5. Empirical results

The Cragg (double-hurdle) model results for private tutoring expenditure are reported in Tables 3 and 4. The Cragg model allowed exploration of both the statistical significance and the direction of the relationships for the factors hypothesized to be related to both the participation and the allocation decisions. The results show that some factors are significantly associated with one decision but not the other. Though not significant, the sign for some of the selected factors on the probability decision and the allocation decision differed.

Due to space considerations, the log-terms are not reported. Nevertheless, Table 3 presents the marginal effects of the first hurdle or selection equation and Table 4 presents the (un)conditional average partial effects (APEs) of the second hurdle or allocation equation. The (un)conditional average partial effects are estimated using the approach described in Burke (2009). The standard errors and corresponding P-values are bootstrapped using 500 repetitions.

Table 2

Tobit models.

Source: 2012 Qatar Education Survey.

	Unconditional Average Partial Effects (Qataris)		Unconditional Average Partial Effects (Non-Qataris)		Conditional Average Partial Effects (Qataris)		Conditional Average Partial Effects (Non-Qataris)	
	Effects	S.E.	Effects	S.E.	Effects	S.E.	Effects	S.E.
p_male	0.491	(0.371)	0.408	(0.285)	0.162	(0.123)	0.175	(0.121)
age	0.223	(0.112)**	0.051	(0.108)	0.073	(0.037)**	0.022	(0.046)
agesq	-0.237	(0.125)*	-0.074	(0.119)	-0.078	(0.041)*	-0.032	(0.051)
maleeduc1	-0.137	(0.485)	0.049	(0.396)	-0.045	(0.160)	0.021	(0.170)
maleeduc3	-0.862	(0.723)	0.714	(0.399)*	-0.284	(0.241)	0.307	(0.169)*
femaleedu1	-0.669	(0.511)	-0.290	(0.373)	-0.220	(0.169)	-0.125	(0.162)
femaleedu3	0.315	(0.484)	0.406	(0.216)*	0.104	(0.160)	0.174	(0.094)*
emplfth2	0.535	(0.234)	-0.243	(0.337)	0.176	(0.185)	-0.104	(0.146)
emplfth3	0.776	(0.331)**	-0.727	(0.281)***	0.255	(0.112)**	-0.312	(0.123)**
emplmth1	0.309	(0.375)	0.174	(0.201)	0.102	(0.124)	0.075	(0.087)
emplmth2	-1.345	(0.836)	0.127	(0.372)	-0.443	(0.277)	0.055	(0.160)
s_male	-0.284	(0.404)	0.392	(0.231)*	-0.093	(0.133)	0.168	(0.100)*
8th grade	-0.366	(0.411)	0.432	(0.237)*	-0.121	(0.136)	0.186	(0.101)*
11th grade	-0.847	(0.419)**	0.485	(0.248)**	-0.279	(0.141)**	0.208	(0.106)**
12th grade	-0.759	(0.416)*	1.181	(0.240)***	-0.250	(0.141)*	0.508	(0.107)***
repgrade	-0.082	(0.516)	0.118	(0.331)	-0.027	(0.170)	0.051	(0.142)
absenteeism	-0.320	(0.340)	-0.106	(0.206)	-0.105	(0.112)	-0.046	(0.088)
munisch1	0.908	(0.422)**	-1.180	(0.231)***	0.299	(0.144)**	-0.507	(0.113)***
munisch3	0.963	(0.435)**	0.183	(0.424)	0.317	(0.147)**	0.079	(0.183)
intschool								

Notes: The columns present average partial effects unconditional and conditional on participating in private tutoring respectively; *indicates significant at 10 per cent; **significant at 5 per cent; ***significant at 1 per cent.

Table 3

Probit models.

Source: 2012 Qatar Education Survey

	Qataris		Non-Qataris	
	Marginal effects	Standard error	Marginal effects	Standard error
p_male	0.075	(0.056)	0.154	(0.208)
age	0.031	(0.016)**	0.041	(0.078)
agesq	-0.033	(0.017)*	-0.053	(0.085)
maleeduc1	-0.018	(0.080)	0.069	(0.286)
maleeduc3	-0.153	(0.107)	0.393	(0.288)
femaleedu1	-0.097	(0.082)	-0.157	(0.266)
femaleedu3	0.044	(0.079)	0.270	(0.157)*
emplfth2	0.082	(0.081)	-0.118	(0.248)
emplfth3	0.128	(0.050)**	-0.412	(0.196)**
emplmth1	0.048	(0.056)	0.185	(0.145)
emplmth2	-0.173	(0.120)	0.130	(0.279)
s_male	-0.049	(0.059)	0.240	(0.162)
8th grade	-0.062	(0.063)	0.277	(0.163)*
11th grade	-0.123	(0.065)*	0.378	(0.172)**
12th grade	-0.133	(0.062)**	0.916	(0.182)***
repgrade	-0.003	(0.076)	0.111	(0.263)
absenteeism	-0.039	(0.049)	-0.139	(0.152)
munisch1	0.147	(0.067)**	-0.796	(0.177)***
munisch3	0.147	(0.065)**	0.416	(0.309)
intschool	0.099	(0.160)	0.658	(0.137)***

Notes: The columns present hurdle 1 marginal effects estimated using the Probit model; *indicates significant at 10 per cent; **significant at 5 per cent; ***significant at 1 per cent.

Table 2 presents the Tobit and double hurdle model's estimation results for factors influencing parental demand for private tutoring. For the Tobit model, the marginal effects indicate the (un)conditional expectation of private tutoring demand as respective variables change. While for the double hurdle model, the first hurdle in Table 3 contains the determinants of the decision to spend on private tutoring, while the second hurdle in Table 4 shows the factors affecting private tutoring consumption. The coefficients representing the marginal effects are evaluated at the means of each covariate. The marginal effects in the participation or spending decision represent the probability of private tutoring market participation for changes in corresponding explanatory variables. For the private tutoring demand model in the second hurdle, the marginal effects indicate the (un)conditional private tutoring demand expectation as respective variables change.

Table 4

Truncated models.

Source: 2012 Qatar Education Survey.

	Unconditional average partial effects (Qataris)		Unconditional average partial effects (Non-Qataris)		Conditional average partial effects (Qataris)		Conditional average partial effects (Non-Qataris)	
	Effects	S.E.	Effects	S.E.	Effects	S.E.	Effects	S.E.
p_male	0.039	(0.296)	0.897	(0.443)**	0.033	(0.252)	0.767	(0.377)**
age	-0.013	(0.137)	-0.133	(0.174)	-0.011	(0.117)	-0.114	(0.149)
agesq	0.042	(0.151)	0.154	(0.203)	0.036	(0.129)	0.131	(0.173)
maleeduc1	0.051	(0.289)	0.390	(0.480)	0.043	(0.247)	0.333	(0.411)
maleeduc3	0.520	(0.530)	0.930	(0.577)	0.444	(0.452)	0.794	(0.491)
femaleedu1	0.180	(0.341)	0.112	(0.503)	0.154	(0.291)	0.096	(0.430)
femaleedu3	0.230	(0.347)	0.178	(0.236)	0.196	(0.297)	0.152	(0.202)
emplfth2	-0.362	(0.418)	0.374	(0.441)	-0.309	(0.357)	0.320	(0.377)
emplfth3	-0.259	(0.241)	-0.004	(0.454)	-0.221	(0.206)	-0.003	(0.388)
emplmth1	-0.110	(0.226)	-0.226	(0.227)	-0.094	(0.193)	-0.193	(0.194)
emplmth2	-1.127	(0.781)	-0.334	(0.656)	-0.961	(0.668)	-0.286	(0.560)
s_male	0.727	(0.292)**	-0.056	(0.324)	0.621	(0.251)**	-0.048	(0.277)
8th grade	0.627	(0.262)**	0.192	(0.314)	0.535	(0.223)**	0.164	(0.268)
11th grade	-0.373	(0.332)	-0.106	(0.395)	-0.319	(0.283)	-0.091	(0.337)
12th grade	0.593	(0.299)**	0.630	(0.295)**	0.507	(0.255)**	0.538	(0.254)**
repgrade	-0.066	(0.470)	-0.394	(0.495)	-0.056	(0.401)	-0.337	(0.424)
absenteeism	-0.500	(0.236)**	-0.629	(0.288)**	-0.427	(0.203)**	-0.537	(0.246)**
munisch1	-0.215	(0.300)	-0.158	(0.380)	-0.184	(0.257)	-0.135	(0.325)
munisch3	0.331	(0.310)	-0.017	(0.572)	0.283	(0.265)	-0.015	(0.489)
intschool								

Notes: The columns present hurdle 1 marginal effects estimated using the Probit model; *indicates significant at 10 per cent; **significant at 5 per cent; ***significant at 1 per cent.

Parental gender does not influence participation in private tutoring for both Qataris and non-Qataris. These results are similar to [Davies \(2004\)](#), using a Canadian nationally represented study that found no association between the parent's gender and private tutoring use. In comparison, in Bangladesh, compared to female-headed households, male-headed households are less likely to use private tutoring services for their children ([Pallegedara and Mottaleb, 2018](#)). Nevertheless, gender is positively associated with expenditure on private tutoring for non-Qataris only. The unconditional average partial effects suggest that households with male household heads increase spending on private tutoring by 89.7%. This could imply that among non-Qataris, men are more financially well off than women, and they are in a better position to spend on private tutoring. The gender difference has also been observed in similar studies conducted in other countries such as Turkey ([Tansel and Bircan, 2006](#)) and Vietnam ([Dang, 2007](#)). In the Qatari context, one possible reason for that is that the labor force participation rate for males (94.7%) is higher in comparison to females (57.8%) ([UNDP, 2020](#)). This finding could suggest that male household heads may have a higher opportunity cost of time. Thus, explaining why households with male household heads spend more than female household heads.

In the Probit model for Qataris, the linear part of the quadratic age relationship is positive, and the squared term is negative; private tutoring expenditures increase at a decreasing rate with respect to age. A one year increase in the age of a Qatari household head is associated with a 3.1% increase in participation in private tutoring. Also, the first hurdle (Probit model) for Qataris show that the likelihood of participation in private tutoring increases at a decreasing rate with respect to age. Nevertheless, this result only holds for Qataris. While for non-Qataris, the household head's age does not influence both the decision to use private tutoring and how much to spend on private tutoring. Findings in other contexts also established the same pattern. For instance, in Malaysia, [Kenayathulla \(2012\)](#) found similar results.

The first hurdle for non-Qatari females has a positive and statistically significant association with private tutoring participation. While the mother's education level did not influence private tutoring expenditure, one possible explanation for this finding is that non-Qatari highly educated mothers are more likely to participate in the labor force. As a result, they might lack time to assist their children due to the higher opportunity cost of time, while at the same time they are in an excellent position to use their earnings to use private tutoring services. Furthermore, highly educated mothers are more likely to value education in comparison to lowly educated mothers. Thus, they might spend on additional hours of education for their children to reinforce socio-economic advantages associated with a better education. These results are in line with other private tutoring demand studies such as [Pallegedara \(2018\)](#) in Sri-Lanka, [Azam \(2016\)](#) for India, and [Kim and Park \(2010\)](#) for South Korea.

Parental employment status is associated with the demand for private tutoring. However, employment influences private tutoring demand differently for Qataris and non-Qataris. Findings in [Table 3](#) suggest that for Qataris, unemployed fathers are more likely to participate in private tutoring than fathers employed full-time. In contrast, for non-Qatari fathers, there is a negative association between being unemployed and private tutoring participation. Unlike Qataris, the contradicting results could mean that apart from earnings associated with employment, non-Qataris have limited financial resources from other sources. Also, household income is likely to be higher when either the man or both parents are working. Thus, in turn, improving the chances of affording private tutoring.

Consistent with the results from other private tutoring studies, the double hurdle results show that student gender, grade or level, and absenteeism are significantly associated with private tutoring demand. Nevertheless, the patterns of statistical significance differ between Qataris and non-Qataris. The second hurdle in Table 4 shows that for Qataris, parents spend more money on male students' private tutoring than female students. Specifically, the unconditional partial effects in the second hurdle (expenditure equation) suggest that if the student is male, on average Qatari parents spend 72.7% more on private tutoring. For non-Qataris, the first hurdle model in Table 3 shows no association between student gender and private tutoring participation. Also, Table 4 shows no association between student gender expenditure decisions. These results are in line with Buchmann (2002) and Azam (2016), who highlighted that boys are more likely to receive private tutoring than girls in some contexts.

The grade or the level the student attends influences the use of private tutoring. In the first hurdle of Table 3, results show that Qatari parents with students in the 8th and 12th grades are less likely to participate in private tutoring than parents with students in the 9th grade. The second hurdle in Table 4 shows that for Qataris, parents spend more money on 8th grade students' private tutoring in comparison to the base level, that is, attending the 9th grade. Also, the same applies for 12th grade students. In contrast, Table 3 shows that for non-Qatari parents, the likelihood of participation in private tutoring increases as the student's level of schooling increases. Moreover, the second hurdle in Table 4 confirms that for non-Qataris, there is a positive association between parental expenditure on private tutoring and the student's grade. Notably, parents with students attending the 12th grade spend 63.0% more than households with students in the 9th grade. In Qatar, similar to many countries, the students' academic results in the final year of high school have an essential role in access to further education and employment. For instance, in Korea, Kim and Lee (2010) found that households with students writing the final Korean high school exit exams spent more than the other groups. Azam (2016) also reports a similar pattern in India. In other words, there is a positive association between the grade and usage of private tutoring. This evidence suggests that some households use private tutoring to extend their educational demand and improve the chance of getting better academic results in the final high school results. These results are in line with Kim and Lee (2010), who argue that households that value good higher education due to perceived higher returns are more likely to use private tutoring services.

Table 3 shows that for Qataris attending an international private school is not associated with parental demand for private tutoring. While in Table 3, for non-Qataris, the first hurdle confirms that there is a positive association between attending an international private school and participation in private tutoring. In other words, for non-Qatari students, attending an international private school is associated with a 65.8% increase in the likelihood of using private tutoring. As observed in previous studies such as the works of Davies (2004), Tansel and Bircan (2006), and Kim and Lee (2010), attending an international private school significantly affects the likelihood of using private tutoring. Moreover, in the context of Qatar, the socioeconomic status could contribute to this relationship. Notably, although international private schools are fee-based, non-Qatari students attending these schools receive an education subsidy from the government (MDPS, 2014). Also, it is common for parents of most non-Qatari students to receive education subsidies from their respective employers. This is in line with research findings from India (Azam, 2016). Additionally, it is common for parents not to be familiar with additional languages taught in international private schools, and the need for parents to reinforce the content learnt at school could drive them to seek supplementary instruction for their children.

The geographic area in which the school the student attends has an impact on private tutoring demand. In Table 3, the results show that attending a school in Doha or other municipalities increases Qataris' likelihood of participating in private tutoring. On the other hand, for non-Qataris, there is a strong negative association between participation in private tutoring and attending a school located in the Doha municipality. Previous studies also report the association between geographical area and private tutoring (Mottaleb et al., 2019; Tansel and Bircan, 2006). In the Qatari context, given that the Doha municipality is the most urbanized area, and schools in this area might be more expensive due to the expenses of running a school situated in a relatively highly developed area compared to the base category, that is, Al Rayyan municipality. This implies that non-Qatari parents may not have the financial means to meet the costs of fees, other educational expenditures, and the cost of private tutoring. Additionally, Romanowski et al. (2019) highlight differences in teachers' backgrounds in the Qatari education system and argue that public schools lack well-qualified teachers in some cases. On the other hand, schools situated in relatively more metropolitan areas such as Doha are likely to attract the best teachers. As a result, students studying at schools located in the better parts of Doha are more likely to attract better teachers who can teach in a way that students find easier to understand and limit the need for additional hours of learning.

Table 5 presents the results for likelihood ratio (LR) tests of Tobit vs Double Hurdle specifications tests. The findings of the LR test suggest that the double hurdle model with is the most suitable model to explain private tutoring demand in Qatar. In other words, both Qataris and expatriate households initially establish whether to participate or not, and subsequently decide the amount they spent on private tutoring.

6. Discussion

This study's objectives were to determine to what extent socioeconomic factors are related to whether or not to use private tutoring and how much to spend on it. Descriptive statistics show that approximately one-third of the parents spend money on private tutoring. Overall, given that private tutoring is illegal, the magnitude is striking, and evidence that the parents give in to the pressures of creating a competitive advantage for the children is likely to have contributed to this observation.

Table 5
Likelihood ratio (LR) tests of Tobit vs. Double hurdle specifications.

	H ₀ =Tobit specification H ₁ =Double hurdle specification	H ₀ =Tobit specification H ₁ =Double hurdle specification
	Qataris	Non-Qataris
Test statistic	27 142.07	22 329.78
Critical value	30.14	30.14
Outcome	Reject H ₀	Reject H ₀

6.1. Equal access to education

This study indirectly indicates the presence of a male bias. Being a male participant is associated with more spending on private tutoring and may suggest that men have better access to financial resources. Also, being a male student is positively associated with spending on private tutoring. In general, Qatari women's level of education is increasing. Nevertheless, [Charrad \(2011\)](#) points out a mismatch between women's high education levels and labor force participation. Similar conclusions were drawn in other GCC states ([Rutledge et al., 2014](#)). Also, the results show that male students are more likely to access private tutoring. This could suggest that in patriarchal societies, parents are more likely to invest more male students as they are the ones who are expected to join the labor force when they are adults ([James-Hawkins et al., 2017](#)). Facilitating equal access to education services should be encouraged. Specifically, a change in social norms and gender expectations that promote equal access to both formal and supplementary education could help support future female labor force participation.

6.2. Promote supplementary one-on-one sessions in mainstream schools

Teachers need to be encouraged to support slow or students not performing very well. The results have shown that private tutoring is more likely to be expected when students are in grades before critical transitions. In particular, from preparatory to high school, and from grade 12 to tertiary education. Given that Qatar has a low pupil-teacher ratio (12), forms of support could include giving one on one sessions during or after school hours to these students ([UNDP, 2020](#)). Notably, teachers should be encouraged to offer unpaid remedial classes to disadvantaged students during or after school hours. In Germany, [Guill et al. \(2020\)](#) proposes a similar approach. Additionally, where unpaid remedial classes are a challenge, other interventions may include advocating for college students undergoing teacher training to offer supplementary classes. Also, developing ways for linking tutors with potential tutees.

6.3. Implications for mainstream schooling

In Qatar, it is common among private tutoring participants to use private tutoring as a means to enhance performance in critical exams. The results of this study shows that students who miss school are less likely to use private tutoring. These results may suggest that parents mostly focus on children who are already exceling in their studies. In addition, the population composition of Qatar implies that classrooms are melting pots of students from academically different backgrounds. Thus, in general teachers may encounter challenges in managing the classroom. In Korea, [Kim and Lee \(2010\)](#) argue that classes composed of students from academically different background and ability maybe difficult to manage for teachers. Also, parents with a strong focus on students' academic performance may have a bias towards private education in terms of preparing their children for key examinations. Continuous appraisals of the mainstream school systems' commitment towards quality education delivery should form part of national education policy. Furthermore, educators should embrace the diversity in the classrooms and small class sizes and use them as a foundation for developing flexible approaches to teaching and learning.

6.4. Implications for supplementary private tutoring

Government intervention should target and support students belonging to socio-economically vulnerable households. An indirect effect of private tutoring is that, it may increase labor force productivity and perhaps increase income mobility over time for vulnerable groups. In addition, there are also issues of fairness involved in the establishment of a high-quality tutoring programs intended to serve children from vulnerable groups such as the elderly, women, households with low socioeconomic wellbeing. Several authors have focused on the issue of social equity for instance, in different parts of the world ([Holloway and Kirby, 2020](#); [Marshall and Fukao, 2019](#); [Matsuoka, 2018](#)). Therefore the process of targeting may involve consideration of the mode of delivery for instance mass (free national educational television programs) or one-on-one and the types of shadow education students mostly receive.

6.5. Implications for research establishments

This paper shows important patterns in private tutoring in Qatar. However, generalizing these results more broadly in the Gulf region, and other parts of the world with a significant migrant population, will require filling some gaps in data gathering. Besides gathering data on regular schooling, and shadow education expenditures, household income and expenditure surveys, time-use surveys, and other education related studies should capture household composition, nationality, total household income, academic performance, and household, and school location characteristics. In some parts of Asia, it has been acknowledged that heavy investments in private tutoring results in financial hardship due to household budget constraints (Dawson, 2010; Pallegedara and Mottaleb, 2018). Perhaps with more information, it will be easier to address several crucial questions on education investment. For example, such data can assist in understanding the proportion of private tutoring expenditure in household budgets, and household allocation decisions in households with several children attending school.

7. Conclusion

This study examines the factors that drive the decision to use private tutoring services. This study also examines household expenditure on private tutoring services conditional on first, the decision to use private tutoring. The need to continuously learn how to master private tutoring as it gains further momentum cannot be undermined.

The analysis revealed that as Qatari household heads age, they are less likely to participate in private tutoring. Therefore, efforts to support students from such households should focus on why older Qataris avoid using private tutoring and the type of mechanisms that can convince them to participate in private tutoring. Evidence shows that Qatari male parents who possess a bachelor's degree or above are more likely to participate in private tutoring. While for non-Qataris, male-headed households are associated with positive expenditure on private tutoring services. Furthermore, Qatari males students are positively associated with expenditure on private tutoring. Overall, the results suggest the presence of a male-bias in private tutoring demand in Qatar.

Similar to other countries (Azam, 2016; Stevenson and Baker, 1992), the need to enroll in higher education proved to influence the demand for private tutoring services. Moving from grade 12 to lower grades shows that the likelihood of using and the expenditure on private tutoring decreases. In other words, the association between the student's current grade and private tutoring reveals that private tutoring is more critical in the 12th grade. This might suggest that private tutoring is a means for households to put their children in a favorable final year exam position. In addition, private tutoring is considered a strategy for improving the child's post-schooling labor market prospects. Other authors (Bray et al., 2014) perceive such investment in the final year as a form of purchasing better academic outcomes. In terms of the policy, the margins' size suggests a critical need to regulate private tutoring services to limit private tutoring's social inequality effects.

In this study, the differences in correlates of private tutoring demand between Qataris and non-Qataris is apparent. Also, the proportion of Qatari parents using private tutoring is higher in comparison to non-Qataris. One possible explanation for this result is that non-Qataris have higher levels of human capital. Notably, there is a higher proportion of non-Qataris with a first degree or a post-graduate qualification. Thus, they can assist their children with homework assignments and review what they study daily. Another potential explanation for this finding is that Qataris have better employment prospects in their country. As a result, adult household members in Qatari households might have busy schedules that limit their ability to supervise their children's schoolwork. This pattern could explain why private tutors are an alternative way for individual supervision. Furthermore, on average, Qataris households spend more on private tutoring than non-Qatari households. These results suggest that the consideration of the heterogeneous nature of the residents of Qatar is critical in education policies that address the issue of private tutoring.

Various forms of subsidized private tutoring are one possibility for providing equal access to additional hours of schooling. This will improve the likelihood for students from households with less financial resources a better chance to access supplementary private tutoring. The UNDP (2020) reports a high penetration (99.7%) of internet users in Qatar. Thus, there are better prospects for using the internet to disseminate free and high-quality tutorials in Qatar. This strategy is highly likely to help mitigate illegal private tutoring because it will reduce the demand for unregulated private tutoring. Notably, the cost of technology is evolving rapidly, and the cost of financing the dissemination of tutorials via this channel is likely going to decrease over time. Thus, government regulations of tutoring may serve the majority population, including low-income groups, rather than just a minority of relatively prosperous families.

The data did not have the following variables that are considered important in the estimation. First, family size, and in particular the number of children under the age of 18 years. Previous studies have shown that the extent of expenditure on building children's human capital depends on the family size and the number of household members placing demands upon the household's financial capital. In other words, as the number of dependence per household increases, it reduces the income per capita and the resources available for human capital investment per child due to resource constraints. Bray et al. (2014) found that there is a negative association between family size and the expenditures on private tutoring in Hong Kong. Second, parental and aggregate household income. Financial resources, particularly disposable income, influence allocation decisions in the household. The low the income constraints, the higher the expenditure on building human capital. Given that income data is not in the dataset, it is impossible to determine the income elasticity. Nonetheless, this study provides several insights that improve our understanding of private tutoring.

Several studies assessing private tutoring in other parts of the globe exist. Nevertheless, this is the first study that comprehensively establishes the association between demographic, socioeconomic, student, and school factors with the use of private tutoring and household expenditure on private tutoring in Qatar. From a policy perspective, however, it is important to have reliable estimates of the prevalence of private tutoring and knowledge about private tutoring determinants. The findings have useful policy implications for a wide range of Qatar's educational policies, particularly equal access to education. Given the survey design, the results of this study can be generalized in Qatar.

Furthermore, this study's findings are in line with Bray et al. (2014), who assessed the use and expenditure on private tutoring in Hong Kong and Azam (2016) in India. Besides, similar to Qatar, several Middle Eastern countries have a significant proportion of expatriate households. Thus, this study's results are key in forming equal access to educational opportunities, not only in Qatar but in other parts of the world.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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