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Published online: 10 Feb 2020.

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PROFESSIONAL EDUCATION & TRAINING | RESEARCH ARTICLE

Valuation of incentives to recruit and retain teachers in rural schools: Evidence from a choice experiment in Cambodia and Laos

Viriyasack Sisouphanthong[1]*, Terukazu Suruga[2] and Phouphet Kyophilavong[3]

Abstract: To provide an appropriate incentive for teaching profession, the important questions are "how much should we pay?" and "which factors influence potential teachers' decision the most?" This research evaluates the factors that discourage and encourage potential teachers to join the profession in Cambodia and Laos by applying a discrete choice experiment to analysis teacher trainees' preferences for school location, classroom condition, non-teaching professions, and indirect monetary incentives. The result highlights reasons and a possibility of potential teachers to leave the educational system.

1. Introduction

After decades of educational development, the global net enrollment ratio for primary and secondary education has increased from 83.7% to 52.5% in 2000, respectively, to 89.1% and 62.9% in 2010, respectively. The improvement is also observed in developing countries such as

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PUBLIC INTEREST STATEMENT

Recruiting sufficient number of teachers is a critical issue for education development worldwide. The governments and educational development partners in many countries enroll a number of teacher trainees to increase the number of teachers; however, some trainees do not join the teaching profession due to low level of benefit and difficulties in working conditions. Evaluating factors and incentives that influence the potential teacher's decision is very important and the main objective of this article. By using discrete choice experiment with sample in Cambodia and Laos, this research measures a monetary term of several factors and incentives that affect a preference of the trainees. The results suggest that health care, electricity access, ethnicity of the children, and condition of the classroom are important factors for trainees; while the significant incentives are a continuing education, in-service training, and ability to select a school. The findings benefit the governments and partners to optimize budget by setting the appropriate policies and incentives.

Cambodia and Laos. In 2000, the ratio in primary education grew from 91.9% in Cambodia and 74.8% in Laos to 98.1% and 95.3% in 2010, respectively. Similarly, the ratio for secondary education increased from 15.3% (Cambodia) and 27.4% (Laos) in 2000 to 38.1% and 35.2%, correspondingly (World Bank, 2015). These studies highlight the need to provide sufficient educational resources, particularly for teachers. With increasing pupil enrollment, there is a possibility for teacher shortage (Benveniste, Marshall, & Araujo, 2008; Benveniste, Marshall, & Santibañez, 2007).

In addition to ensuring the quantity of teacher, increasing the number of teachers also increases students' performance (Angrist & Lavy, 1997) and their future earnings (Card & Krueger, 1992). Furthermore, recruiting qualified and academically talented teachers enhances the quality of teaching and improves pupils' learning outcomes (Hanushek & Rivkin, 2010; McKenzie, Santiago, Sliwka, & Hiroyuki, 2005).

A number of studies has examined the factors that influence teachers' decisions to join the teaching profession (Chivore, 1988; Gunduz, 2014; Rots, Aelterman, & Devos, 2014; Skaalvik & Skaalvik, 2011; Stinebrickner, 2002; Yong, 1995). The salary and additional benefits are regarded as the most important factors. High salaries motivate potential teachers to join the teaching profession (Barber, Mourshed, & Whelan, 2007; Figlio, 1997; Hanushek, Kain, & Rivkin, 1999). In addition, the living and working conditions are very important. Remoteness of teaching sites and poor working conditions of schools discourage potential teachers from taking teaching jobs (Chapman & Hutcheson, 1982; McEwan, 1999). Furthermore, increasing the benefits of non-teaching jobs can also attract potential teachers to leave teaching. Unlike other civil servants, such as doctors, police officers, soldiers, etc. Graduates with teaching certificates seem to adapt easily to other jobs in the labor market.

In Cambodia and Laos, the Ministry of Education is the principal responsible for the construction and recruiting instructors. The district education department drafts and suggests a number of teachers in school, and the ministry approves for deployment. By and large, teachers teaching primary to lower secondary are expected to graduate from teacher training college in both nations. In Cambodia, trainees are supposed to identify the province to teach before training, and select three potential schools after completing the course and final examination (Tandon & Fukao, 2015). The trainees from the remote area are encouraged to teach at school in their hometown. In Laos, the provincial education department conducts the examination to select the trainees and the district education office, deploy the selected trainees to school (MOES, 2018). In practice, trainees apply for school, which they were apprenticed.

The common problems in both countries are low salaries and delayed payments (Benveniste et al., 2008; Tandon & Fukao, 2015). Teacher salaries are insufficient to cover basic living costs, especially for families. Tandon and Fukao (2015) show that the significant factors affecting trainee's decision in Cambodia are a distance to school and a level of salary. They also mentioned that teacher earnings are generally lower than in other professions in Cambodia. Some teachers need to take additional jobs to secure sufficient income. Therefore, the governments in both countries provide incentive programs. However, the actual amount is small and does not seem to attract effective, qualified teachers. Usually, trainees who enroll in teacher training programs are from households with poor socioeconomic backgrounds and cannot enroll in a university (Benveniste et al., 2008, 2007; Nock & Bishop, 2008). Some trainees enroll in teacher training programs through village or regional quotas, and some need to take an entrance examination. However, trainees who enter teacher training programs are likely to come from urban areas, and teaching is typically not their preferred career; thus, there is a probability that they will leave teaching.

To encourage potential teachers to join the teaching profession and to keep them in the system, incentive programs, such as providing increased salaries, allowances, housing, transportation, continued education, promotions are commonly used in many countries (Carnoy & Torres, 1992;

ILO, 1991; Lockheed & Verspoor, 1991; McEwan, 1998; Urquiola & Vegas, 2005). To provide an appropriate evaluation of incentives, the important questions are "how much should we pay?" and "which factors influence potential teachers' decisions the most?" In practice, it is very difficult to estimate the value of these factors because of the absence of a market. Many previous studies have valued and measured the importance of factors by asking teachers' satisfaction on each factor individually. However, such a procedure cannot give a value in monetary terms, and the rankings it produces are imprecise because they are removed from the real conditions where factor does not appear individually.

To address these problems, this study employs a discrete choice experiment (DCE) to value factors that influence teachers' preferences in monetary terms. We introduce several factors in a single choice set, allowing teachers to compare and select the most important factor. Using a DCE to analyze professional participation is widely practiced in health economics (Li, Scott, McGrail, Humphreys, & Witt, 2014; Lin et al., 2014; Scott et al., 2013; Vujicic, Alfano, Shengelia, & Witter, 2010). However, this method is still rare in analyses of potential teachers' preferences (see Burke, Aubusson, Schuck, Buchanan, & Prescott, 2015). Therefore, the main objective of the present research is to value factors that discourage and encourage potential teacher's decision to join the profession. The specific objectives are (1) to value rural school location and classroom conditions, (2) to estimate potential teachers' preferences for non-teaching jobs, and (3) to value indirect monetary incentive programs.

The sample comprises teacher trainees preparing for primary and lower secondary schools in Cambodia and Laos. Using data from current trainees, rather than actual teachers, provides an opportunity to examine the preferences of all potential teachers, who may or may not join the teaching profession.

The remainder of this paper is organized as follows: Section II reviews relevant literatures. Section III is the methodology that includes an analytical framework, a development of attributes and levels, data collection, and econometric equations. The results are illustrated in Section IV. Section V discusses the results and Section VI concludes the paper.

2. Literature review

Chapman (1963) organizes the factors that influence teacher's decision into personal characteristics, training and primary teaching experience, professional and social influences, and career satisfaction. Ingersoll (2002) also mentions similar factors, including family or personal reasons, school staffing actions, pursuit of another job, and dissatisfaction with the job and workplace.

After training school, some trainees are assigned to leave home and teach in schools located in rural villages. Teaching in rural areas isolates teachers from a normal social life, exposes them to security risks, and involves difficult living conditions (ILO, 1991; Lockheed & Verspoor, 1991; Murnane, 1993); these factors consequently reduce teachers' willingness to teach (McEwan, 1999). Oftentimes, infrastructure such as hospitals, centralized water, electricity, and regular markets are absent from rural locations; therefore, rural schools can often attract only teachers with less formal education, less experience, and weaker skills in specific subjects (McEwan, 1999; Psacharopoulos, Valenzuela, & Arends, 1993).

Additionally, the decision to teach is affected by the condition of the potential workplace (Vegas, 2005). Teachers' job satisfaction affects whether they continue teaching (Chapman & Hutcheson, 1982), and poor working conditions are one of the factors that influence teacher satisfaction (Buckley, Schneider, & Shang, 2005).

Sufficient financial support is very important for retaining teachers. Many studies have noted that low pay can push teachers to leave teaching (Ingersoll, 2000; Liu & Meyer, 2005; Macdonald, 1995; Murnane & Olsen, 1990; Stinebrickner, 2001b; Tye & O'brien, 2002). Kersaint et al. (2007)

found that teachers who leave teaching usually care more about the financial benefits than teachers who remain in teaching. Increasing benefits to non-teaching jobs increases the opportunity cost for teaching; when the opportunity cost is very high, teachers will not join or remain in the system (Rogers & Vegas, 2010).

Providing additional benefit, incentives, to the teaching profession is expected to lower the possibility of a teacher leaving. Incentive programs can be categorized into monetary and non-monetary incentives (Kemmerer, 1990). Monetary incentives are further separated into direct and indirect incentives. Direct monetary incentives include increasing the salary, providing an allowance, etc.; indirect monetary incentives include offering special training, materials for teaching, instructional supervision, and support for housing, transportation, etc. Non-monetary incentives are common tools for governments with insufficient budgets. These include factors such as social status, recognition, positions of greater authority, approval from important people, etc.

Jones (2013) examines performance pay by asking teachers how long they will continue teaching. The results show that teachers with a pay incentive state a lower likelihood of leaving than teachers without the incentive. Stevenson, Dantley, and Holcomb (1999) show that increasing salary and bonus incentives increase the number of potential teachers. Urquiola and Vegas (2005) studied financial incentives in Bolivia that increased teachers' salary, and they concluded that the incentive would not be effective in attracting suitable teachers to rural areas if it was too small.

Recruitment policies such as increasing teachers' salary or providing bonus pay, housing, or training have been implemented in many developing countries (Carnoy & Torres, 1992; ILO, 1991; Lockheed & Verspoor, 1991; McEwan, 1998). Bonus and payment incentives are found in countries such as Argentina, Costa Rica, Jamaica, and the Philippines. Venezuela increases salaries on the condition of spending time in rural areas. Honduras treats three years of rural service as equivalent to five years of regular service in their seniority calculation. Housing support is provided in Iraq, Mexico, and Senegal, among other places. As an example of indirect monetary incentives, Bangladesh provides special training for teachers in rural areas, and in Guyana, rural teachers are promoted sooner (ILO, 1991). The government of Cambodia and Laos also have introduced an incentive scheme to encourage trainees to teach; however, there is a rare research on how effective the incentives are. Besides, at that place are few studies using choice modelling to identify causes of the teacher leaving the profession.

3. Methodology

According to the mentioned literatures, the decision to join the teaching profession is mainly dependent on the benefits and the workplace environment of the teaching profession compared to other professions. Let us denote the expected utility for a potential teacher conditional on joining the teaching profession as:

$$U_t = U(W_t, E_t) + \epsilon_t \tag{1}$$

where W_t and E_t are the benefits and workplace environment of the teaching profession, respectively. W_t includes benefits such as salary and social status. E_t reflects the development of infrastructure, etc. ϵ_t is a disturbance term. W_t and E_t have a positive effect on the expected utility, and thus, they are compensated.

Now, let us consider the possibility of not joining the teaching profession, or in other words, of deciding to join another profession. The expected utility for joining another profession is:

$$U_o = U(W_o, E_o) + \epsilon_o \tag{2}$$

From (1) and (2), the utility maximization is:

$$U^* = \max(U_t, U_o) \tag{3}$$

To maximize utility, the potential teacher would choose to join the teaching profession if $U_t > U_o$ and vice versa. There are three cases in which U_t is lower than U_o. The first case is when both W_t and E_t are lower than W_o and E_o, respectively. The second case is when $W_t = W_o$ and $E_t < E_o$, reflecting the effect of a poor condition of workplace. The third case is when $W_t < W_o$ and $E_t = E_o$, reflecting a higher opportunity cost to join the teaching profession.

3.1. Development of attributes and levels
We report four choice experiments to identify teacher preferences. They focus on rural school locations, classroom conditions, preferences for non-teaching jobs, and indirect monetary incentives. Attributes and levels are listed in Table 1. They were designed after considering the relevant literatures and conducting focus group discussions with local education specialists. Some of the attributes and levels were tested in a pilot survey, and they were then modified and used in the actual survey.

3.2. Experimental design
The total combination (full factorial design) of levels is 144 (3^2*2^4) in the rural location experiment, 54 (3^3*2) in the classroom conditions experiment, 12 ($3*4$) in the non-teaching jobs experiment, and 96 ($3*2^5$) in the indirect monetary incentive experiment. The full factorial design would require a large sample size, and so this study applies a fractional factorial design to allow a smaller sample

Table 1. Attributes and levels	
Attributes	**Levels**
Rural location of school	
Salary	For Cambodia: 0.25, 0.5, 0.75 million Riel For Laos; 1, 2, 3 million Kip
Travel time to closest town	3, 5, 10 hours
No electricity	Yes, No
No main water	Yes, No
No hospital	Yes, No
No regular market	Yes, No
Classroom	
Salary	For Cambodia: 0.25, 0.5, 0.75 million Riel For Laos; 1, 2, 3 million Kip
Floor	Dirt, Concrete
Class size	20, 30, 40 pupils
Ethnicity of pupils	For Cambodia: non Khmer pupils, Khmer pupils For Laos: non-Laotian pupils, Laotian pupils
Indirect monetary incentives	
Salary	For Cambodia: 0.25, 0.5, 0.75 million Riel For Laos; 1, 2, 3 million Kip
In-service training	Yes, No
Continuing education in university	Yes, No
Dormitory	Yes, No
Motorbike	Yes, No
Choose school	Yes, No
Non-teaching jobs	
Salary	For Cambodia: 0.25, 0.5, 0.75 million Riel For Laos; 1, 2, 3 million Kip
Jobs	Teacher, Government, State enterprise, Private company.

size. The combination of levels for every experiment is constructed to reflect a D-optimal design with main effect. The D-optimal design is one of the most famous techniques among experimental designs and minimizes the overall variance of estimated coefficients (Atkinson & Alexander, 1992).

Our questionnaire consists of the four choice experiments (one experiment per page). Each experiment includes three choice sets and each choice set contains four alternatives. Each choice set was randomly selected to form one experiment set, and each experiment set was also randomly selected to form one questionnaire. Examples of the choice set in each experiment are shown in the appendix. Every questionnaire set was randomly distributed to teacher trainees with equal frequency. Before the trainees began, the administrators showed a sample questionnaire on A1-size paper to explain the meaning of each attribute and the method for selecting alternatives.

3.3. Data collection

The experiments were conducted in Cambodia in February 2015 and in Laos in October 2014. Two teacher training colleges were selected in Cambodia, Kandal Teacher Training College, and Kandal Regional Teacher Training College. Two teacher training colleges were also selected in Laos, Dongkhamxang and Bankern Teacher Training Colleges. Trainees were randomly selected from several classes, and the trainees for the lower secondary level education were specializing in local language and mathematics. Altogether, there were 205 trainees from Cambodia and 240 trainees from Laos. Female trainees made up 68.7% of the sample in Cambodia and 69.6% in Laos. Trainees for the lower secondary level comprised 56.6% of the Cambodian sample and 23.3% of the Laotian sample.

3.4. Econometric equation and calculation of willingness to accept

Variation in the selection of alternatives among potential teachers allows us to analyze the probability of joining the teaching profession conditional on the benefits and workplace environment. In DCE, a random utility model is used. Let us denote the utility of alternative j for individual i as:

$$U_{ij} = \mathbf{x}'_{ij}\boldsymbol{\beta}_i + \varepsilon_{ij} \tag{8}$$

where $\mathbf{x}$ is a vector of alternative specific regressors (i.e., job characteristics) and $\boldsymbol{\beta}$ is a vector of coefficients with density $f(\boldsymbol{\beta}|\boldsymbol{\theta})$. $\boldsymbol{\theta}$ is the mean and covariance of $\boldsymbol{\beta}$. ε is a disturbance term and is assumed to be identically and independently distributed as the extreme value distribution. Equation (8) is the mixed logit model, which relaxes the independence of irrelevant alternatives assumption by allowing the parameters to be normally distributed (Train, 2009).

The econometric Equations (9), (10), (11), and (12) are used for the rural school location, classroom conditions, non-teaching jobs, and indirect monetary incentives scenarios, respectively.

$$P(select) = f(Salary, Travel\text{-}time, No\text{-}electricity, No\text{-}water, No\text{-}hospital, No\text{-}market) \tag{9}$$

$$P(select) = f(Salary, Dirt\text{-}floor, Class\text{-}size, Ethnic\text{-}pupils) \tag{10}$$

$$P(select) = f(Salary, Government, State\text{-}enterprise, Private\text{-}company) \tag{11}$$

$$P(select) = f(Salary, Training, Education, Dormitory, Motorbike, Select\text{-}school) \tag{12}$$

where *select* is a dependent variable that is equal to one if an alternative is selected and zero otherwise. The *Salary* variable is the salary level and is used as a fixed variable in the mixed logit equation. In Equation (9), the *Travel-time* variable reflects the hours required to travel to the closest town. *No-electricity, No-water, No-hospital*, and *No-market* are equal to one if the school location does not have electricity, a central water system, a hospital, and a regular market, respectively, and zero otherwise. In Equation (10), *Dirt-floor* is equal to one if the material of the classroom's floor is dirt and zero if it is concrete. The *Class-size* variable indicates the number of pupils in the classroom, and the *Ethnic-pupils* variable is equal to one if pupils in the class are not

members of the ethnic majority. For Equation (11), *Government, State-enterprise*, and *Private-company* are equal to one if the selected job is a government job, state enterprise job, or private company job, respectively; they are equal to zero otherwise. The teaching job is used as the reference group. In Equation (12), the variables *Training, Education, Dormitory, Motorbike*, and *Select-school* are equal to one if the government provides annual in-service training, continued education in a university, a dormitory, a motorbike, and the ability to select the school at which one teaches, respectively.

The monetary value of willingness to accept the job (WTA) is the negative quotient of the coefficient of a given job's attribute divided by the coefficient of the salary:

$$WTA_{attribute} = -\frac{\beta_{attribute}}{\beta_{salary}} \qquad (13)$$

To facilitate the interpretation and comparison of WTA values, the WTA value is transformed to a percentage difference from the regular salary of the teaching profession, which is 0.5 million Riel in Cambodia and 2 million Kip in Laos.

4. Results

4.1. Estimation of equations
The estimation results from the rural location of school, classroom conditions, non-teaching jobs, and indirect monetary incentives experiments are shown in Table 2, 3, 4, and 5, respectively. Each table consists of four columns of estimates. The first and second columns show the results for Cambodia, and the third and fourth columns illustrate the results for Laos. The mean coefficients are in the first and third columns, while the standard deviation of the coefficients (S.D.) is in the second and fourth columns.

Overall, all random parameters are statistically significant at the one percent level. All attributes have the expected sign. The *Salary* variable has a positive sign in every equation. The other

Table 2. Results for rural location of school				
Variables	**Cambodia**		**Laos**	
	Mean	**S.D.**	**Mean**	**S.D.**
Salary	5.249***		0.719***	
	(8.414)		(7.600)	
Travel-time	−0.285***	0.274***	−0.147***	0.194***
	(−5.824)	(3.430)	(−4.675)	(3.381)
No-electricity	−1.925***	1.818***	−2.273***	1.459***
	(−6.549)	(5.402)	(−9.092)	(4.690)
No-main water	−1.249***	1.125***	−0.724***	−0.860**
	(−5.710)	(3.246)	(−4.548)	(−2.442)
No-hospital	−3.074***	1.678***	−2.947***	2.255***
	(−8.801)	(4.276)	(−9.196)	(6.282)
No-regular market	−1.156***	1.175***	−0.956***	−0.566*
	(−5.327)	(3.533)	(−6.051)	(−1.898)
Log-likelihood	−533.5		−667.9	
Observations	2,460		2,856	
Respondents	205		238	

z-statistics are in parentheses and *** p < 0.01, ** p < 0.05, * p < 0.1

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Table 3. Results for classroom conditions				
Variables	**Cambodia**		**Laos**	
	Mean	**S.D.**	**Mean**	**S.D.**
Salary	5.704***		0.959***	
	(11.294)		(10.660)	
Dirt-floor	−1.698***	1.605***	−0.715***	0.727**
	(−7.392)	(4.877)	(−5.401)	(2.555)
Class-size	−0.040***	0.067***	−0.073***	0.073***
	(−3.609)	(3.267)	(−6.507)	(3.931)
Ethnic-pupils	−1.157***	2.598***	−2.918***	2.859***
	(−4.493)	(7.379)	(−8.880)	(7.450)
Log-likelihood	−605.2		−692.2	
Observations	2,460		2,876	
Respondents	205		238	

z-statistics are in parentheses and *** p < 0.01, ** p < 0.05, * p < 0.1

Table 4. Result for indirect monetary incentives				
Variables	**Cambodia**		**Laos**	
	Mean	**S.D.**	**Mean**	**S.D.**
Salary	4.499***		0.980***	
	(8.631)		(9.074)	
Training	1.901***	1.434***	1.148***	0.974***
	(7.228)	(3.686)	(6.453)	(3.204)
Education	3.170***	−1.455***	3.261***	2.276***
	(8.158)	(−3.097)	(8.588)	(5.553)
Dormitory	0.980***	1.334***	0.788***	1.168***
	(4.395)	(3.564)	(4.326)	(3.859)
Motorbike	0.937***	1.540***	0.577***	0.918**
	(3.937)	(4.122)	(3.383)	(2.265)
Select-school	1.477***	2.341***	1.433***	−1.584***
	(5.248)	(5.286)	(6.512)	(−4.772)
Log-likelihood	−529.4		−664.0	
Observations	2,420		2,844	
Respondents	202		237	

z-statistics are in parentheses and *** p < 0.01, ** p < 0.05, * p < 0.1

attributes in the rural school location and classroom condition equations have a negative sign. These findings show that potential teachers have a lower preference for teaching as difficulties increase. Furthermore, all non-teaching jobs have a negative coefficient, which shows that, at a fixed salary level, potential teachers prefer teaching over non-teaching jobs. Among the indirect monetary incentives, every attribute has a positive sign. This suggests indirect monetary incentives might substitute for direct incentive pay.

4.2. Willingness to accept the job attributes
The value of WTA in the local currency and the percentage of the average teacher's salary are shown in Table 6. The different percentage of the WTA is used for interpretation. The attributes rural location,

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Table 5. Results for non-teaching jobs				
Variables	Cambodia		Laos	
	Mean	S.D.	Mean	S.D.
Salary	5.001***		1.669***	
	(8.950)		(6.673)	
Government	−3.426***	2.665***	−4.458***	5.451***
	(−7.752)	(6.405)	(−6.120)	(6.977)
State-enterprise	−2.741***	2.003***	−7.493***	5.994***
	(−8.275)	(5.830)	(−5.420)	(5.444)
Private-company	−4.344***	0.562	−12.982***	5.435***
	(−5.720)	(0.390)	(−3.479)	(3.420)
Log-likelihood	−447.3		−398.8	
Observations	2,372		2,760	
Respondents	205		238	

z-statistics are in parentheses and *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

classroom conditions, and non-teaching jobs have a positive percentage, which reflects an additional percentage on top of the current average salary that potential teachers require as compensation. In contrast, the attributes of indirect monetary incentives have a negative percentage, reflecting the percentage decrease in the current average salary that potential teachers would accept for the indirect monetary incentives.

In the rural school experiment, potential teachers from Cambodia and Laos require a 10.8% and 10.2% increase in average salary for every one-hour increase in travel time from the location to the nearest town. If the location of the school does not have electricity, a central water supply, a hospital, or a regular market, potential teachers require additional compensation of 73.3%, 47.6%, 117.1%, and 44.1% in Cambodia and 158.0%, 50.3%, 204.8%, and 66.5% in Laos. In the classroom condition experiment, potential teachers require 59.5% more in Cambodia and 37.3% more in Laos to teach in a classroom with a dirt floor compared to one with a concrete floor. For every additional pupil, Cambodian and Laotian potential teachers want approximately a 1.4% and 3.8% increase in salary, respectively. Finally, potential teachers demand increases by 40.6% in Cambodia and 152.2% in Laos if they are to teach non-majority pupils.

In the non-teaching jobs experiment, potential teachers require increases of 173.7% in Cambodia and 388.3% in Laos to move from teaching to working in a private company. The most preferred non-teaching jobs in Cambodia are state enterprise jobs (109.6%), followed by government jobs (137.0%); in Laos, the most preferred non-teaching jobs are government positions (133.5%), followed by state enterprise jobs (224.4%).

In the indirect monetary incentives experiment, potential teachers are willing to sacrifice more than a hundred percent of the average salary (140.9% for Cambodia and 166.4% for Laos) to receive continuing university-level education. A percentage greater than one hundred means that potential teachers would add their own money to obtain the incentive. Meanwhile, the in-service training, ability to select school, dormitory, and motorbike incentives are valued at 84.5%, 65.6%, 43.6%, and 41.6% in the Cambodian case and 73.1%, 58.5%, 40.2%, and 29.4% in the Laotian case, respectively.

5. Discussion
In general, the WTA value of the attributes considered here appear to be high and very expensive for the government to compensate. However, the importance of WTA values is on their ranking.

Table 6. WTA for teaching profession				
	WTA in million		**WTA in different percentage from average salary**	
	Cambodia	**Laos**	**Cambodia**	**Laos**
Rural location of school				
Time-travel	0.05	0.20	10.8	10.2
No-electricity	0.37	3.16	73.3	158.0
No-water	0.24	1.01	47.6	50.3
No-hospital	0.59	4.10	117.1	204.8
No-market	0.22	1.33	44.1	66.5
Classroom				
Dirt-floor	0.30	0.75	59.5	37.3
Class-size	0.01	0.08	1.4	3.8
Ethnic-pupils	0.20	3.04	40.6	152.2
Indirect monetary incentives				
Training	−0.42	−1.17	−84.5	−58.5
Education	−0.70	−3.33	−140.9	−166.4
Dormitory	−0.22	−0.80	−43.6	−40.2
Motorbike	−0.21	−0.59	−41.6	−29.4
Select-school	−0.33	−1.46	−65.6	−73.1
Non-teaching jobs				
Government	0.68	2.67	137.0	133.5
State-enterprise	0.55	4.49	109.6	224.4
Private-company	0.87	7.78	173.7	388.8

Riel for Cambodia and Kip for Laos

A budget to cover incentives for recruiting new teachers should be allocated and ranked according to the WTA values. This can help the government to invest more efficiently.

The results from the school location experiment suggest similar important factors for both countries. The existence of a hospital is the most influential factor for potential teachers' satisfaction. In other words, health security is the top issue encouraging teacher trainees to become teachers. Personal security is followed by the availability of electricity and the existence of a regular market and centralized water system, which have similar importance levels. In the classroom condition experiment, attributes have the same sign but different coefficient magnitudes across countries. Potential teachers in both countries are discouraged to join teaching if they are assigned to teach in a classroom with a dirt floor or to teach ethnic minority children (non-Khmer for Cambodia and non-Lao for Laos). However, a concrete floor is more important than pupil ethnicity in Cambodia, while in Laos, the opposite is true.

From Table 6, the positive WTA in the non-teaching job experiment suggests that potential teachers, who have entered a teacher training college, prefer a teaching job. In both Cambodia and Laos, private company jobs were the least likely to be selected. This shows that trainees put a higher value on working with state organizations, such as the government and state enterprises, than on working in the private sector.

The results from the indirect monetary incentive experiment show that similar attributes are important in both countries. The most attractive incentive is continued university education. One possible explanation is that potential teachers are concerned about advancing in their teaching careers or being able to leave teaching for other bachelor-level jobs. Thus, the government should provide this incentive with conditions to keep teachers in the profession. Next, potential teachers value in-service training and the ability to select their school assignment. The in-service training incentive generally requires a higher cost than allowing trainees to select their school; however, if the government wants to send trainees to a particular school, the in-service training incentive is a feasible option.

To evaluate the likelihood of trainees not joining the teaching profession, the value of non-teaching jobs was compared with the value of attributes of a rural location and classroom conditions. This comparison is possible because these values come from the potential teachers' preferences. Per Table 6, the additional cost assigned to teach in a rural location or under poor classroom conditions is lower than the additional cost of taking a non-teaching job. This might indicate a low likelihood of potential teachers leaving teaching. However, if a school has multiple attributes such as *no-hospital, no-electricity*, and *ethnic-pupils*, the combined cost of those attributes easily exceeds the cost of every type of non-teaching job. This finding suggests that there is a possibility that potential teachers will move from teaching to non-teaching professions.

6. Conclusion

Recruitment of new teachers is a pressing issue that needs to be addressed. Increasing the opportunity cost of joining the teaching profession is a major problem. Many studies suggest solutions, such as providing monetary and non-monetary incentives. However, there are few studies that estimate an appropriate value for incentives. Therefore, it is worthwhile to estimate and value the factors that influence potential teachers' decision to join teaching.

This study applies a discrete choice experiment with trainees from four teacher training colleges in Cambodia and Laos. The experiment was conducted in Cambodia in February 2015 and in Laos in October 2014. There are four experiment sets: rural location of the school, classroom conditions, non-teaching jobs, and indirect monetary incentives. The attributes for the rural school location experiment are salary, time to travel to the closest town, and availability of electricity, a central water system, a hospital, and regular markets. For the classroom conditions experiment, the attributes are salary, classroom floor material, class size, and ethnicity of students. For the non-teaching jobs experiment, attributes are salary, teaching jobs, government jobs, state enterprise jobs, and private company jobs. For the indirect monetary incentives experiment, attributes are salary, annual in-service training, continued education in university, provision of a dormitory, provision of a motorbike, and the ability to select the school in which to teach. The sample consisted of 205 trainees from Cambodia and 240 trainees from Laos. Participants were potential teachers for primary and lower secondary school levels. The data were analyzed with a mixed logit model.

All attributes were statistically significant at the one percent level. Among the rural location of the school, the presence of hospitals is the most important factor, followed by the availability of electricity, a regular market, and central water. The time to travel to the closest town was also important for potential teachers' decisions. Among the classroom condition attributes, Cambodian potential teachers cared more about the material of the floor than the ethnicity of their pupils, while the opposite was the case among potential Laotian teachers. Increasing pupil numbers also lowered trainees' willingness to teach. Potential teachers in both countries have a lower preference for non-teaching jobs (government, state enterprise, and private company) than for the teaching profession. The least preferred job was working for private companies. Among the indirect incentives, the most preferred incentive was continued education at the university level, followed by annual in-service training and the ability to select the school at which one teaches.

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Overall, the values of the attributes considered here are very high, and they seem likely to be difficult for governments to afford. However, the ranking of attributes can help a government to budget an appropriate amount for incentive programs. Governments should prioritize the budget of each incentive program, according to the ranking of attributes in this study. This can help governments allocate their education budget more efficiently.

Comparing the value of non-teaching jobs to the value of the individual attributes in the rural location and classroom condition experiment, there seems to be a small likelihood of potential teachers not joining the teaching profession. However, the combined value of a few important attributes from the rural location and classroom condition experiment can easily surpass the value of non-teaching jobs. This highlights the possibility that potential teachers might not join the teaching profession if they are assigned to a rural location with poor classroom conditions.

One limitation of this study is that we did not include characteristics of trainees, such as residential area or ethnicity, in the equations. By interacting trainee characteristics with attributes, it might be possible to find a cheaper way to pay for the incentives. For example, trainees might prefer to work in particular places, such as their hometown, an urban area, or locations with famous schools. Additionally, future studies should value other factors that might influence potential teachers' decisions.

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Appendix
Rural location of school

If you are assigned to teach in a school that is located in a rural area with conditions such as those in the choice set below, which is the most satisfying alternative that you are willing to accept?

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Time spent to travel to closest town (hours)	5	3	5	5
Electricity supply in village	Yes	Yes	Yes	No
Main water supply in village	Yes	No	No	Yes
Hospital in village	No	No	No	Yes
Regular market in village	No	No	No	No
Salary (Kip)	3,000,000	3,000,000	2,000,000	1,000,000
Please select the most satisfying alternative				

Condition of classrooms

If you are assigned to teach in a school with classroom condition such as those in the choice set below, which is the most satisfying alternative that you are willing to accept?

	Alternative1	Alternative2	Alternative3	Alternative4
Material of classroom floor	Concrete	Concrete	Dirt	Concrete
Number of pupils per class	40	40	30	30
Ethnicity of pupils	Non-Lao	Non-Lao	Non-Lao	Lao
Salary (Kip)	2,000,000	2,000,000	3,000,000	2,000,000
Please select the most satisfying alternative				

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Non-teaching jobs

If you are able to select an occupation such as those in the choice set below, which is the most satisfying alternative that you are willing to accept?

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Type of job	Teacher	Government	State enterprise	Private company
Salary	3,000,000	3,000,000	3,000,000	2,000,000
Please select the most satisfying alternative				

Indirect monetary incentive

If the government is willing to improve the teaching profession by providing a set of incentive programs such as those in the choice set below, which is the most satisfying alternative that you are willing to accept?

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Motorbike	Yes	Yes	Yes	Yes
Teacher dormitory	Yes	Yes	Yes	Yes
Being able to select school in which to teach	Yes	No	Yes	Yes
Continuing education in university	No	No	Yes	Yes
Annual in-service training	No	Yes	Yes	Yes
Salary (Kip)	3,000,000	3,000,000	2,000,000	1,000,000
Please select the most satisfying alternative				

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