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Educational expansion and the economic value of education in Vietnam: An instrument-free analysis

Thu Ha Truong [a,*], Keiichi Ogawa [b], Jean-Baptiste M.B. Sanfo [b]

[a] Faculty of Development Economics, University of Economics and Business, Vietnam National University, Hanoi, Viet Nam
[b] Graduate School of International Cooperation Studies, Kobe University, Japan

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ABSTRACT

Expansion of education has effects on many aspects of society. There are debates around a possible change in the economic return to education as it expands and by that education may have become a positional good. This study uses Vietnam Household Living Standards Surveys (VHLSS) data over the period of 2002 to 2014 with a sample of 212,521 individuals to explore how educational expansion influences the strength of the relationship between education (its absolute and relative measures) and income. The instrument-free method was employed to minimize bias. Results suggest that as higher education expands, the effect of the absolute measure of the years of schooling on labor market outcomes does not differ, but the effect of its positional measure on these outcomes does. Likewise, as higher education expands, the effect of the absolute measure of higher education graduation on labor market outcomes does not vary, but the effect of its relative measure on these outcomes does. The findings support the positional theory of education, which predicts that the absolute level of education is not critical, but rather its level relative to that of other individuals.

1. Introduction

Examining the economic return to education has been given much attention for many decades. This attention has been focused on understanding the extent to which each additional year of schooling affects earnings or the extent to which the different credentials affect earnings. There is an extensive literature on the topic, whether on developed countries or developing ones (Barone & Ortiz, 2011; Ortiz & Kucel, 2008; Peet, Günther & Wafaie, 2015). In the last decades, many countries have gone through a process of educational expansion, mainly at tertiary education. Though scarce, studies are recently interested in unpacking mechanisms through which the strength of the return to education varies along with the expansion of education at the societal level. This research agenda has produced mixed results that have led to a debate on the topic. Some researchers argue that the return to education decreases as education expands because education has the status of a scarce good, and reduction of scarcity reduces its premium (Van de Werfhorst, 2011a; Dickson & Smith, 2011). However, evidence from other studies suggests that the relative premium of education remains unchanged even with an expansion, due to people with low educational levels being penalized by the labor market (Bills, 2016; Smyth & McCoy, 2011). Moreover, other scholars argue that the returns to education have increased over time along with the higher demand for highly educated workers in the labor market (Acemoglu & Autor, 2011; Goldin & Katz, 2008).

Although these previous studies helped get better insights into how education expansion affects the link between education and labor market outcomes, in order to bring more responses to the current debate, one essential aspect of the process is to be appropriately accounted for. Traditionally, the returns to education are estimated by comparing the labor market outcomes of highly educated people relative to less educated ones, using the absolute education level. However, evidence suggests that in societies with a high level of education expansion, education operates as a positional good in the labor market, in which the relative position of the worker (not the absolute education level or skill) is increasingly important to economic rewards (Bol, 2015; Ortiz et al., 2016). This means that in examining the strength of the return to education in a context of expansion, it is essential to consider both the absolute measure of education and its relative measure, and the latter might be even more relevant. Nevertheless, following the human capital model of education, existing literature typically uses only the absolute measure of education, leaving out the positional measure of education. This critical measure can provide insights into how the returns to education might change with educational expansion.

As such, Vietnam is an interesting case to study how the returns to education might change with educational expansion. The country has experienced an education expansion policy. The expansion increased the supply of university graduates in the labor market, leading to a decline in employment in the agricultural sector and a substantial increase

* Corresponding author.
E-mail addresses: truongha@vnu.edu.vn (T.H. Truong), ogawa35@kobe-u.ac.jp (K. Ogawa), sanfjb@people.kobe-u.ac.jp (J.M.B. Sanfo).

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in jobs in the industry and services sectors. Wage employment has expanded from 15 percent in 1993 to 51 percent of those employed in 2014. Although the share of skilled and highly-skilled labor force is still low, it has steadily expanded. The number of workers with university degrees has increased from merely 3 percent in 2002 to 15.6 percent in 2014. It seems clear that the expansion of higher education in Vietnam has provided more educational opportunities for the country's young population. As the Vietnamese government has entered the second stage of higher education development, the mass level, the young labor force has had more chances to obtain a university degree. As a result, the characteristics of individuals with only a high school diploma as well as those with a university degree have changed.

Using Vietnam Household Living Standards Surveys (VHLSS) data over the period of 2002 to 2014, the primary purpose of this paper is to assess whether the effect of education (in terms of its absolute measure and its positional measure) on labor market return increases with the proportion of individuals with more education or credential as a result from the higher education expansion. Specifically, the objectives of this study are (1) to examine differences in the effect of the number of years of education (absolute relative to positional measures) on labor market returns as higher education expands; (2) to analyze differences in the effect of tertiary education graduation (absolute relative to positional measures) on labor market returns along with the higher education expansion. There are two hypotheses that we posit, related to each research objective: as higher education expands, the effect of the absolute measure of the years of schooling on labor market outcomes varies while the effect of its positional measure on these outcomes does not, supporting the human capital theory of education (hypothesis 1); as higher education expands, the effect of the absolute measure of higher education graduation on labor market outcomes varies, while the effect of its relative measure on these outcomes does not, also supporting the human capital model (hypothesis 2).

2. Education expansion in Vietnam

Ever-increasing enrollments have characterized higher education in developing countries. In many countries in the Southeast Asian region, including Vietnam, Indonesia, and Thailand, the access to higher education is growing far faster than the population growth, and there are several common reasons behind this phenomenon. The first results from the increase of access to secondary school, which comes along with a higher demand for access to higher education from the populations of each country. The second is that changing employment opportunities in the process of globalization enable skilled workers to become more valuable. Last but not least, the governments in these countries realize the importance of higher education to the future of their countries. Although higher education is not able to guarantee rapid economic development, sustained progress is impossible without it.

Vietnam introduced what is called *'Doi Moi*' in 1986, and it was a system of transition from an economy planned at the central level to a market economy with a socialist direction. '*Doi Moi*' affected almost all aspects of the Vietnamese socioeconomic system. After the introduction of this policy, Vietnam underwent dramatic changes socially and economically. The reforms associated with *'Doi Moi*' have produced immediate results and changed the country dramatically. Annually, growth expanded by 8 to 9 percent in the 1990s and maintained an average of 7 percent between 2002 and 2008. This progress has led to a rising demand for skilled labor, especially for workers with higher education. Simultaneously, economic reforms also facilitated the development of the educational system in general and the higher education system in particular. As a result, in the last two decades, university education in Vietnam has experienced rapid growth in terms of access. In 1999, there were only about 719 thousand students in 69 universities. However, the number of students sharply increased to almost 1.75 million in 223 universities by 2015. The gross enrollment rate at the tertiary level in 2010 was 22.3 percent, implying that Vietnam has entered the second stage of higher education development.

The economic reforms of Vietnam allowed the development of industries and the involvement of foreign investors. The economy got opened to world markets, and foreign investors are ready to invest in the Vietnamese market. Subsequently, there has been an increase in the demand for skilled workers, and higher education has to produce more graduates to meet the increasing need. In such a context, human capital becomes an essential factor for the development of the country, and its leaders realized that the expected economic development could not be achieved without reorganizing and expanding the educational system. For example, The Ninth Congress of the Vietnam Communist Party recognized the importance of education, science, and technology for the industrialization and the country's modernization by 2020.[1]

Significant reforms of the government policy framework that directly contributed to the expansion of higher education in Vietnam can be grouped into three: 1) the encouragement of private institutes of tertiary education; 2) the reduction of the control that was put on enrolment quotas; and 3) the expansion of the network of higher education institutions. In terms of the first, it is important to remind that there were no private universities in the country before 1989. After the first pilot private institution (Thang Long People-founded Learning Center) was founded, the government started promoting the establishment of private higher education institutions. From this perspective, the government adopted the Resolution 04-NQ/HNTW in 1993, followed by the concept of private university mentioned in Decision No. 240/TTG in the same year. However, the idea of "privatization" was sensitive because the country is a communist one, and debates led to the more acceptable concept of the "socialization of education".

In terms of the second major reform, the government loosened enrolment quotas by adopting Resolution 04-NQ/HNTW in 1993. From this perspective, the strict control of enrolment quotas got reduced, and institutions were gradually given more autonomy to decide on their respective enrolment quotas. Recently, the 2006–2020 Resolution on the renovation in higher education management, often called the Higher Education Reform Agenda (HERA), gives autonomy to higher education institutions to decide the number of students to admit based on factors such as facilities and staff available. Since 2007, the government is in a dynamics of increasing higher education enrolments by establishing new higher education institutions throughout the country.

Regarding the third major reform, the government tried to build a nationwide network of higher education institutions, grouping them by function and educational mission. The structure of the network of higher education institutions is conceptualized as a pyramid. Top-research universities are at the top of the pyramid, followed by research-oriented universities, and vocationally-oriented universities and colleges are at the bottom. The third reform also has a plan to have some universities ranked within the top 200 universities globally.

3. Literature review

Human capital theory suggests that individuals make decisions about whether to pursue more education based on cost-benefit analyses to predict whether the future returns to more years of education over their current education level outweigh the direct and indirect costs (reference needed). Economic factors are the main determinants of the decision to pursue more education. It is expected that people with more education will have higher productivity and thus can enjoy higher rewards in the labor market (Card, 1995; Mincer, 1974; Willis & Rosen, 1979). Based on this utility-maximizing paradigm for the probability of pursuing more education, it seems that individuals who are most likely to attend college would also benefit most from the additional education

[1] Decision 201/2001/QĐ-TTg on "The Education Development Strategic Plan for 2001-2010" dated December, 28th 2001 by the Prime Minister.

pursued (Carneiro & Heckman, 2003; Carneiro, Heckman & Vytlacil, 2011). The higher the educational level, the higher the productivity, and employers will reward individuals with a higher productivity level. This economics-based rational-behavioral hypothesis is the typically accepted one, and it implies education as an absolute rewarding good. This view does not give a prediction on how the relationship between education and labor market outcomes will change with education expansion.

The human capital theory was criticized by some signaling and screening theories developed by different scholars (Arrow, 1973; Spence, 1973). According to these models, education does not enhance productivity but rather gives a signal of productivity potential. There are unobservable characteristics in individuals (e.g., ability to acquire new knowledge and perseverance), and education is a signal to employers that individuals potentially have these characteristics that the labor market is looking for. As such, employers screen individuals based on educational qualifications, and the skills and knowledge relevant for the work will be learned through in-service trainings. Just like human capital theory, the signaling and screening theories of education do not predict the labor market outcomes to education as the latter expands.

Oppositely, evidence from other studies has shown that there are differences in the returns to education across countries and also time periods. These differences are usually explained in the literature by the characteristics of societal institutions like education systems and labor market institutions (Bol & Van de Werfhorst, 2013). Some studies have also explained differences in the economic returns to education through a mechanism of industrialization and technology development, which increased the demand for skilled workers (Acemoglu & Autor, 2011; Goldin & Katz, 2008). This increase in the demand assumes an increase in the rewards that employers are willing to pay to attract good workers. Furthermore, in some countries, education has been made to function as an occupational barrier (Bol & Kim, 2015). In such contexts, people with low educational levels are kept away from well-paid jobs and are therefore penalized in the labor market (Bills, 2016).

Bol (2015) examined possible differences in the economic return to education as education expands. The scholar used the absolute and positional education measures and found that education is more a positional good than an absolute one. However, that study used tertiary education enrolments as a proxy of higher education expansion. This might not capture the fact that people may be enrolled in tertiary education but will not graduate it, and in the labor market, they will likely not be considered as university graduates. Brand and Xie (2010) argue that college-going behavior is predicted not only by rational choice but also by cultural and social norms and circumstances. Students in less advantaged groups are typically not likely to make it until graduation, and we therefore argue that a better proxy for education expansion is to be used.

The model of education as a positional good is based on the queuing theory, which suggests a queue in the labor market, and individuals are ranked according to observable characteristics. Education is the most important of these characteristics for individuals to secure a relatively good position in the queue (Thurow, 1975). Additionally, there is also a job queue where jobs are ranked based on their complexities and requirements. Consequently, employers will always seek to assign top-ranked jobs to individuals in the front line of the queue, while the latter will always seek to obtain the top-ranked job in the queue. In this model, there is a competition among individuals, and the economic return to education depends much on the educational composition of other individuals competing for the same jobs. The educational distribution varies over time and space, leading to a potential change in the value given to a given level of education.

The positional model of education might explain a consequence of the trend in gaining as much education as possible to secure a relatively good position in the queue: overeducation. Specifically, due to the competition, individuals might acquire more education than is needed for their targeted future job. This creates an overeducation and a context where many have to accept jobs that require an education level below the one they have acquired. At the same time, employers will tend to be stricter on the screening process and even demand higher levels of education for jobs that do not usually require that much education (Frank, 2011; Gesthuizen, Solga & Künster, 2011). The positional model explains this phenomenon and also assumes the relative educational position is increasingly important in an environment with a strong education expansion.

4. Data and methodology

4.1. Data and variables

The dataset used for this study comes from Vietnam Household Living Standards Surveys (VHLSS) for the years 2002, 2004, 2006, 2008, 2010, 2012, and 2014, conducted by the General Statistics Office of Vietnam. The objective of the survey is to provide living standards information to the country for policy and plans making. The surveys over the years include a number of characteristics, including health, education, and employment, which are measured over all the rounds, which allows to harmonize the characteristics over all rounds of the survey. VHLSS data represents the whole country and is based on a three-stage stratified cluster design. The overall sample in the dataset used for this study includes 212,521 individuals (103,541 males and 108,980 females) aged between 24 and 55. Regarding educational attainment, 78.97 percent of them had not completed high school, 16.24 percent were high school graduates, and 4.79 percent were university graduates; among them, 94.38 percent had a job. However, workers in wage employment are observed only in 44.19% of cases, and wages of these people are found only in 81% of cases.

In terms of labor market outcomes, economists tend to favor monetary outcomes, i.e., earnings, and therefore, this study uses earnings as the dependent variable in the analysis. VHLSS provides individual data on earnings in absolute amounts. However, since most of the economic literature traditionally uses the logarithm of earnings as a dependent variable (for statistical reasons), this study also uses it as a dependent variable instead of the absolute amount of earnings. The preference of using continuous measures of income when examining the association between education and earnings assumes that the two are linearly related.

This study followed Bol (2015) in operationalizing the absolute measure and the relative measure of education. In order to capture the absolute measure of education, the number of years of formal education is used. The number of years of education is used in order to capture education as a whole, without reference to any specific level attained. As such, the number of years spent in formal education by an individual is independent of the years of education other individuals in the same cohort spent, leaving education unadjusted over time.

In order to capture the relative measure of education, the number of years of education of individuals within each cohort combination is adjusted to be relative to the years of education that other individuals in the same cohort have. Specifically, the number of years of formal education of individuals in each cohort is recoded into a proportional score, that is, a percentile position ranging from 0 to 100. This conversion into a ranked variable measures the educational position of an individual relative to others within the same cohort, which implies that the relative measure depends on time since the number of years of education of other individuals will likely change over time. Furthermore, to assess the relationship between a tertiary education and labor market outcomes, the study includes a dummy variable that captures university graduates. The variable takes a value of 1 if an individual has a university degree (graduated university) and 0 otherwise. The same approach as in the case of the overall number of years of education is applied; that is, a percentile ranking of university graduates is computed. For example, if 30% of the concerned cohort are university graduates, the relative measure of education for university graduates will be 70, and if 40% of the cohort are university graduates, their relative measure will

Table 1
Summary statistics.

Variable	Obs	Mean	Std. Dev.	Min	Max
Log wage	133,603	1.587	0.822	−3.712	8.101
Female	133,603	0.507	0.500	0	1
Married	133,603	0.786	0.410	0	1
Employed	133,603	0.935	0.246	0	1
Wage employment	133,603	0.478	0.500	0	1
Experience	133,603	17.593	7.079	1	34
Experience squared	133,603	359.639	249.596	1	1156
Education (absolute)	133,603	7.899	4.225	0	16
Education rank (relative)	133,603	50.002	28.475	3.159	98.619
University graduate	133,603	0.054	0.227	0	1
University Graduate rank	133,603	10.194	20.141	2.77	97.23
Graduates percentage	133,603	5.447	2.292	2.77	10.8
Rural	133,603	0.734	0.442	0	1
Farmer/self-employed	133,603	0.669	0.471	0	1
Private sector	133,603	0.063	0.243	0	1
Foreign sector	133,603	0.023	0.149	0	1
Cohort1	133,603	0.175	0.380	0	1
Cohort2	133,603	0.164	0.370	0	1
Cohort3	133,603	0.160	0.366	0	1
Cohort4	133,603	0.162	0.369	0	1
Cohort5	133,603	0.168	0.373	0	1
Cohort6	133,603	0.172	0.377	0	1
Big city	133,603	0.117	0.322	0	1
North	133,603	0.314	0.464	0	1
Central	133,603	0.266	0.442	0	1
2002	133,603	0.260	0.439	0	1
2004	133,603	0.076	0.265	0	1
2006	133,603	0.072	0.259	0	1
2008	133,603	0.071	0.257	0	1
2010	133,603	0.378	0.485	0	1
2012	133,603	0.073	0.260	0	1
2014	133,603	0.070	0.255	0	1

Source: Created by Authors using VHLSS (2002, 2004, 2006, 2008, 2010, 2012, 2014).

be 60. Subsequently, a higher score on the relative measure of education for a given individual indicates that there are fewer peers in the cohort who have a university degree, and the better the relative educational position of that individual.

In addition to the variables that measure education, i.e., the main the absolute and relative measures of education, because the paper is interested in how education expansion (which results in more individual in the labor market that have a university degree) influences the strength of the return to education, a variable capturing the percentage of individuals by cohort that have a university degree for each year is also used. This variable captures the degree of the expansion of higher education at the cohort level for each year. Bol (2015) used tertiary education enrolment for the same variable, but we use a different approach because we want to capture the proportion of those who actually completed higher education. An interaction between the indicator of educational expansion and the measures of education is included in the analysis. This interaction term is our main variable of interest.

Furthermore, a certain number of variables have been included as control ones. At the individual background level, the gender variable is controlled for. The other variables at the individual level which are also controlled for are marital status, employment status, and work experience. Work experience is added so as to control for income differentials that arise as the number of years of working experience increases. The squared term of work experience is also added in fitting regressions, as labor economics suggests that the effect of experience on earnings might have quadratic form. The different working sectors and the area of the country where people work are also very likely to influence earnings, so these are controlled for as well. The descriptive statistics of the dependent and the independent variables are all presented in Table 1.

In addition to these control variables, following Ortiz and Rodriguez-Menés (2016), we also control for a potential cohort effect. This captures the effect of the increasing educational attainment over time since educational expansion may also improve the quality of education. To check this assumption of an increase of education level over time, we plotted the mean of the number of years of education from the period of 2002 to 2014 as presented in Fig. 1. It can be seen on the figure that the mean of the number of years of education has been consistently increasing over the concerned period. Cohorts dummies were created using the age groups since younger individuals are more likely to have a higher level of education but relatively lower education position (Rotman, Shavit & Shalev, 2016).

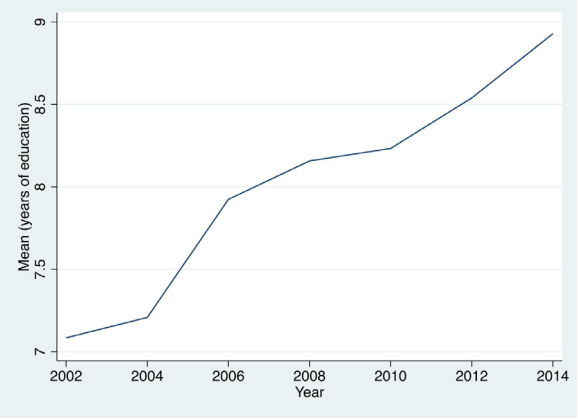

Fig. 1. Mean of the number of years of education from 2002 to 2014
Created by Authors using VHLSS (2002, 2004, 2006, 2008, 2010, 2012, 2014).

4.2. Empirical analysis

In the empirical analysis for this study, we first adopt the framework of the Mincerian earnings equation (Mincer, 1974), but also consider-

ing Bennell's (1996) extended earnings function. Accordingly, the log of individual wages in a given time can be decomposed into the additive function of a linear education term:

$$\text{lnwage}_i = b_0 + b_1 S_i + b_2 x_i + e_i \quad (1)$$

Where lnwage is a measure of income or wage rates, specifically the natural log wage; *Si* is a variable that refers to education, X is a vector of individual characteristics and other observed factors that affect wages (working sector, regions); ε_i is the error terms, capturing factors that are not included in the regression.

Eq. (1) can be fitted by ordinary least square (OLS) to estimate the relationship between education and wages, but the estimation might suffer from bias due to endogeneity of education. For instance, individuals can decide the number of years of education they will have, based on factors that we do not observe, creating an issue of self-selection of the education variable. Moreover, individuals with more abilities or motivation are more likely to study more than those with lower abilities or motivation, will stay at school longer, and also earn more when they eventually enter the labor market. Ashenfelter, Harmon and Oosterbeek (1999) rightly argue that the rate of return to education may be biased since an individual's ability affects both earnings and education. Subsequently, variables such as ability or motivation need to be controlled for, or there will be an issue of omitted variables. However, these characteristics are difficult to measure, and studies often use statistical corrections to deal with such situations.

Researchers have used various methods to deal with the issue of endogeneity and to estimate the returns to education consistently. Studies often attempt to address the education endogeneity in an earnings function framework by utilizing the instrumental variables (IV) approach. The IV methodology identifies instruments that correlate with the variable of interest (education in our case) but are uncorrelated to the dependent variable or the error term. However, the challenge in using IV is to find valid instruments that will be correlated with the variable of interest but not the dependent one. Poor IVs can create a situation where the "cure" to endogeneity is worse than the "disease" itself (Rossi, 2014). Another approach that researchers suggest to deal with endogeneity is fixed-effect models, but this approach requires panel data (Germann, Ebbes & Grewal, 2015; Verbeek, 2012; Wooldridge, 2010).

Regarding the requirements and limitations of previous approaches to deal with endogeneity, this research adopts a new methodology developed by Kiviet (2020a): the internal instrumental variable methods, also called instrument-free methods or Kinky Least Square (KLS). As such, we can consider a regression model with a regressand *y*, a single coefficient β, one endogenous regressor *x*, and a disturbance ε, with identically and independently distributed observations $i = 1,\ldots,n$ specified as follows:

$$y_i = x_i\beta + e_i \quad (2)$$

$\varepsilon_i \sim (0, \sigma_\varepsilon^2)$, $x_i \sim (0; \sigma\sigma_x^2)$, with $E(x_i\ \varepsilon_i) = \rho_{x\varepsilon}\sigma_x\sigma_\varepsilon$

An OLS estimation of Eq. (2) yields the estimators

$$\hat{\beta}_{OLS} = \sum_{i=1}^{n} x_i y_i / \sum_{i=1}^{n} x_i^2, \hat{\varepsilon}_i = y_i - \hat{\beta}_{OLS} x_i \text{ and } \hat{\sigma}_\varepsilon^2 = n^{-1}\sum_{i=1}^{n}\hat{\varepsilon}_i^2, \quad (3)$$

These estimators in Eq. (3) are inconsistent for β, ε_i, and σ_ε^2 when $\rho_{x\varepsilon} \neq 0$. Knowing $\rho_{x\varepsilon}$, KLS estimation is consistent and asymptotically normally distributed and can be defined as of the following estimators:

$$\hat{\beta}_{KLS}(\rho_{x\varepsilon}) = \hat{\beta}_{OLS} - \rho_{x\varepsilon}\sqrt{\frac{\hat{\sigma}_\varepsilon^2\ (\rho_{x\varepsilon})}{n^{-1}\sum_{i=1}^{n} x_i^2}} \quad (4)$$

$$\hat{\sigma}_\varepsilon^2\ (\rho_{x\varepsilon}) = \hat{\sigma}_\varepsilon^2\ /1 - \rho_{x\varepsilon}^2 \quad (5)$$

Knowing $\rho_{x\varepsilon}$, an inference on β in the form of tests and confidence regions could be consistently produced, but in practice $\rho_{x\varepsilon}$ is generally unknown. Therefore, KLS inference production relies on a range of realistic values $r_{x\varepsilon}$.

In the context of a linear regression like in Eq. (1), Kiviet (2020b) shows that the endogenous regressor *Si* can be decomposed into two uncorrelated components. The first component is exogenous or pre-determined, while the second one is endogenous. This decomposition of *Si* can be specified as

$$S_i = \alpha_i + \lambda u_i \quad (6)$$

Where random $\alpha_i \sim (0, \Sigma_{\alpha\alpha})$ and deterministic λ are K x 1 vectors, with $E(u_i\ |\alpha_i) = 0$, hence

$$E(\alpha_i u_i) = 0 \text{ and } E(S_i u_i) = \lambda\sigma_{ui}^2.$$

As already mentioned, and considering Eq. (1), when the degree of endogeneity of $\rho_{s\varepsilon}$ is non-zero, an OLS estimation is inconsistent. Even though $\rho_{s\varepsilon}$ is unknown, it is assumed to lie in an interval $\rho_{s\varepsilon} \in [r_i, r_u]$, and KLS estimation of β_1 will be $\hat{\beta}_1(r)$. $\hat{\beta}_1(r)$ corrects the inconsistency of OLS and is computed for a range of values $r \in [r_i, r_u]$. This approach helps minimize the endogeneity of the concerned regressor for the produced estimations to be more reliable. It might be important to mention that KLS estimation relies on the data to determine $\rho_{s\varepsilon}$.

KLS handles data with observations over time, and most general tests after fitting models with such data can be implemented (Kiviet, 2020b). For Observations over time for Eq. (2), KLS assumes:

$$E(x_i\varepsilon_t) = 0 \text{ for } 1 \le i \le n, \text{ but allow } E(x_i\varepsilon_t) \neq 0 \text{ for } 1 \le t \le i \le n$$

Since we are using pooled cross-sectional data over seven periods in this study, one option is to fit seven separate regressions, one for each period, and then compare the obtained results. However, this would be possible only if there is a decent degree of freedom. An alternative that raises minor statistical issues in estimating Eq. (1) over the time periods we are interested in is to include dummy variables for all but one period to allow the intercept to differ across periods (Wooldridge, 2010). Including dummy variables for periods is necessary because it reflects that the population the samples are drawn from might be changing over time, which entails that the observations in the sample of each year are independent from each other and may not be identically distributed. Consequently, Eq. (1) can be re-written as Eq. (7), incorporating a vector of dummies for the time periods (D_t) with one as a base, a variable that expresses the proportion of individuals with higher education degrees as a result of the higher education expansion (E_t), and an interaction regressor between that variable and education. The inclusion of this variable and the interaction is motivated by the fact that the paper is interested in assessing whether the effect of education (absolute measure and its positional measure) on labor market return varies with the increasing proportion of individuals with higher education degrees.

$$\text{lnwage}_i = \beta_0 + \beta_1 D_t + \beta_2 S_{it} + \beta_3 E_t + \beta_4 S_{it} * E_t + \beta_5 X_i + \varepsilon_{it} \quad (7)$$

5. Results and discussions

5.1. The effect of the number of years of education on labor market returns as higher education expands

The estimation of the effect of the relative and absolute measures of education was done in separate models to avoid issues of collinearity between the two, and then either the absolute measure or the relative measure is considered in each model. The results for both measures of education are presented in Table 2.

Using the absolute measure of education as of the number of years of education of individuals, the analysis found that the direct effect of the number of years of education on income is positive and significant at the 5% level. As already discussed in the method section, this study is interested in the effect of education on income as higher education expands and increases the number of university graduates in the labor market. It

Table 2
The effect of education on labor market returns with higher education expansion.

VARIABLES	Absolute measure		Positional-measure	
	Coefficient	Standard errors	Coefficient	Standard errors
Female	−0.168***	(0.014)	−0.178***	(0.009)
Married	−0.010	(0.030)	0.002	(0.021)
Education (absolute)	0.632**	(0.313)		
EducXgraduates prop.	−0.007	(0.021)		
Graduates proportion	0.203	(0.143)	−1.119**	(0.504)
Education rank (relative)			0.050**	(0.021)
Ed.rankXgraduate proportion			0.017***	(0.006)
Employed	−2.455***	(0.588)	−2.512***	(0.537)
Wage employment	−0.162***	(0.013)	−0.157***	(0.013)
Experience	0.554**	(0.282)	0.287**	(0.129)
Experience squared	−0.000	(0.000)	−0.000	(0.000)
Rural	−0.081***	(0.026)	−0.109***	(0.015)
Farmer/self-employed	0.286***	(0.066)	0.258***	(0.041)
Private sector	0.140***	(0.028)	0.130***	(0.020)
Foreign sector	0.232***	(0.031)	0.212***	(0.022)
Cohort1	8.124*	(4.301)	4.161**	(1.995)
Cohort2	6.553*	(3.463)	3.377**	(1.612)
Cohort3	4.957*	(2.610)	2.577**	(1.217)
Cohort4	3.336*	(1.748)	1.751**	(0.818)
Cohort5	1.675*	(0.876)	0.875**	(0.409)
Big city	−0.105**	(0.047)	−0.096***	(0.033)
North	−0.355***	(0.042)	−0.403***	(0.045)
Central	−0.238***	(0.030)	−0.260***	(0.028)
2004	0.435***	(0.017)	0.499***	(0.033)
2006	0.479***	(0.016)	0.746***	(0.114)
2008	0.511***	(0.016)	0.866***	(0.146)
2010	0.750***	(0.010)	1.151***	(0.166)
2012	0.904***	(0.018)	1.419***	(0.207)
2014	0.949***	(0.019)	1.565***	(0.017)
Constant	−15.120	(9.859)	−6.119	(4.632)

Standard errors in parentheses.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$.
Note: Year 2002 is the base for year dummies.
Cohort 6 is the based for cohort dummies.

included an interaction term between the number of years of education and the proportion of graduates in the labor market. The results show the direct effect of the increase of university graduates as a result of higher education expansion is not statistically significant. Furthermore, the study finds no statistical evidence showing that the interaction term between years of education and the proportion of university graduates is related to income. Statistically, the expansion of higher education does not seem then to increase or decrease the effect of education on income when education is measured using the absolute number of years of formal education that individuals have.

The regression results using the relative measure of education indicate that the better the educational position of individuals, the higher they are expected to earn. Specifically, an increase in one unit of the position is expected to increase income by 5%, and results are statistically significant at the 5% level. Like in the model using the absolute measure of education, this model also created an interaction between the positional measure of education and the ratio of university graduates in the labor market. The direct effect of the proportion of university graduates in the labor market on income is statistically significant. Similarly, the interaction term between this variable and the relative measure of education is statistically significant. Despite the significance of these three variables, the coefficients might not be interpreted directly due to the presence of an interaction term. We followed Hox (2010) to interpret the significance of these results and present them in Table 3. The results indicate that an increase in one standard deviation of the positional measure of education is expected to increase income (by 1.136Grad + 0.05). The direction of the interaction term suggests that the effect of the positional measure of the number of years of education on income increases along with a higher proportion of graduates in the labor market.

5.2. The effect of tertiary education on labor market returns as higher education expands

The paper's second interest was to analyze how the effect of graduating tertiary education on income varies with the higher education expansion. In doing so, the study fitted two models separately, using on the one hand the absolute measure of having graduated tertiary education, and on the other hand, the positional measure of this variable. Results of each measure are both presented in Table 4.

The absolute measure of graduating tertiary education is measured by a dummy variable indicating whether the individual is a graduate or not. The direct effect of that variable on income indicates no statistical significance. This means that graduating from university does not expect to increase the income of individuals. Additionally, we created an interaction variable between graduating university and the proportion of university graduates in the labor market. The results on the direct effect of the proportion of university graduates in the labor market indicate no statistical significance. This seems to confirm the results that we got in the first research question. Furthermore, results based on the created interaction terms do not indicate any statistical significance on the relationship between this interaction term and income. Using the direct measure of graduating university, these results indicate that graduating university does not improve income, and the expansion of tertiary education graduates in the labor market does not change this relationship between education and income.

Going further with the analysis, the positional measure of education is used. The results of the analysis using this measure show that having a better position as a university graduate is expected to increase income. Specifically, a better position is expected to increase income by 5%, and results are statistically significant at the 5% level. These results

Table 3
Interaction between education and proportion of graduates in the labor market.

Baseline	0.05Educ. -	1.119Grad +	0.017Educ*Grad	
Educ = - 1	−0.05 -	1.119Grad -	0.017Grad =	−1.136Grad − 0.05
Educ = 0	0 -	1.119Grad +	0 =	−1.119Grad
Educ = 1	0.05 -	1.119Grad +	0.017Grad =	1.136Grad + 0.05

Source: create by Authors.
Note: Following Hox (2010), education variable was standardized in order for the selected values to be one standard deviation below the mean, the mean, and one standard deviation above the mean. The equation of the proportion of graduates in then computed against the values of the education one.
Grad: the proportion of graduates in the labor market.
Educ: the positional measure of education.

Table 4
The effect of tertiary education on labor market returns with the expansion.

VARIABLES	Absolute measure		Positional-measure	
	Coefficient	Standard errors	Coefficient	Standard errors
Female	−0.194***	(0.014)	−0.192***	(0.007)
Married	0.151	(0.158)	0.091***	(0.024)
University Graduate	11.713	(17.711)		
Uni.Xgraduates proport.	−13.607	(20.828)		
Graduates proportion	1.904	(2.326)	1.328***	(0.491)
University graduate rank (relative)			0.055**	(0.028)
Univ.rankXgraduate proportion			−0.062*	(0.032)
Employed	−2.745***	(0.975)	−2.763***	(0.576)
Wage employment	−0.193***	(0.061)	−0.185***	(0.019)
Experience	0.290	(0.462)	0.111*	(0.064)
Experience squared	−0.006	(0.008)	−0.003**	(0.001)
Rural	−0.084	(0.068)	−0.105***	(0.014)
Farmer/self-employed	0.434	(0.425)	0.230***	(0.041)
Private sector	0.350	(0.397)	0.174***	(0.045)
Foreign sector	0.501	(0.491)	0.281***	(0.055)
Cohort1	1.305	(2.806)	0.234	(0.397)
Cohort2	0.773	(1.823)	0.081	(0.261)
Cohort3	0.456	(1.156)	0.023	(0.168)
Cohort4	0.239	(0.651)	−0.003	(0.096)
Cohort5	0.097	(0.286)	−0.008	(0.044)
Big city	0.136	(0.229)	0.048	(0.034)
North	−0.040	(0.347)	−0.174***	(0.049)
Central	−0.072	(0.165)	−0.134***	(0.025)
2004	0.420***	(0.028)	0.367***	(0.033)
2006	0.620***	(0.216)	0.464***	(0.018)
2008	0.719**	(0.307)	0.488***	(0.022)
2010	0.913***	(0.243)	0.641***	(0.057)
2012	1.014***	(0.141)	0.736***	(0.095)
2014	0.976***	(0.027)	0.652***	(0.162)
Constant	−0.277	(7.636)	2.523**	(1.258)

Standard errors in parentheses.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$.
Note: Year 2002 is the base for year dummies.
Cohort 6 is the based for cohort dummies.
Uni.Xgraduates proport = university graduate times the proportion of graduates.

shed light on the existence of a direct effect of graduating university on individuals' income, when the measure of having graduate university is in terms of positional measure. Since we are interested in assessing the existence of any difference in this direct effect as higher education expands and increases the number of graduates in the labor market, we created an interaction term between graduating university and the proportion of graduates in the labor market. Looking at the direct effect of the proportion of graduates in the labor market on income, we find statistically significant results. Similarly, the indirect effect of graduating university through education expansion shows statistically significant results. As in the first research question, the significance of the interaction terms cannot be interpreted directly. We still follow Hox (2010) for the interpretation, and the results are presented in Table 5. This interpretation reveals the direction of the interaction term. The results indicate that an increase in one standard deviation of the positional measure of being a university graduate is expected to decrease income (by 1.266Grad + 0.05). This is a direction that suggests that the effect of the positional measure of being a university graduate on income decreases as there is a higher proportion of higher education graduates in the labor market.

6. Discussion

This article examines the economic value of education as higher education expansion policy increases the proportion of university graduates in the labor market. Many studies in the literature on the economic return to education have investigated the relationship between education and labor market economic outcomes in the background of a higher education expansion. However, this study differs from them by using absolute and positional measures of education. There were two dimen-

Table 5
Interaction between university graduate and the proportion of graduates.

Baseline	0.05Univ. +	1.328Grad -	0.062Univ*Grad	
Educ = - 1	−0.05 +	1.328Grad +	0.062Grad =	1.39Grad − 0.05
Educ = 0	0 +	1.328Grad +	0 =	1.328Grad
Educ = 1	0.05 +	1.328Grad -	0.062Grad =	1.266Grad + 0.05

Source: create by Authors.
Note: Following Hox (2010), education variable was standardized in order for the selected values to be one standard deviation below the mean, the mean, and one standard deviation above the mean. The equation of the proportion of graduates in then computed against the values of the education one.
Grad: the proportion of graduates in the labor market.
Univ: University graduate (positional measure).

sions of interest as to which measure of education between its absolute measure and its relative measure would show (1) how the economic returns to the number of years of education in general vary depending on the proportion of university graduates in the labor market, and (2) how the economic returns to graduating higher education differ depending on the proportion of university graduates in the labor market.

The results of the analysis showed that the increase of the proportion of university graduates resulting from the expansion of higher education does not influence the strength of the effect of education on income when education is measured using the absolute number of years of formal education that individuals have. However, when the number of years of education is measured from a positional perspective, a higher proportion of graduates in the labor market as a result of the education expansion of higher education contributes to increase the economic returns of education. This finding does not confirm our initial hypothesis and is consistent with Ortiz and Rodriguez-Menés (2016), who found that in Spain, the higher proportion of graduates in the labor market changes the positional returns of education in the labor market. Our findings do not support our first hypothesis, which is in favor of the human capital model, but they rather support the positional model of education. In this model, many scholars view education as a positional good, where its scarcity is expected to increase its societal or market value. These findings in Vietnam can be explained by the fact that higher education expansion has changed the labor market structure in the country. Precisely, the share of employment in agriculture gradually declined, while the share of employment in industry, construction, and services expanded. Mostly, the labor structure in the country changed more into organizational spaces, which are known to be very positional (Goldthorpe, 2014). Subsequently, higher education expansion and the change in the economy have brought about a rising demand for skilled workers and many highly-educated ones, and a better educational position can be a signal of higher skills rather than mere years of education (Rotman et al., 2016). In a context where there are more and more educated individuals, as in Vietnam, employers will likely not reward them simply for their absolute level of education, but employers will be more seeking to pay premiums for the relative educational position. As such, the positional measure of education seems to be more appropriate to assess the effect of education on subsequent labor market economic returns, in a background of educational expansion going on over time and might change the structure of the educational system or even the whole economy.

The findings in the context of Vietnam can be linked to others from previous contexts. For example, Katrňák and Doseděl (2019) also examined how educational expansion affects the relationship between education and labor market outcomes in 38 European countries. They found that the relationship changes when education is conceptualized from a positional perspective. As such, educational positionality, without consideration of levels, seems then not to vary across national contexts, as our findings corroborate those from European contexts which are very likely to be different than the Vietnamese one. The Vietnamese context is informative in relation to the model of education as a positional good. Employers are more likely to assign top-ranked jobs to individuals in the front line in the positional queue of the labor market. The positional model of education explains then why many young educated people are struggling to find a job in Vietnam, confirming the similar situations in other contexts.

Furthermore, the findings of the analysis for research objective two confirmed those of research question one. In other words, as education expands, mere higher education graduation is not expected to make a difference when higher education graduation is measured in absolute terms. However, when it is measured from a positional perspective, results show that its effect through education expansion on income changes. This finding does not confirm our initial hypothesis and is consistent with previous studies in the literature (Bol, 2015; Di Stasio, Bol & Van de Werfhorst, 2016). In this case, findings seem to confirm that the human capital model does not prevail in the Vietnamese context. This finding might be explained by the fact that the labor market structure in Vietnam, as already discussed, is a setting that is selective of university graduate credential based on a positional goods mechanism. Despite its expansion, the labor market in the country might not still have a high demand for university graduates, resulting in the latter being overqualified and getting lower wages (van de Werfhorst, 2011b). In fact, in Vietnam, the reality shows that many people are unemployed even after leaving university as graduates. According to Vietnam's School-to-work transition survey conducted by International Labor Organization (ILO) in 2015, 26 percent of young working people were overeducated for the job they are doing. Consequently, more and more people with higher education degrees have chosen to do laborious jobs such as shopkeepers or motorbike taxi drivers in Hanoi or Hochiminh City to avoid being unemployed after graduation. The disturbing trend of college and university graduates being underemployed and unemployed is drawing attention not only in Vietnam but also other countries in the region. In 2019, Thai Minister of Higher Education, Science, Research and Innovation raised concerns that fully half of new graduates in the country were likely to go jobless or underemployed.

Studies have shown that in the context of education expansion, the inflation of credentials changes education into a positional good, and this can also be related to institutions of the education system (Van de Werfhorst, 2011a). Precisely, education is more likely to be a positional good in countries with education systems having weakly-developed vocational education as Di Stasio et al. (2016) found in other contexts. In such systems, individuals seek to acquire higher levels of education to have a positional advantage relative to others in the labor market. This explanation seems to picture the context of Vietnam, where vocational education is weakly developed. Vocational education is not a popular choice for students in the country, especially in urban areas. Many vocational education institutions have then closed because they could not attract a minimum number of students. The labor market conditions and the educational system can help them get insights into the results found in this study. At the same time, the results inform on the positional model of education, and warns about possibilities of overeducation in Vietnam. Bills (2016) puts it rightly that the

transformation of education from a material to a positional good creates social waste, and overqualification leads to the increase of anxious job-seekers.

7. Conclusion

There has been progress in the estimation of the economic return to education. However, the expansion of education in some context brought about debates about a potential decrease of the economic return of education as the latter expands and pours more graduates into the labor market. Some studies that looked at changes in the relationship between education and economic outcomes typically used the absolute measure of education to do so. In contrast, some others suggest that using a positional measure of education better captures potential changes. In this study, we explored how educational expansion influences the strength of the relationship between education and income using the absolute and the relative measures of education. A first hypothesis was formulated, predicting that as higher education expands, the effect of the absolute measure of the years of education on labor market outcomes varies while the effect of its positional measure on these outcomes does not. Similarly, the second hypothesis predicted that as higher education expands, the effect of the absolute measure of higher education graduation on labor market outcomes varies, while the effect of its relative measure on these outcomes does not.

We found that as higher education expands, the effect of the absolute measure of the years of education on labor market outcomes does not differ, but the effect of its positional measure on these outcomes does. Likewise, as higher education expands, the effect of the absolute measure of higher education graduation on labor market outcomes does not vary, but the effect of its relative measure on these outcomes does. These findings support the idea that the effect of relative educational position on labor market returns varies as education expands and increases the proportion of graduates in the labor market. The findings also support the positional theory of education, where the absolute level of education is not much important, but rather its level relative to that of other job seekers (Thurow, 1975). Based on these results, we argue that the way education now functions in the labor market is different, at least in Vietnam. Its relative level determines the economic returns related to it, and not its traditional absolute level.

Our study comes with some limitations. First, the study focused on the change over time and did not control for some factors which might also influence income and need to be controlled for. The classic ability or motivation factors are some examples in this case, even though the methodology used tried to minimize such a bias. Second, the data used is far from perfect, and it might be necessary to retest our findings with other data and compare results. Retesting the findings using the IV (assuming some valid instruments are available) approach and comparing them to KLS ones also seems to be an appealing path for future research. Despite its limitations, the study shows that higher education expansion can change education from an absolute to a positional good. The use of a dataset covering the period from 2002 to 2014 helps captures how educational expansion influences the value of education from a long-term perspective.

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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