ERIA Discussion Paper Series

No. 475

Does the Skill Premium Influence Educational Decisions? Evidence from Viet Nam*

Ian COXHEAD†
University of Wisconsin-Madison and
Institute of Developing Economies (IDE-JETRO), Tokyo

Nguyen Dinh Tuan VUONG‡
University of Wisconsin-Madison.

May 2023

Abstract: *Viet Nam's economy has grown and changed in dramatic ways since WTO accession in 2007. Much of the growth and change is due to expanded international trade and FDI. These in turn have greatly increased domestic labour demand. However, growth that exploits the country's abundant supply of low-skill labour may depress the relative demand for skills. In this paper we ask whether the skill premium – the relative price of skills, which also measures the gross economic benefit to schooling at high school and beyond – plays an influential role in schooling decisions amongst teenagers for whom wage-work is an alternative to continued education. We first use event study methods to clarify trends in wages and skill premia. We then decompose influences on upper secondary school enrolments from income growth, demographic change, and skill premia. We find that the college skill premium has a positive influence on enrolments, whereas the premium from upper secondary completion has no significant effect. Our conclusions explore implications for future productivity growth as well as economic and educational policies.*

Keywords: Skill premium, wages, enrolments, Viet Nam

JEL Classification: O15, J24, J31

* The authors acknowledge financial support from the Economic Research Institute for ASEAN and East Asia (ERIA) through the project on 'Sustaining Vietnam's Economic Miracle: The Role of Productivity Growth.' We thank project participants and ERIA research staff for helpful comments on earlier drafts.
† Email: Ian_Coxhead@ide.go.jp.
‡ Email: nguyen.vuong@wisc.edu.

1. Introduction

As economies develop and mature, the accumulation of human capital – knowledge and skills – emerges as a necessary condition for continued dynamism. But this accumulation is not automatic; it depends on many facets of the development experience. One of those is the skill premium, a measure of expected gross returns to education. If individuals are responsive to this relative price, then changes in the skill premium could affect educational investments. In Viet Nam, the skill premium has fallen a lot since WTO accession. Does this matter for human capital accumulation, and if so, how much? In this paper, we try to answer this question.

Observing the relationship between skill premium and school enrolment poses some empirical challenges. Household spending for children's education depends on income, and per capita income in Vietnam has risen rapidly in recent years. Schooling is also subject to demographic changes – notably, increases in the average educational attainment of parents, since these should lead to increased parental demand for children's education. Both income effects and demographic changes are potentially correlated with the skill premium and this could bias the estimation of skill premium effects. To purge this bias, we estimate the effects of income and demographic changes on school enrolment and use those estimates to identify the skill premium effect.

To capture Vietnamese realities we use two alternative thresholds to define high-skilled workers: upper-secondary school (Grade 12) graduates, and college graduates. OLS estimates after controlling for income and demographic changes show a positive, statistically significant and economically meaningful relation between the college skill premium and upper-secondary enrolment. We do not find any significant effect of the 12^{th}-grade premium on upper-secondary school enrolment.

Our study makes two types of contribution to the literature on returns to education and school enrolments. First, we offer a methodological innovation to study the impact of skill premia on school enrolment in partial equilibrium settings. In addition to studies taking a general equilibrium approach (Matsuda, 2020; Athreya and Eberly, 2021), partial equilibrium studies by Oster and Steinberg (2013), Atkin (2016), and Kuka et al. (2020) found support for the conjecture that a higher skill premium leads to higher school enrolment. However, these studies do not consistently identify the channel(s)

through which the skill premium effect is transmitted. This paper offers a means to estimate skill premium impacts net of income growth and demographic changes.

Second, our empirical results generate insights with potential value for education policy. For the period studied, we find that upper-secondary enrolments respond to the college skill premium but not the 12th-grade premium. These results are consistent with the observation that upper-secondary school curricula in Viet Nam are oriented mainly toward preparing students for the university entrance exam, rather than adding skills for 12th-grade graduates entering the job market. About three-quarters of Vietnamese high school students enrol in upper-secondary schooling, but a much smaller fraction completes 12th grade, and a smaller fraction still enters tertiary education. Moreover, students who remain in the education system through 12th grade and into tertiary levels come overwhelmingly from wealthier and better-educated households. If the upper-secondary skill premium does not encourage progression from lower secondary school, then its effect may be particularly influential for children from households where income growth and increases in parental education have been lower than the national average.

The rest of the paper is organised as follows. Section 2 reviews the literature on skill premium and education. Section 3 shows the trends in the labour market and education. Section 4 provides the method and result of our estimations on skill premium-school enrolment relationship. Section 5 concludes.

2. A Survey of Issues and Literature

2.1. Globalisation, Skill Premia, and Schooling

In the past two decades, Vietnam's increasingly close integration with the global economy, through trade and FDI, has been the dominant driver of GDP growth and structural change. This has been most notably true in labour markets (McCaig and Pavcnik 2018). Any discussion of changes in the skill premium must be framed against this backdrop.

Theory identifies an ambiguity in the effects of trade on the skill premium (Findlay and Kierzkowski 1983). A national economy that specializes in labour-intensive production will see incomes rise (the gains from trade effect) but the skill premium

decline (because specialization causes demand for lower-skill labour to rise relative to demand for other factors of production). Over generations, lower growth rates of educational attainment may further reinforce comparative advantage in blue-collar industries. This prediction, despite its age, is surprisingly in harmony with many more recent narratives about a 'middle income trap' in emerging economies.

Empirical studies report a wide range of findings on the direction of change in the skill premium in developing countries undergoing trade liberalisation and investment inflows. Goldberg and Pavcnik (2007) reviewed numerous studies assessing the effect of 1990s liberalisation in Mexico, Colombia, India, Brazil, Chile, Argentina and Hong Kong and found that the skill premium increased in almost every case. Li (2018) found the same for regions of China that specialised in skill-intensive exports.

Other studies, however, have found the opposite effect: in Indonesia (Amiti and Cameron, 2012; Coxhead and Shrestha, 2016), Bangladesh (Robertson et al., 2020), and China (Li, 2018). Foreign direct investment (FDI) inflows were found to reduce school enrolment rates in Mexico (Atkin, 2016) and Viet Nam (Coxhead and Shrestha, 2017; Coxhead, Vuong, and Nguyen, 2021). A panel study of more than 100 countries found that specialisation in low-skill industries translates into reduced educational attainment (Blanchard and Olney, 2017).

It is important to note, however, that effects are not necessarily uniform across individual or community characteristics. A landmark early study of Viet Nam by Edmonds and Pavcnik (2005), for example, found that income effects from trade reforms affecting the rice-growing economy resulted in higher school retention rates for daughters of rural households. In India, trade policy liberalisation produced significant increases in household investments in schooling, but these were differentiated by the degree of exposure to trade (Edmonds et al., 2010). Robertson et al. (2020) found that rapid growth of Bangladesh's ready-made garment sector led to significant reductions in the male-female wage gap, a change often associated with increased household spending on health, nutrition and schooling. One important source of variation in results is the extent to which there exists an accessible labour market option. In Edmonds and Pavcnik (2005), for example, the data come from rural households in an era preceding the boom-like activation of non-farm labour markets. By contrast, the India and Bangladesh data are heterogeneous in terms of labour market constraints and

opportunities, giving rise (in the Bangladesh case, at least) to sharp differences amongst regions and between short-run and long-run responses.

There are also several studies relevant to the specific question of income and labour market effects of FDI in a developing country setting. Using data from a resource-induced FDI boom in Mozambique, Toews and Vezina (2020) found that for each new job directly linked to FDI, 4.4 additional new jobs were created, roughly half each in the formal and informal sectors. Both the magnitude and the ratio are comparable with those found in United States data by Moretti (2010), in whose work the addition of a single job in manufacturing generates 1.6 jobs in local nontradable industries (notably construction, wholesale and personal services), while each additional job in tradable high-tech added 2.5 additional jobs in nontradables. A Viet Nam study focused more specifically on productivity impacts found evidence of spatial spillovers from FDI firms to local firms, of varying strength depending on distance and the nature of the linkages (backward, forward, horizontal) (Thang et al., 2016). For industries producing tradables, productivity gains translate directly (and under the law of one price, approximately one-for-one) to new job creation.

2.2. School Enrolment and Attainment and Skill Premia in Viet Nam

Empirical studies of enrolment rates and school attainment in Viet Nam almost uniformly affirm a pattern of very rapid increase during the early globalisation period, followed by stagnation (or in some data series, decline) beginning around the time of Viet Nam's accession to the World Trade Organization (WTO) in 2007. Data presented in Dang and Glewwe (2018) showed that although progress in school enrolments was impressive from the start of the 1990s to the first decade of the 21st century, growth subsequently leveled off. The upper secondary school enrolment rate, for example, almost trebled from 27% in 1992–1993 to 74% in 2008, but enrolments in each biennial survey from 2010–2014 were 1–2 percentage points lower than this peak (Dang and Glewwe, 2018, Table 1). Viet Nam has achieved universal enrolment at primary level,

but has fallen short of that target and the government's own more modest goals in lower secondary (grades 6–9) and upper secondary (grades 10–12) education.[4]

Demombynes and Testaverde (2018) found that the composition of the labour force by educational attainment has also been slow to change. During 2007–2014, the share of the labour force with university education rose from 5% to 8%, while the share with no more than lower secondary schooling dipped only from 75% to 71%. These numbers indicate that the share of the labour force with upper-secondary, vocational or college education was thus virtually unchanged at 20%–21%.

Numerous published estimates of the average rate at which Viet Nam's labour market rewards educational development – the expected return per additional year of schooling – indicate that it reached a maximum around the time of WTO accession (2007) and has declined in subsequent years. Skill premia rose sharply during the early reform years, especially from the early 1990s to the early 2000s, a period associated with abandonment of command-economy wage-setting mechanisms and the activation of domestic labour markets (Coxhead and Phan, 2013). However, and despite economic growth rates averaging 6% per year, returns to education have *declined* since WTO accession (Doan and Gibson, 2012; Doan et al., 2018; Patrinos et al., 2018; Coxhead and Phan, 2020; McGuinness et al., 2021). Doan et al. (2018) found that the selection-corrected return to schooling reached a peak (at just above 11%) in 2006–2008 and then declined steadily, to 6.5% by 2014, the year of their last estimate. The estimates of McGuinness et al. (2021) showed that, for men returns in 2016 were 26%–30% lower than in 2008 for every level of education except postgraduate degrees, which have also declined though by just 13%. Looking more deeply, the decline is more pronounced in private-sector employment, where returns were lower to begin with, and where most new job creation now occurs (Demombynes and Testaverde, 2018; Phan and Coxhead, 2020). We present our own data on skill premium trends in the next section.

Is it possible that returns to schooling are falling due to rapid increase in the supply of skilled workers? Doan et al. (2018), for example, concluded that 'the expansion of labour supply of higher education graduates in recent years may explain the declining

[4] Data presented in the same study makes it clear that the recorded gains in *average* educational attainment disguise substantial and persistent discrepancies between social groups and over geographic regions.

returns of higher education and then falling overall returns to schooling in Viet Nam' (p.212). But even supposing that economic growth were neutral with respect to skills demand, the supply of skills would have to increase by far more than the rate of GDP growth in order to reduce the skill premium. Enrolment growth indicate that this is not happening; since 2010, growth in the tertiary enrolment rate has been 'negligible' (World Bank, 2020). There has been no boom in the supply of skills sufficient to significantly reduce the skill premium, even under the very conservative assumption that skills demand grew at the same pace as GDP.

If an expanding supply of skills cannot fully account for the falling skill premium, then what about the demand side of the market? We hypothesise that part of the fall comes from structural change. While this can come from several sources, previous studies have identified FDI inflows and associated labour demand changes as playing a major role (Coxhead and Shrestha, 2017; Coxhead, Nguyen, and Vuong, 2022), consistent with predictions from trade-theoretic models of which Findlay and Kierzkowski (1983), cited above, is the prime example.[5]

In the chain of reasoning from globalisation and structural change to educational investments, the final link is from the skill premium to decisions over schooling. The principle is obvious: the skill premium conveys information about the expected return on schooling investments. Oster and Steinberg (2013) found that the growth of IT service centers in India increased local schooling investments, primarily through the returns to schooling channel rather than through income effects. Kuka et al. (2020) exploited a policy change in the United States to find empirical support for a positive response of high school investments to the skill premium. Elsewhere in the developing world, however, this link has not been much studied.

3. The Labour Market and School-work Choice

A great deal of research effort has been devoted to understanding constraints to educational development from the supply side (that is, in schools, teachers, access, and

[5] Another source of structural change reducing demand for skills comes from the reform and contraction of SOE employment. Vu and Yamada (2020) found this to be a primary reason for wage and salary convergence between Vietnam's private and public sectors.

other conventional targets of education policy) and in terms of credit and other resources available to households (e.g. Dang and Glewwe, 2018). However, the scale and speed of Viet Nam's economic transformation, and the puzzling recent decline in returns to schooling, demand that we look beyond supply-side and household-specific factors to signals that students may receive from the labour market. For this purpose, we begin by looking at trends in the data. We conduct an event study with the following specification:

$$y_{pt} = \beta_0 + \sum_{i=2012}^{2019} \beta_t . 1\{t = i\} + \delta_p + \varepsilon_{pt},$$

in which y_{pt} is the outcome variable of province p at year t. The outcome variable could be average wage, skill premium or high school dropout rate. In each case the parameter of interest is β_t, which measures the difference in the outcome variable between the base year, 2011, and year t. Other components are province fixed effects δ_p and error terms ε_{pt}.

3.1. Data

Given the econometric specification, we use the Labor Force Surveys (LFS) 2010–2019. This is the most suitable data source for two reasons. First, the survey is representative at the provincial level. Conducted by the General Statistics Office of Vietnam (GSO), LFS has about 800,000 observations annually, drawn from every district in the country. Second, LFS provides basic demographic information, educational status or attainment, and employment on individuals aged 15 years and above. With this dataset, we can study trends in the labour market and observe the school status of children who have reached legal working age but are still of age to be in secondary school, i.e. 15–17-year olds.

With the LFS, we calculate the weighted average wage by year, educational attainment, and province. We restrict the sample to 18–65 years old individuals who work at least 20 hours a week. In each year, province and industry, we categorise workers into high-skill and low-skill groups based on educational attainment. We use two alternative criteria for this. In the first we define high-skilled workers as those who have completed a 4-year college degree, and low-skilled workers as every level of educational attainment below that. In the second, we define high skill by upper

secondary (12th grade) completion, and low skill as everything below that. As ω_{isdpt} is the weight for individual i of skill group s working in industry d in province p in year t, the average monthly wage in each group is $w_{sdpt} = \sum \omega_{isdpt}.w_{isdpt}/\sum \omega_{isdpt}$. Then we calculate the skill premium as the ratio of the average wage of high-skilled workers to that of low-skilled workers: $\rho_{dpt} = w_{Hdpt}/w_{Ldpt}$. We also use the weight ω_{isdpt} to calculate the share of FDI workers at the provincial level.

Table 1 provides summary statistics for average wages and the skill premium by different definitions of high-skilled labour in manufacturing and service industries in 63 provinces from 2010 to 2019. With these data, we plot the provincial average wage in 2010–2019, deflated by the annual rate of Consumer Price Index (CPI) change, as shown in Figure 1. During this period, the average wage of low-skilled workers increased more rapidly than that of high-skilled workers. For example, from 2010 to 2019 the average wage of college graduates rose by 32.4%, but that for those without a college degree rose by 61.2%. In the case of upper-secondary school graduates and dropouts, the numbers are 51.9 and 64.2, respectively. This implies that the skill premium in the manufacturing sector declined during this period. There was no discernible decline in the service sector, where the monthly income of high-skilled and low-skilled labour by either definition increased by about 50%–60%.

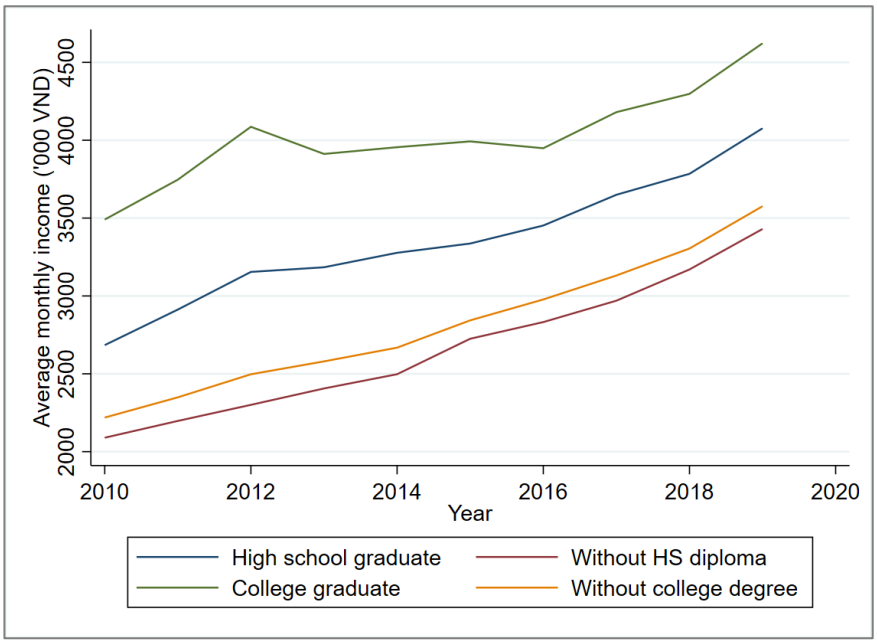
Table 1: Descriptive Statistics for Event Study Analysis

Variable	Obs.	Mean	Std. dev.	Min	Max
Skill definition based on college graduates					
Low-skilled wage	1,260	2,820	582	1,565	5,136
High-skilled wage	1,260	3,804	783	2,117	8,128
Skill premium	1,260	1,37	0.26	0.58	2.89
Skill definition based on lower secondary graduates					
Low-skilled wage	1,260	2,708	563	1,448	5,071
High-skilled wage	1,260	3,309	664	1,896	6,386
Skill premium	1,260	1.24	0.18	0.75	2.27
Educational attainment					
% of students amongst high-school-age teenagers	630	50.28	12.31	24.61	83.88
% of high school grad, birth cohort	2,520	36.49	19.00	3.42	92.87
% of middle school grad, birth cohort	2,646	66.02	21.79	11.45	100

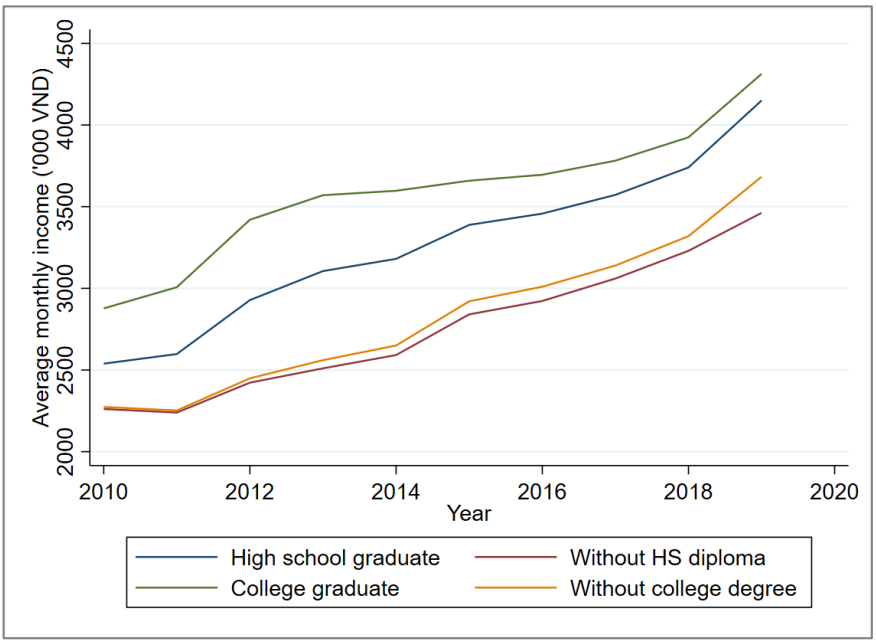
Note: 63 provinces X 10 years = 630. Skills data cover 2 sectors: 630 X 2 = 1,260. Unit of monthly earnings is thousand VND in 2010, adjusted for Consumer Price Index.
Source: Authors' calculation from Labour Force Surveys 2010–2019, Statistical Yearbooks 2010–2019, 2009 Census of Population and Housing.

Figure 1: Provincial Average Real Wage in 2011–2019

a) Manufacturing Sector



b) Service Sector



Note: Wages deflated by annual Consumer Price Index change.
Source: Authors' calculation from Labour Force Surveys 2010–2019.

We calculate high school enrolment rates from the 2009 Census of Population and annual Housing and Statistical Yearbooks. Since the census is representative at the provincial level, we estimate the number of high-school-age individuals by province and

year. We then compare these numbers to the number of high school students from Statistical Yearbooks to calculate the enrolment rate. We also calculate the shares of lower and upper secondary school graduates by cohort at the provincial level. The summary statistics of these variables are shown in Table 1.

Two other datasets are Population Surveys 2012–2018 and Vietnam Household Living Standards Surveys 2010–2018. The Population Surveys are a smaller version of the Census that the GSO conducts annually. The survey collects demographic information of about one million individuals in about 700 districts of Vietnam. We use Population Surveys to estimate the change in school enrolment rate due to demographic change. To measure the effect of income change on enrolment, we use Vietnam Household Living Standards Surveys 2010–2018 because of the consistency of the questionnaire. The survey is a rotating panel dataset collected by the GSO in 1992/1993, 1997/1998, and biannually from 2002. In each wave, GSO collects data on the demography, employment, expenditure, education, and healthcare of more than 9,000 households across the country.

3.2. Results: Event Study

The remaining figures show plots of parameter estimates from the event study model described above. Each figure shows annual values of the outcome variable *relative to 2010*, the base year. Figure 2 reports the event study regression with the log of monthly income as the dependent variable. The patterns are similar to the trends in average monthly earnings mentioned previously. In the manufacturing sector, the wage of college graduates in 2010–2019 did not grow as fast as that of workers without a college degree. This trend can also be observed in wage growth of high school graduates and high school dropouts but with a narrower gap. In the service sector, the earning growth of college graduates is smaller than that of workers without a college degree. However, the trend is reversed if we consider high school graduates as high-skilled.

Figure 2: Real Wage Change Since 2010, 2011–2019.

a) Manufacturing Sector

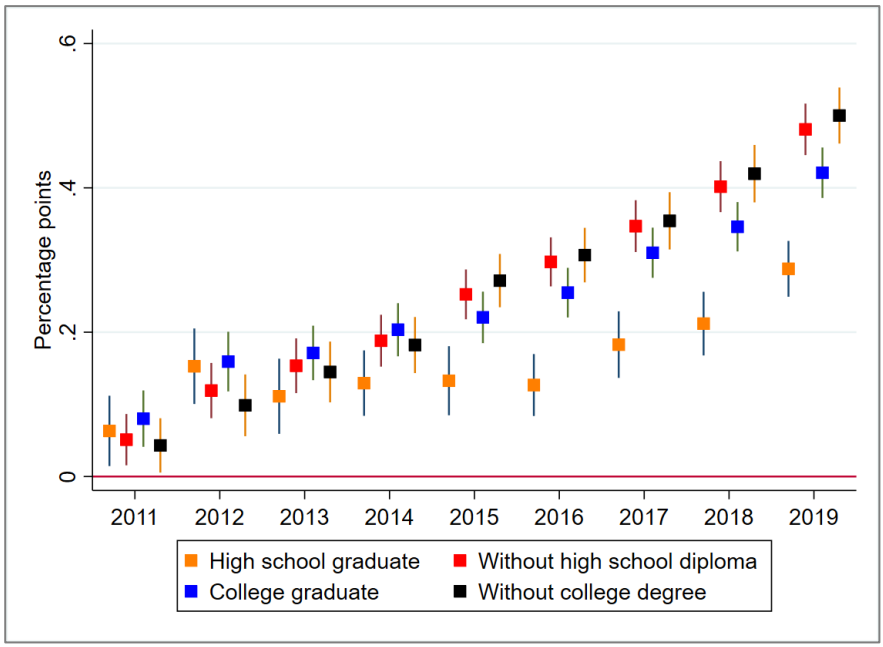
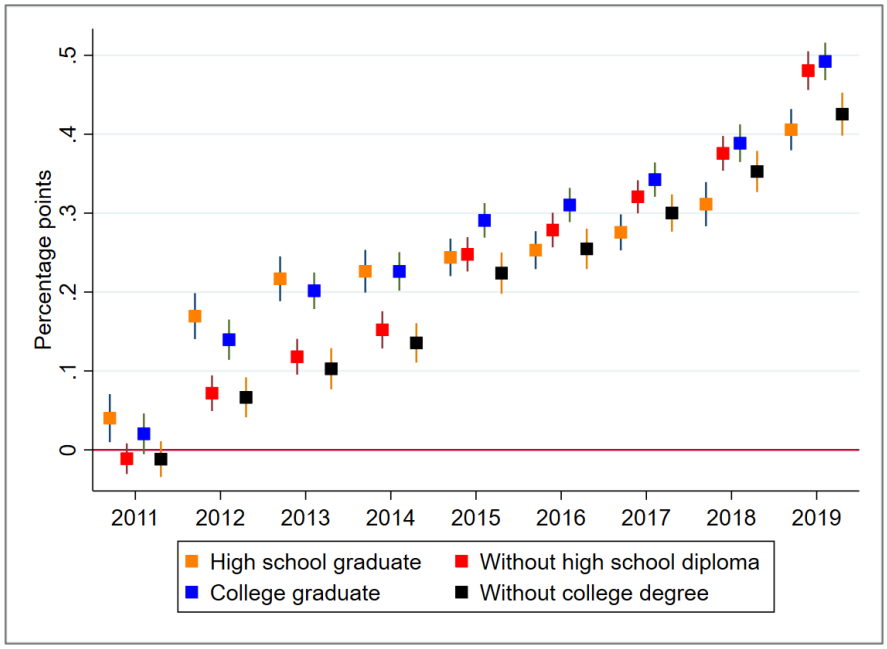


Figure 2. Continued

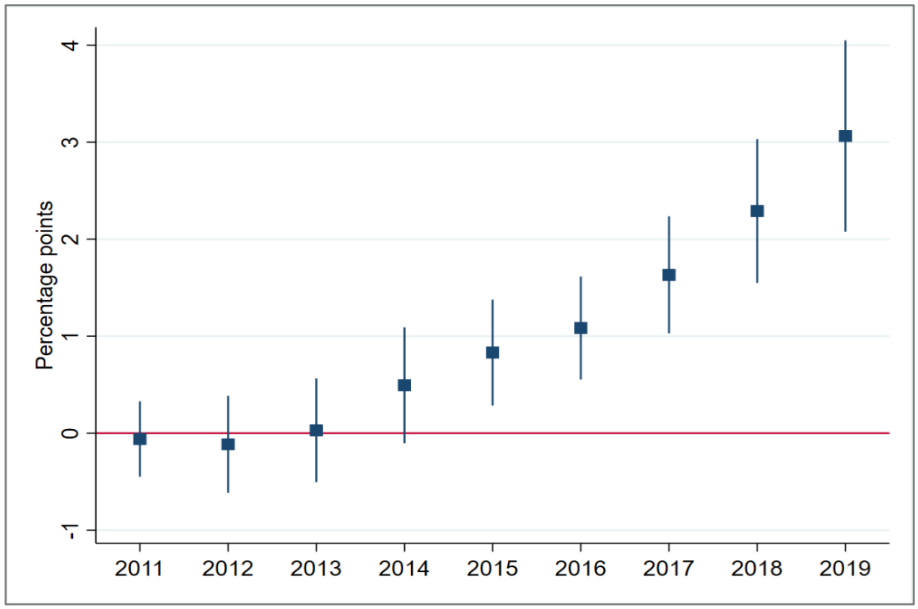
b) Service Sector



Note: Wages deflated by annual Consumer Price Index change. The base year is 2010.
Source: Authors' calculation from Labour Force Surveys 2010–2019.

Figure 3 shows trends in the average share of FDI workers in total employment calculated at province level. This share increased by three percentage points from 2010 to 2019, and significantly so (relative to 2010) by 2015. In the same year, the skill premium showed a precipitous decline, as seen in Figure 4. The skill premium of high school graduates increased until 2013 and then declined. The skill premium of college graduates has followed a similar trend. However, the skill premium of college graduates has dropped significantly since 2015, and it was clearly below its 2010 level after 2015.

Figure 3: Provincial Average FDI Employment Share Trend, 2010–2019

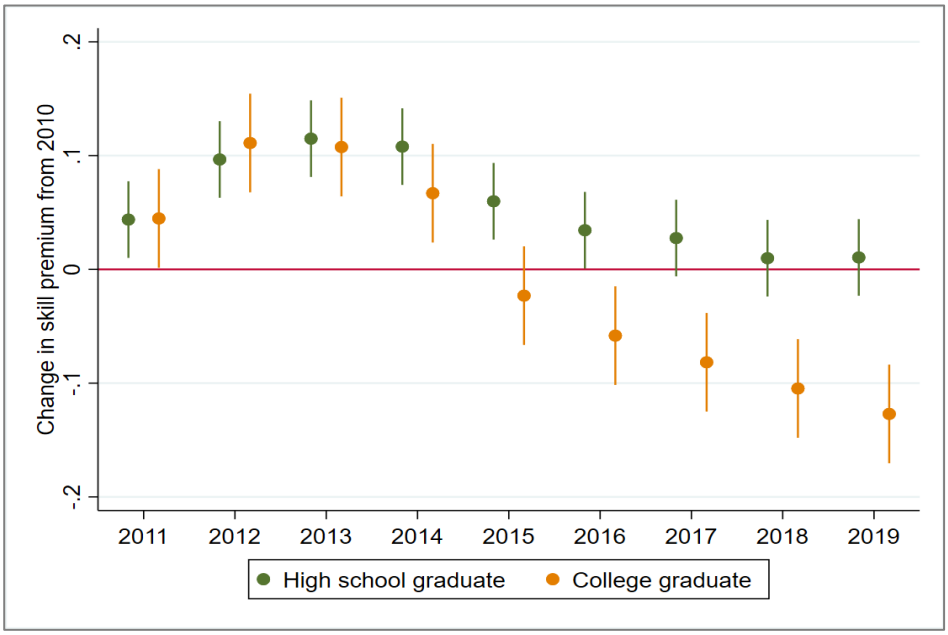


FDI = foreign direct investment.
Note: Graph shows the percentage point difference in provincial average FDI employment (percentage of total employment) relative to the base year, 2011, with 95% confidence intervals.
Source: Authors' calculation from Labour Force Surveys 2010–2019.

We conduct the same exercise on the share of 15–17-year olds that are still in school. Figure 5 shows that the high school enrolment rate increased from 2010 to 2019. As in Figure 4, the skill premium increased until 2013. The puzzle is that, after 2013, the high school enrolment rate increased even though the skill premium declined. Finally, we use the same event study model to examine differences in educational attainment by birth cohort, using data from the 2019 LFS. In this case we report the difference in school attainment by each birth cohort relative to the 1961 cohort. Results are shown in Figure 7. To better reflect the educational composition of the labour force in the earlier years, we compare lower-secondary and upper-secondary completion rates

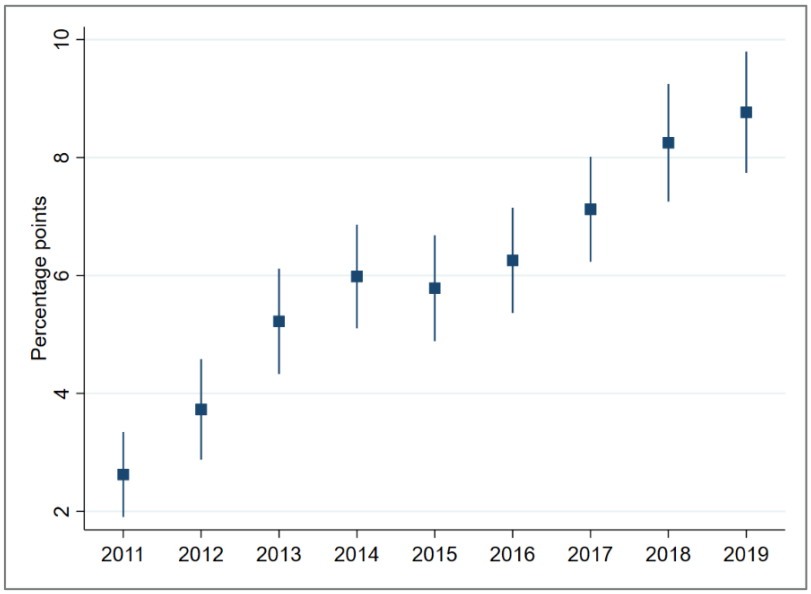
rather than tertiary completion rates. In panel (a), lower secondary graduates, the increase becomes significant with the 1978 birth cohort, who graduated from 9th grade beginning in 1993. After more than 1 decade of steady increase during the first *doi moi* decade, the 1990 birth cohort achieves a 9th grade graduation rate roughly 25% higher than the 1961 cohort, but after that (i.e. after about 2005) the rate does not increase until 2015 (the 2001 birth cohort).

Figure 4: Trends in Skill Premium at the Provincial Level, 2010–2019



Note: Graph shows the difference in skill premium relative to 2010 with 95% confidence intervals. We use two definitions for 'high-skilled labour': high school graduates and college graduates.
Source: Authors' calculation from Labour Force Surveys 2010–2019.

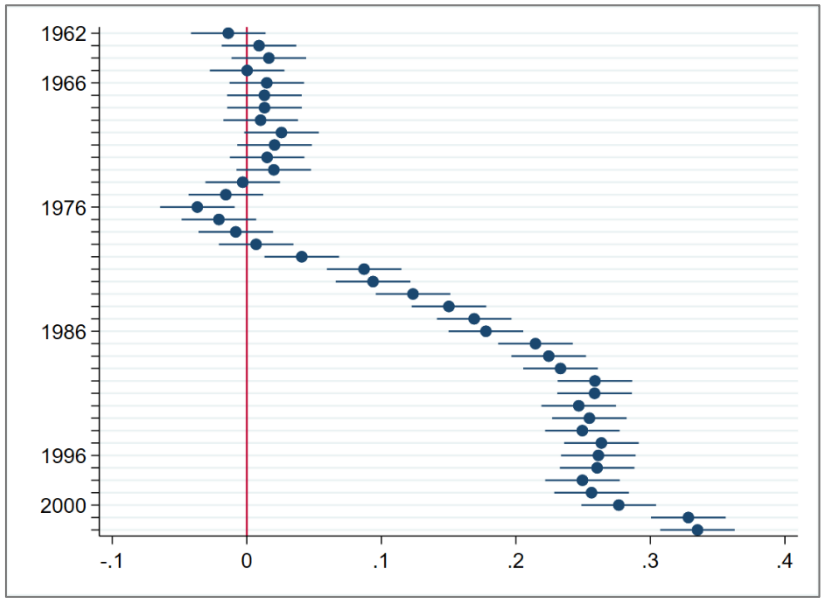
Figure 5: Change in Net Enrolment Rate amongst High-school Age Teenagers in 2010–2019



Note: The y-axis measures the provincial average percentage point difference in net enrolment rate amongst 15–17-year old children relative to 2010, with 95% confidence interval.
Source: Authors' calculation from Statistical yearbooks 2010–2019 and 2009 Census of Population and Housing.

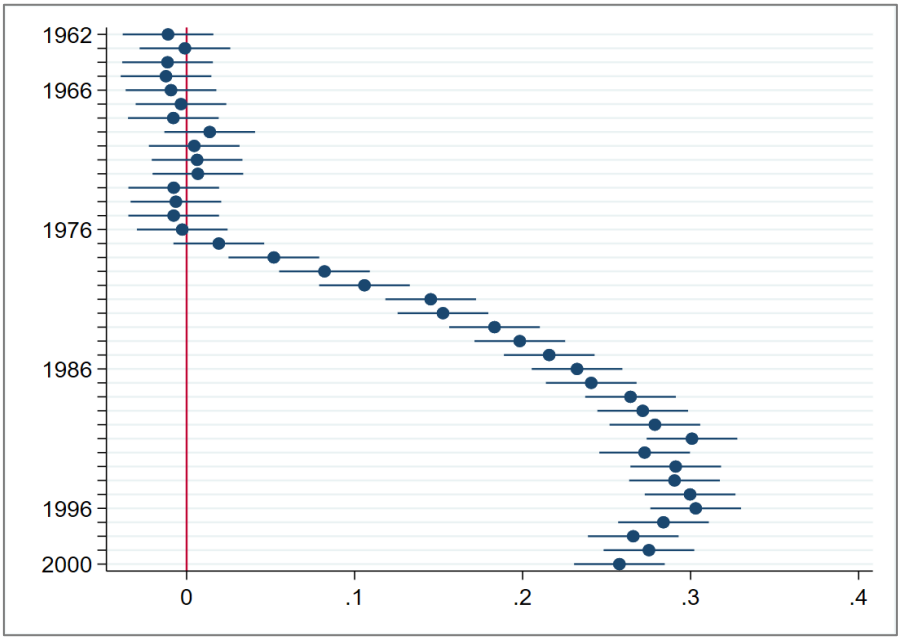
Figure 6: Change in Educational Attainments by Birth Cohorts

a) Lower secondary school



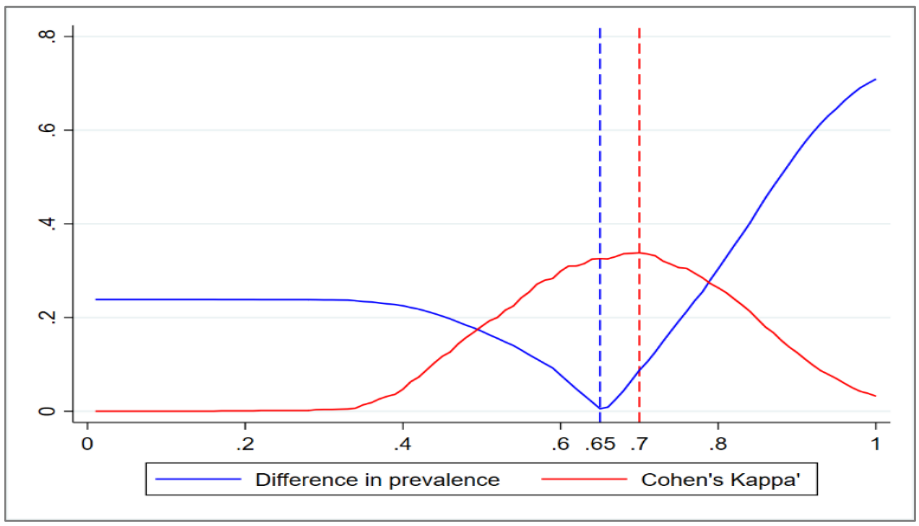
Note: Graph shows difference in lower-secondary graduation rate relative to the 1961 birth cohort. The 1999 birth cohort is the graduating class of 2014.

b) Upper secondary school



Note: Graph shows the difference in upper secondary school graduation rate relative to the 1961 birth cohort. The 1996 birth cohort is the 12th grade graduating class of 2014. The null hypothesis that the 1996 and 1998 birth cohorts have the same graduation rate is rejected with p<0.01, and that between the 1996 and 1999 birth cohorts with p<0.05.
Source: Authors' calculation from Labour Force Surveys 2019.

Figure 7: Choosing the Threshold



Note: We plot two criteria for choosing the threshold to classify a continuous predicted probability of enrolling in school to a binary variable. The predicted probability comes from the regression in Column (4) of Table 1. The first criterion that minimises the difference in prevalence suggests the threshold $c = 0.65$, but Cohen's Kappa suggests $c = 0.7$.
Source: Authors' calculation from Vietnam Household Living Standards Surveys 2010–2018.

The upper-secondary graduation rate also increased throughout the *doi moi* years, reaching a peak with the 1991 birth cohort (i.e. in 2009). Thereafter the graduation rate ceased to rise. Moreover, in strong contrast to the lower secondary trend, the share of high school graduates declined, starting with the 1996 birth cohort – that is, in 2014. The drop in graduation rates is statistically significant when comparing 2016 and 2018 and the magnitude of the decline, from the 1995 cohort to that of 2018, is remarkably large at almost 5 percentage points.

The difference in trends between lower and upper secondary graduation rates provides food for thought. In an intuitive model of demand-side determinants of the school-work choice, income effects should be influential at all age levels and higher family incomes should increase school retention and graduation rates. However, the opportunity cost of schooling, as measured by blue-collar wages, is relevant for many children of legal working age – that is, those contemplating moving beyond 9th grade into upper-secondary education. After 2014, the lower secondary school graduation rate rises, while that for children at upper secondary age declines. Since lower-secondary children are below working age, the result for that group provides a falsification test for the trend in the upper-secondary group.

4. Skill Premium and Educational Attainment

In the remainder of this paper we examine links between changes in the skill premium and indicators of school attainment (Orazem and King, 2007). As noted above, estimating the impact of the skill premium on educational attainment is complicated by the need to separate income effects from relative price effects (the skill premium) and demographic changes. In this section we develop a decomposition method intended to identify skill premium effects separately from those of income growth and demographic change. We then implement the decomposition using data from the decade of rapidly rising FDI inflows between 2011 and 2019.

Using provincial data derived from the Labor Force Surveys 2010–2017, we apply the following econometric specification:

$$s_{pt} = \beta_0 + \beta_1 x_{pt} + \gamma_p + \varepsilon_{pt},$$

in which s_{pt} is the high school enrolment rate in province p and year t, and x_{pt} is the skill premium. Other parameters are province fixed effects γ_p and a heteroskedasticity and autocorrelation consistent (HAC) error term ε_{pt}. This equation can be rewritten in terms of changes in variables as

$$\Delta s_{pt} = \beta_1 \Delta x_{pt} + \epsilon_{pt},$$

in which β_1 (as redefined) measures the province-level enrolment response to a local change in the skill premium. However, this specification could be biased because it does not account for the effects of income and demographic changes. To better understand this, consider the difference in school enrolment rate between two periods $t = \{0,1\}$. Within a province, assume we have two groups of families, one with more-educated parents and another with less educated parents; we will refer to these as high-skill and low-skill households. The fractions of children with high- and low-skilled parents are s and $1 - s$. Incomes of high- and low-skilled households are w_h and w_l. The skill premium is $x = w_h/w_l$. School enrolment y is a function of household income and the skill premium, $y = y(w, x)$ where $\partial y/\partial w > 0$ and $\partial y/\partial x > 0$.

Given the above settings, the school enrolment rate at $t = 0$ is

$$Y^0 = s^0 . y(w_h^0, x^0) + (1 - s^0) . y(w_l^0, x^0),$$

And the school enrolment rate at $t = 1$ is

$$Y^1 = s^1 . y(w_h^1, x^1) + (1 - s^1) . y(w_l^1, x^1).$$

We attribute the change in school enrolment rate $Y^1 - Y^0$ to changes in income, the skill premium, and demographics. The income effect alters school enrolments independent of the skill premium and parents' education. It is thus found by differencing w_h^t and w_l^t with respect to t, which yields

$$E_1 = s^0 . \Big(y(w_h^1, x^0) - \ y(w_h^0, x^0)\Big) + (1 - s^0) . \Big(y(w_l^1, x^0) - y(w_l^0, x^0)\Big).$$

The skill premium effect is likewise found by differencing x^t:

$$E_2 = s^0 . \Big(y(w_h^1, x^1) - \ y(w_h^1, x^0)\Big) + (1 - s^0) . \Big(y(w_l^1, x^1) - y(w_l^1, x^0)\Big).$$

The third effect is due to changes in the fraction of children living in households with high-skilled parents. The effect of this demographic change is

$$E_3 = \Big(y(w_h^1, x^1) - y(w_l^1, x^1)\Big)(s^1 - s^0).$$

In this study, we seek to estimate the marginal effect of the skill premium on school enrolment, i.e. $\beta_1 = \partial E_2/\partial x$. However, since OLS fails to disentangle the substitution effect from income and demographic changes, the estimates are biased. Following the decomposition, the bias is equal to

$$\hat{\beta}_1 - \beta_1 = \frac{\partial E_1}{\partial w_h}.\frac{\partial w_h}{\partial x} + \frac{\partial E_1}{\partial w_l}.\frac{\partial w_l}{\partial x} + \frac{\partial E_3}{\partial s}.\frac{\partial s}{\partial x},$$

which is likely to be non-zero – for example, if incomes increased and the skill premium decreased, as is the case in Viet Nam in recent years. To correct the bias, we first estimate the income and demographic changes $\hat{E}_1$ and $\hat{E}_3$, then include these as controls. The final equation for OLS estimation will be

$$\Delta s_{pt} = \beta_1 \Delta x_{pt} + \kappa_1 \hat{E}_{1pt} + k_3 \hat{E}_{3pt} + \epsilon_{pt}.$$

4.1. Income Effect Estimation

As shown above, the income effect is the change in school enrolment of the 2010 population if incomes change while other conditions remain the same. Using the method used by Vu et al. (2022), our estimation process has three steps: i) estimate the income-schooling relationship using the sample of 15–17 years old individuals; ii) using the prediction from the linear probability model, find a cutoff that is the best fit to the actual data; and iii) project the income change into 2011 household data. In the first and second steps, we use Vietnam Household Living Standards Surveys 2010–2018 due to consistency in the questionnaire and sample selection. But we use Labor Force Survey (LFS) 2010 to predict the income effect because LFS data are representative at provincial level.

Income and schooling

We are interested in the effect of income change on the decision that keeps teenagers in high school. Using household-level data, we estimate the income-schooling relationship with the following specification.

$$s_{ipt} = \alpha_0 + \alpha_1 w_{ipt} + \theta X_{ipt} + \delta_{pt} + \epsilon_{ipt}$$

In this equation, s_{ipt} is an indicator variable taking a value of 1 if a 15–17 year-old teenager i living in province p and year t is in school. The explanatory variable w_{ipt} is average income per household member (total household income divided by the total

number of household members) and X_{ipt} are control variables. We use the CPI to deflate income in each year to 2010 prices. To account for the change in skill premium at the province level, we include province-year fixed effects.

Finding a threshold

The linear probability model delivers a probability of school enrolment. This is a continuous variable which leaves unclear who remains in school and who departs, given a change in the skill premium. One solution is taking the average probability of school enrolment as an indication of school enrolment rate. However, this approach might be misleading. For instance, an increase in the probability of school enrolment amongst individuals with high *ex ante* probability would increase the average in the model but it might not reflect reality, because these individuals remain in school regardless of any income change. Therefore, to estimate the change in school enrolment, we need a threshold to decide whether a teenager enrols in high school given the predicted probability. Following Freeman and Gretchen (2008), we use two criteria to determine a threshold c to classify the continuous predicted probability of school enrolment into a binary variable $h_{ipt}^{c} = 1\{\Pr(s_{ipt}) > c\}$. The first criterion is minimising the difference in prevalence $d_c = PP_c - OP_c$, where $PP_c = \Pr(h^c = 1)$ is the probability of high-school-age individuals being predicted by threshold c as still enrolling in school and $OP = \Pr(s = 1)$ is the probability that high-school-age individuals are still enrolled. The second criterion in Freeman and Gretchen (2008) is maximising Cohen's Kappa statistic, which is measured as

$$\kappa^c = \frac{\Pr(h^c = s) - \Pr(h^c = 1)\Pr(s = 1) - \Pr(h^c = 0)\Pr(s = 0)}{1 - \Pr(h^c = 1)\Pr(s = 1) - \Pr(h^c = 0)\Pr(s = 0)}.$$

Predicting the income effect

We then use LFS 2010 to predict the income effect. With the estimation of the income-schooling relationship and the threshold c, the 2010 school enrolment rate would be

$$\sum_i \omega_{ip0} . 1\{\Pr(s_{ip0}(w_{ip0}) = 1) > c\}$$

where ω_{ip0} is individual weight in LFS 2010 and w_{ip0} is income per household member. Using LFS 2010–2019, we calculate the income growth of high- and low-skilled labour, denoted as g_h and g_l. The household income in the next period is predicted to be

$$w_{ipt} = g_{ht} w_{hip0} + g_{lt} w_{lip0}$$

Given the above information, we calculate the income effect we seek, as

$$\hat{E}_{1pt} = \sum_i \omega_{ip0}.\left(1\{\Pr(s_{ipt}(w_{ipt}) = 1) > c\} - 1\{\Pr(s_{ipt}(w_{ip0}) = 1) > c\}\right).$$

4.2. Demographic change estimation

To obtain the effect of demographic change, we need the changes in the fraction of high-skilled parents $\hat{s}_{pt} = s_{pt} - s_{p0}$ and the school enrolment gap of teenagers in high- and low-skilled households $y(w_{hpt}, x_{pt}) - y(w_{lpt}, x_{pt})$. Using the 2009 Census of Population and Housing, we estimate $\hat{s}_{pt}$ by calculating the fraction of high-school-age students having at least one high-skilled parent. For consistency, we use a definition of high-school-age students that is similar to that of the constructed high school enrolment rate. For instance, the sample for calculating $\hat{s}_{pt}$ at $t = 2010$ is parents of teenagers born in 1993–1995. The base year of the high-skilled parents fraction $\hat{s}_{p0}$ is 2010.

We estimate the second component $\hat{y}(w_{hpt}, x_{pt}) - \hat{y}(w_{lpt}, x_{pt})$ by calculating the difference in high school enrolment rate of teenagers by parents' educational attainment. We use the annual Population Surveys for this task due to availability of information on high school enrolment. Because the Population Surveys are conducted in April, a sample at year t is for an observation at year $t - 1$. For instance, school enrolment rate for 2010 is calculated with the birth cohorts of 1993–1995, and the high school enrolment rate of these cohorts is available in the Population Survey of 2011. Using 2010 as the base year, we can calculate the demographic change in province p at year t as

$$\hat{E}_{3pt} = \left(\hat{y}(w_{hpt}, x_{pt}) - \hat{y}(w_{lpt}, x_{pt})\right)(\hat{s}_{pt} - \hat{s}_{p0}).$$

4.3. Estimation and Results

4.3.1. Income Effect

Table 2 shows estimates of the income-schooling relationship. After controlling for the skill premium, the OLS estimates suggest that if income increases by 10%, the chance of school enrolment increases by 0.38 percentage points.

Table 2: Income and Schooling of High-school-age Teenagers, 2010–2018

	Attending school			
	OLS (1)	**OLS (2)**	**OLS (3)**	**OLS (4)**
Log of income	0.052***	0.038***	0.038***	0.038***
	(0.009)	(0.010)	(0.010)	(0.010)
Province FE	Yes	Yes		
Year FE		Yes		
Province FE – linear trends			Yes	
Province – year FE				Yes
Observations	7,720	7,720	7,720	7,720

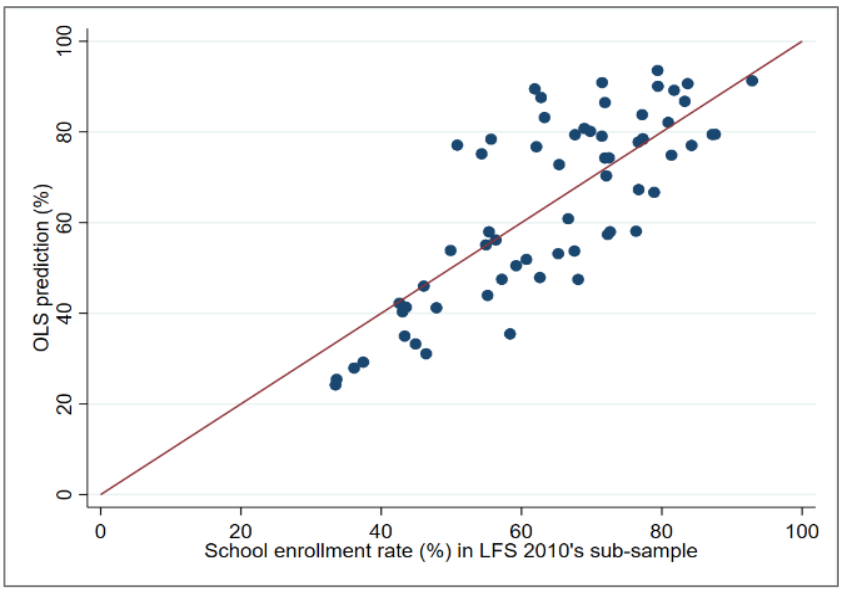
HAC standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Source: Authors' calculation from Vietnam Household Living Standards Surveys 2010–2018.

The model produces a continuous predicted probability of school enrolment. The next step is to choose a threshold to transform this into a binary variable. Figure 7 shows the Difference in Prevalence and Cohen's Kappa with different threshold levels. The former suggests the threshold value $c = 0.65$, but the latter suggests $c = 0.7$. We adopt the threshold $c = 0.7$.

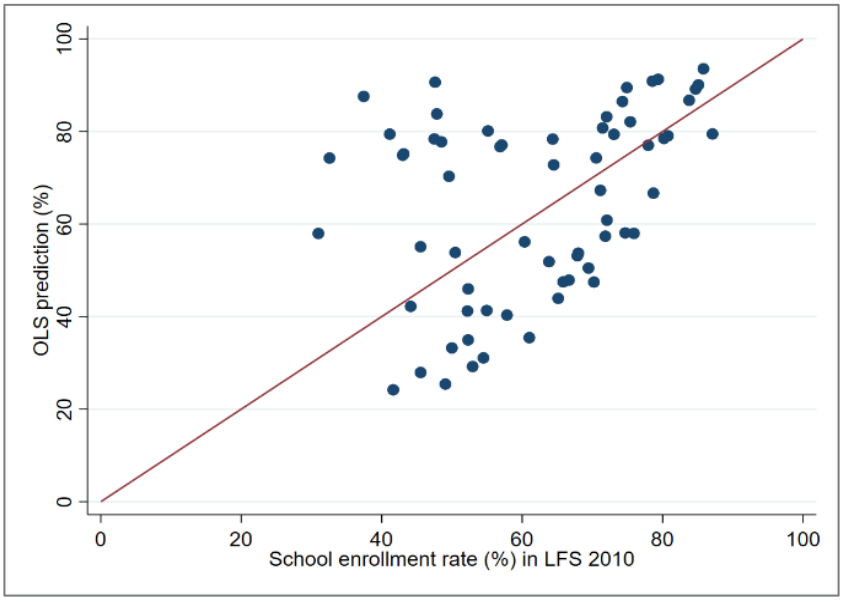
We extract the sub-sample of high-school-age individuals for whom information on parents is available from LFS 2010. Before using this sub-sample to predict the income effect, we test the fit of OLS by comparing the prediction with reality. In Figure 8, we apply the estimated model and the threshold, then calculate the province-level school enrolment rate. In Figure 8a, we compare the prediction with the estimated school enrolment rate in the sub-sample. The R-squared is 96%, indicating that the real school enrolment rate explains 96% of the variation in the predicted rate. In Figure 8b, we compare the prediction with the estimated school enrolment rate in LFS 2010. The R-squared is 91%.

Figure 8: School Enrolment Rates (%): Prediction vs. Reality

(a)



(b)

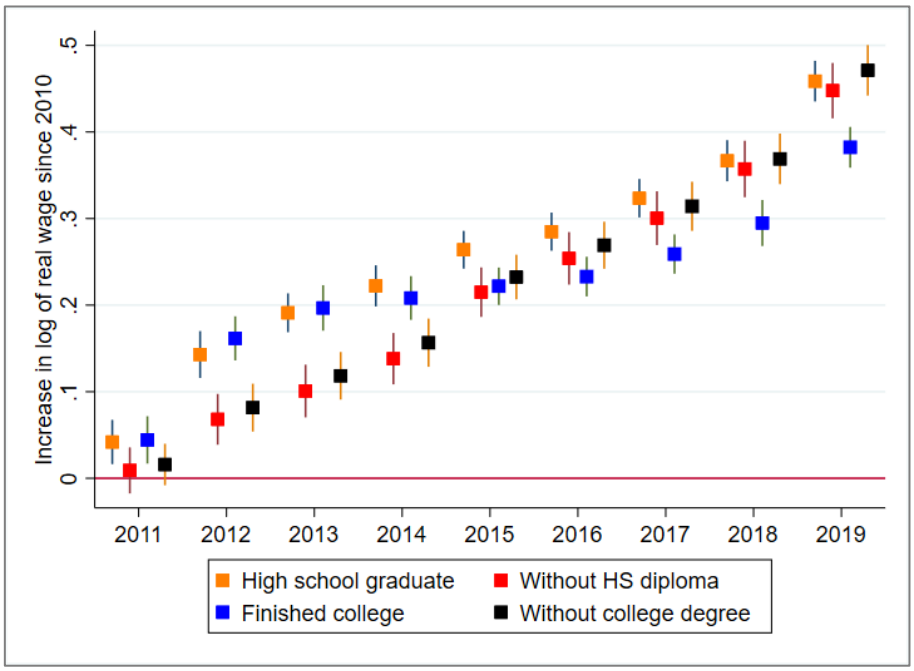


Note: We apply the estimated model in Column (4) of Table 1 and the threshold $c = 0.7$ on a sample of high-school-age individuals whose parents' information is available. We compare the school enrolment rate in prediction and reality of this sample in Figure 8a. We then compare the predicted rate to the school enrolment rate in LFS 2010 in Figure 8b.
Source: Authors' calculation from Vietnam Household Living Standards Survey 2010 and LFS 2010.

The last step is calculating growth in the real wage and the subsequent change in school enrolment rates. Using LFS, we calculate the average monthly income of wage

workers by skill level and adjust for inflation using the CPI. Figure 9 shows the change in real wage since 2010 for two definitions of skill level. One is whether a worker has a high school diploma, and the other is whether they have a college degree. Each implies a different calculation of the income effect. For instance, with the former definition, we separate income from workers who finished high school and workers who did not. As LFS provides earnings growth for each type of labour, we predict future earnings and the school enrolment rate under this new income. We conduct the same process with the second definition of high-skilled labour.

Figure 9: Change of Real Wage since 2010

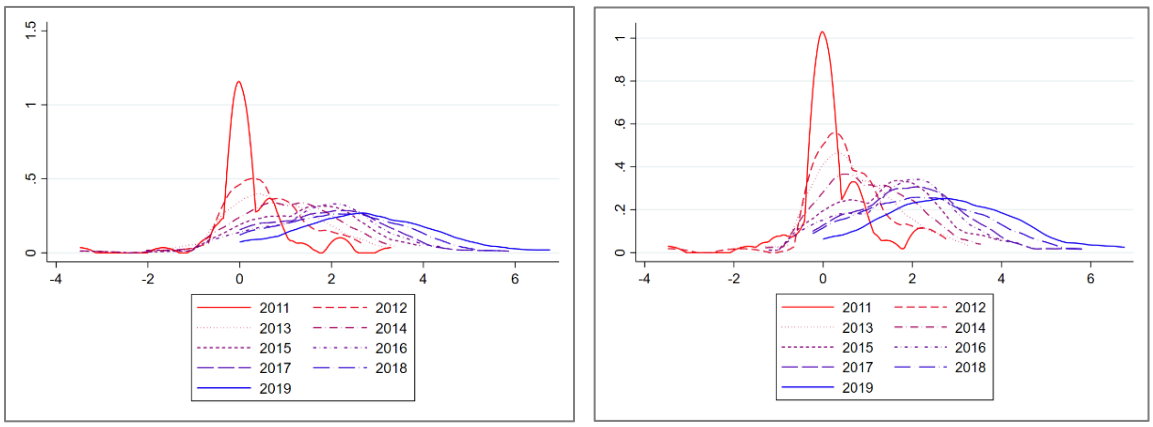


Note: We use to adjust the monthly wage from LFS to the level of 2010. For each group of workers, we use the event study approach to estimate the change in real wages at the provincial level. The group of college graduates is a subset of high school graduates. The group without HS diplomas is a subset of those without college degrees.
Source: Authors' calculation from Labour Force Surveys 2010–2019.

Figure 10 plots the kernel density of the income effect on school enrolment. The distribution of the income effect has shifted right from 2011 to 2019. Some provinces show a negative income effect, especially in 2011–12, years in which inflation was high and GDP growth was reduced by the global financial crisis. The CPI increased by 18.7% in 2011 and by 9.2% in 2012.

Figure 10: Kernel Density Plots of the Income Effect on School Enrolment Rate

(a) (b)



Note: We estimate the income effect with two definitions of high-skilled labour. In Figure 10a, we define high-skilled workers as high school graduates. In Figure 10b, we define high-skilled workers as college graduates.
Source: Authors' calculation from the LFS 2010–2019.

4.3.2. Demographic Change

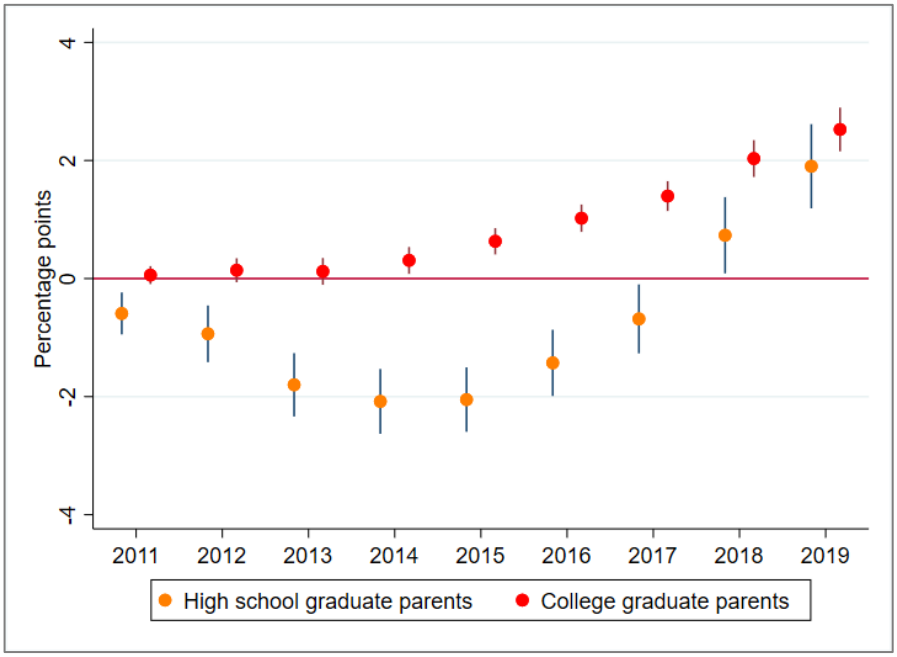
Using the 2009 Census of Population and Housing, we estimate the change in the numbers of high-skilled parents with 2010 as the base year. We use the 2009 Census for this as it contains better information than other available datasets. For this approach to work, we make two assumptions. First, we assume that parents' education ceases after having children. This assumption is likely to hold both due to age at parenthood and because the incentives and opportunities for acquiring additional education are very weak. The only minor exception is government workers, for whom a higher degree may bring promotion opportunities. Second, we assume that parents do not move after having children. This assumption is likely to hold for all but a small minority of households, since moving with children involves a significant cost.[6]

Figure 11 plots trends in the share of high school age teenagers with high-skilled parents since 2010 using an event study approach. As already noted, we use two skill definitions based on high school graduates and college graduates. The share of individuals with high school graduate parents declined from 2010 until 2014 and 2015. However, the total change was small: the share fell by just two percentage points in

[6] Coxhead, Cuong, and Vu (2019) reported that the modal age of internal migrants in 2012 was 21, and the mean age was 23.

2010–2015 from an initial value of 25.04%. On the other hand, the average share of teenagers with college graduate parents increased from 3.69% to 6.16%.

Figure 11: Change in the Share (%) of Teenagers with High-skilled Parents since 2010

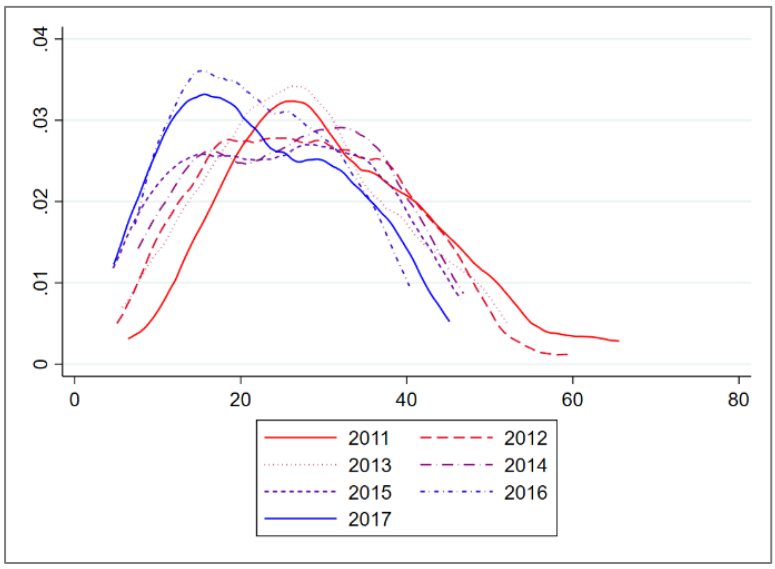


Note: We use an event study approach. We calculate the share at the provincial level from a 15% sample of the 2009 Census of Population and Housing. The standard errors are HAC.
Source: Authors' calculation from the 2009 Census of Population and Housing.

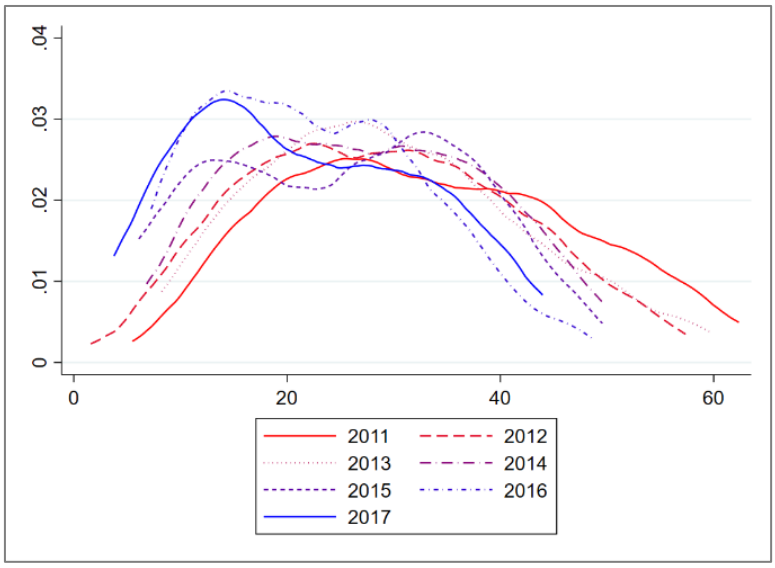
The second component is the gap in school enrolment rate between students with high- and low-skilled parents, $\hat{y}(w_{hpt}, x_{pt}) - \hat{y}(w_{lpt}, x_{pt})$. We calculate the gap directly from Population Surveys because it does not depend on household income and skill premium in other periods. Figure 12 shows the difference in the high school enrolment rate of high-school-age teenagers with high-skilled parents and without. In Figure 12a, the kernel density plot moves to the right from 2011 to 2017 as the enrolment rates of teenagers without high school graduate parents catch up with their peers. Figure 12b shows the similar trends but with the college diploma definition of high-skilled parents.

Figure 12. Difference in School Enrolment Rate by Parents' Skill Level

(a) Parents with HS diploma vs. without



(b) Parent with college degree vs. without



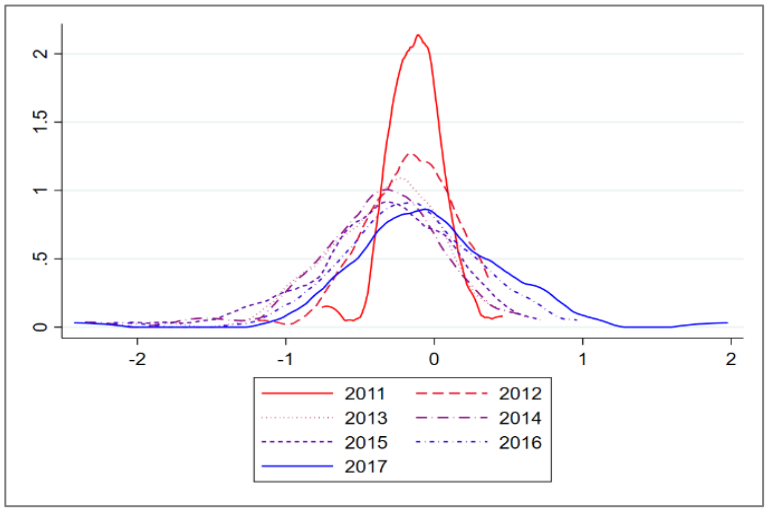
Note: We use the Population Surveys to calculate the high school enrolment rate of teenagers with high- and low-skilled parents at the provincial level.
Source: Authors' calculation from the Population Surveys 2012–2018.

With both components in hand, we can calculate the change in school enrolment due to demographic change. We plot the kernel density in Figure 13. In panel (a), we define a high-skilled labourer as a high school graduate. Since individuals with high-skilled parents always have a higher school enrolment rate than those without, the sign

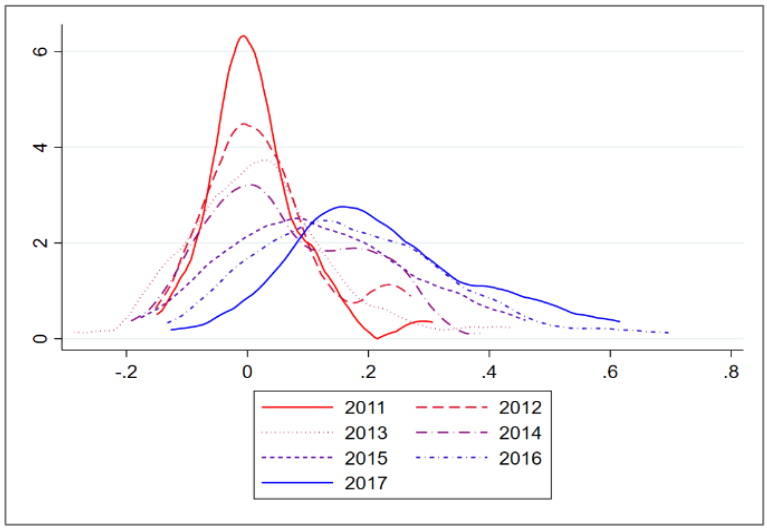
of the demographic effect $\hat{E}_{3pt}$ depends on the change in the fraction of high-skilled parents. Hanoi, Ho Chi Minh city, and the Mekong delta consistently experienced an increase in school enrolment rate from 2010 to 2017 as parents became more educated. In panel (b) we use the college graduate definition of skills. Since the fraction of parents that finished college increased from 2010 to 2019, the associated change in school enrolment rate is mostly positive.

Figure 13: Kernel Density of the Demographic Effect on School Enrolment Rate.

(a)



(b)



Note: We use two different definitions of high-skilled labour. Figure 13a uses a high school diploma as the threshold for being high-skilled labour. Figure 13b uses a college degree.
Source: Authors' calculation from the Population Surveys 2012–2018 and the 2009 Census of Population and Housing.

4.3.3. Skill Premium and School Enrolment

Table 3 shows two sets of estimation results of the school enrolment-skill premium relationship with different definitions of high-skilled workers. In Columns (1) and (2), high-skilled workers are high school graduates. Both the estimated skill premium parameters are positive but insignificant, suggesting that upper-secondary enrolments do not significantly respond to the change in the skill premium of high school graduates. In Columns (3) and (4), we define high-skilled workers as college graduates. Before accounting for the income growth and demographic change, the result in Column (3) shows a significant inverse relationship between school enrolment and skill premium. This result contradicts theory since a lower skill premium signals a higher opportunity cost and lowers school enrolment. However, we expect this result because of the bias coming from income growth and demographic changes. After controlling for these, we show in Column (4) that school enrolment rate increases by 0.02 percentage points for every percentage point increase in skill premium. Over the period 2010–2019, high school enrolments rose by 9 percentage points while the college skill premium declined by 12 percentage points. Over the same period, our estimates show that income growth raised enrolments by 2.5–3 percentage points. The effect of a lower skill premium was to reduce this growth by 0.24 percentage points, or about $1/10^{th}$ of the gain attributable to income growth. Put more simply, the declining skill premium mean that about one child in every ten did not go on to upper secondary education. Though not directly comparable, this figure resembles the Atkin (2016)'s finding that for every 25 new jobs created in Mexican *maquiladoras*, one additional child elected not to continue to upper-secondary school from 9^{th} grade.

Table 3: Skill Premium and High School Enrolment Rate, 2010–2017

	Defining High-skilled Worker as			
	High School Graduate		College Graduate	
	(1)	(2)	(3)	(4)
Skill premium	0.009	0.002	–0.035***	0.020**
	(0.013)	(0.012)	(0.011)	(0.010)
Estimated income effect		1.169***		1.275***
		(0.171)		(0.201)
Estimated demographic effect		0.382		8.111***
		(0.574)		(1.379)
Province FE	Yes	Yes	Yes	Yes
Observations	504	504	504	504

HAC standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Source: Authors' calculation from Labour Force Surveys 2010–2017, Statistical yearbook 2010–2017, Population Survey 2012–2018, 2009 Census of Population and Housing.

Finally, the lack of any influence on enrolment rates from the 12th grade skill premium is consistent with with widely held view that that in Viet Nam, high school does not have much value other than as a prerequisite to tertiary education. During the period covered by our data, the national high school curriculum was focused almost exclusively on academic subjects, which have no direct application other than preparation for the university entrance exam. On the other hand, middle school graduates could work legally.

A limitation of our estimation method is not accounting for the dynamic relationship between school enrolment and skill premium. A higher skill premium should increase school enrolments. Consequently, a high skill premium would increase the supply of high-skilled workers in the future and thus reduce the skill premium, other things equal. Assuming that the skill premium declines over time due to the expansion of low-skilled industries, the dynamic relationship between skill premium and school enrolment might further exaggerate this decline. Therefore, our estimates in the linear model underestimate the impact of the skill premium on high school enrolment rate.

5. Conclusions

A very large question in Viet Nam concerns the effects of trade and FDI on incentives for education. Globally, empirical studies produce ambiguous results on this relationship. Income effects are always positive, but substitution effects – that is, the

effects of skill premium changes induced by FDI inflows – are unclear. International data indicate that specialisation in labour-intensive activities has a depressing effect on educational investments (Blanchard and Olney, 2017), consistent with neoclassical theory. If this is the case in Viet Nam, then from a policy perspective there is a tension between greater reliance on global markets and the accumulation of a domestic stock of human capital in support of long-run economic dynamism.

In the period covered by our study, event studies show that in Viet Nam, school enrolments increased even though low-skill wages, the opportunity cost of attending school, also rose. We find that increased enrolments are due to household income growth and increased educational attainment by parents. After controlling for these, we find that the high school enrolment rate responds strongly to the skill premium of college graduates, but that the 12-grade premium has no statistical influence. The decline in Viet Nam's skill premium is most likely due to increased relative demand for blue-collar workers, and this in turn has shaved off about one-tenth of the schooling gain attributable to income growth.

These results have two implications. First, the school enrolment rate does react to the change in skill premium, as theory predicts. Educational policy in Viet Nam, which focuses solely on the supply of education, might want to devote more attention to the demand side. Second, the school enrolment rate does not respond to the high school graduates' skill premium but that of college graduates, which is consistent with the fact that current high school curricula are mostly oriented toward preparation for the university entrance exam. Since only a small fraction of upper-secondary graduates enter tertiary education, and since a large fraction of teenagers choose to terminate schooling between the 9^{th} and 11^{th} grades, this is a waste of resources. It suggests the need for upper-secondary curriculum reform, to better equip those high school students who will *not* continue to tertiary levels with skills that will make them more productive in the labour market.

References

Amiti, M. and L. Cameron (2012), 'Trade Liberalization and the Wage Skill Premium: Evidence from Indonesia', *Journal of International Economics*, 87(2), pp.277–87.

Asada, H. (2020), 'Effects of Foreign Direct Investment and Trade on Labor Productivity Growth in Vietnam', *Journal of Risk and Financial Management*, 13, doi:10.3390/jrfm13090204

Asian Development Bank (2020), Viet Nam: Secondary Education Sector Assessment, Strategy and Road Map. Manila: ADB.

Asian Productivity Organization (website)

Athreya, K. and J. Eberly (2021), 'Risk, the College Premium, and Aggregate Human Capital Investment.' *American Economic Journal: Macroeconomics*, 13(2), pp.168–213.

Atkin, D. (2016), 'Endogenous Skill Acquisition and Export Manufacturing in Mexico', *American Economic Review*, 106(8), pp.2046–85.

Atkin, D. (2016), 'Endogenous Skill Acquisition and Export Manufacturing in Mexico', *American Economic Review*, 106(8), pp.2046–85.

Buera, F.J., J.P. Kaboski, R. Rogerson, and J.I. Vizcaino (2020), 'Skill-biased Structural Change', *Review of Economic Studies,* 89(2), pp.592–625.

Coxhead, I.; N.V. Cuong, and L. H. Vu (2019), 'Internal Migration in Vietnam, 2000–2012', in A.Y.C. Liu and X. Meng (eds), *Rural–Urban Migration in Vietnam,* Springer, pp. 67–96.

Coxhead, I. and D. Phan (2013), 'Princelings and Paupers: State Employment and the Distribution of Human Capital Investments among Vietnamese Households', *Asian Development Review*, 30(2), pp.26–48.

Coxhead, I. and R. Shrestha (2017), 'Globalization and School-work Choices in an Emerging Economy: Vietnam', *Asian Economic Papers*, 16(2), pp.1–18.

Coxhead, I., N. Vuong, and P. Nguyen (2021), 'Getting to Grade 10 in Vietnam: Challenges from Deprivation, Discrimination, and a Booming Job Market', *ERIA Working Paper Series*, No. 359 (revised).

Dang, H.A. and P.W. Glewwe (2018), 'Well Begun, but Aiming Higher: A Review of Vietnam's Education Trends in the Past 20 Years and Emerging Challenges', *Journal of Development Studies*, 54(7), pp.1171–95.

Demombynes, G. and M. Testaverde (2017), Employment Structure and Returns to Skill in Vietnam: Estimates using the Labor Force Survey. Washington, DC: World Bank.

Doan, T., Q. Le, and T.Q. Tran (2018), Lost in Transition? Declining Returns to Education in Vietnam. *European Journal of Development Research*, 30, pp.195–216. https://doi.org/10.1057/s41287-017-0080-9

Doan, T. and J. Gibson (2012), 'Return to Education in Vietnam during the Recent Transformation', *International Journal of Education Economics and Development*, 3(4), pp.314–29.

Edmonds, E.V. and N. Pavcnik (2005), The effect of trade liberalization on child labor. *Journal of International Economics*, 65(2), pp.401–19.

Edmonds, E.V., Pavcnik, N. and Topalova, P., 2010. Trade adjustment and human capital investments: Evidence from Indian tariff reform. *American Economic Journal: Applied Economics*, 2(4), pp.42–75.

Estevadeordal, A., and A.M. Taylor, 2013. Is the Washington Consensus dead? Growth, openness, and the great liberalization, 1970s–2000s. *Rev. Econ. Stat*. 95(5), pp.1669–90.

Freeman, E.A. and G.G. Moisen (2008), 'A Comparison of the Performance of Threshold Criteria for Binary Classification in Terms of Predicted Prevalence and Kappa', *Ecological Modelling*, 217(1), pp.48–58.

Goldberg, P.K. and N. Pavcnik (2007), 'Distributional Effects of Globalization in Developing Countries', *Journal of Economic Literature*, XLV, pp.39–82.

Goldberg, P.K., A.K. Khandelwal, N. Pavcnik, and P. Topalova (2010), 'Imported Intermediate Goods and Domestic Product Growth: Evidence from India', *Quarterly Journal of Economics*, 125(4), pp.1727–67.

ILSSA–ILO (2018), *Labor and Social Trends in Vietnam, 2012–2017*.

Kuka, E., N. Shenhav, and K. Shih (2020), 'Do Human Capital Decisions Respond to the Returns to Education? Evidence from DACA', *American Economic Journal: Economic Policy*, 12(1), pp.293–324.

Li, B. (2018), 'Export Expansion, Skill Acquisition and Industry Specialization: Evidence from China', *Journal of International Economics*, 114, pp.346–61.

Matsuda, K. (2020), 'Optimal Timing of College Subsidies: Enrollment, Graduation, and the Skill Premium', *European Economic Review*, 129, pp.103549.

McCaig, B., and N. Pavcnik (2018), 'Export Markets and Labor Allocation in a Poor Country', *American Economic Review*, 108(7), pp.1899–1941.

McGuinness, S., E. Kelly, T.T. Pham, T.T.T. Ha, and A. Whelan (2021), 'Returns to Education in Vietnam: A Changing Landscape', *World Development*, 138. https://doi.org/10.1016/j.worlddev.2020.105205.

Moretti, E. (2010), 'Local Multipliers', *American Economic Review: Papers and Proceedings*, 100(2), pp.373–77.

Orazem, P. and E. King (2007), 'Schooling in Developing Countries: The Role of Supply, Demand and Government Policy', *Handbook of Development Economics,* 4, pp.3475–559.

Oster, E. and B.M. Steinberg (2013), 'Do IT Service Centers Promote School Enrollment?', Evidence from India', *Journal of Development Economics*, 104, pp.123–35.

Oster, E. and B.M. Steinberg (2013), 'Do IT Service Centers Promote School Enrollment? Evidence from India', *Journal of Development Economics*, 104, pp.23–135.

Patrinos, H.A., V.T. Pham, and T.D. Nguyen (2018), 'The Economic Case for Education in Vietnam', *World Bank Policy Research Working Papers*, No. 8679.

Phan, D. and I. Coxhead (2013), 'Long-run Costs of Piecemeal Reform: Wage Inequality and Returns to Education in Vietnam', *Journal of Comparative Economics*, 41(4), pp.1106–22.

Robertson, R., D. Kokas, D. Cardozo, and G. Lopez-Acevedo (2020), Short and Long-Run Labor Market Effects of Developing Country Exports: Evidence from Bangladesh. World Bank Policy Research Working Papers No. 9176.

Thang, T.T., T.H.S. Pham, and B.R. Barnes (2016), 'Spatial Spillover Effects from Foreign Direct Investment in Vietnam', *Journal of Development Studies* 52(10), pp.1431–45.

Tinh, D. and T. Q. Tran (2018), 'Lost in Transition? Declining Returns to Education in Vietnam', *European Journal of Development Research*, 30, pp.195–216.

Toews, G. and P.-L. Vézina (2020), 'Resource Discoveries, FDI Bonanzas, and Local Multipliers: Evidence from Mozambique', *Review of Economics and Statistics,* 104(5), pp. 1046–58.

Vu, K., N.D.T. Vuong, T. Vu-Thanh, and A.N. Nguyen (2022), 'Income Shock and Food Insecurity Prediction Vietnam under the Pandemic', *World Development*, 153, 105838.

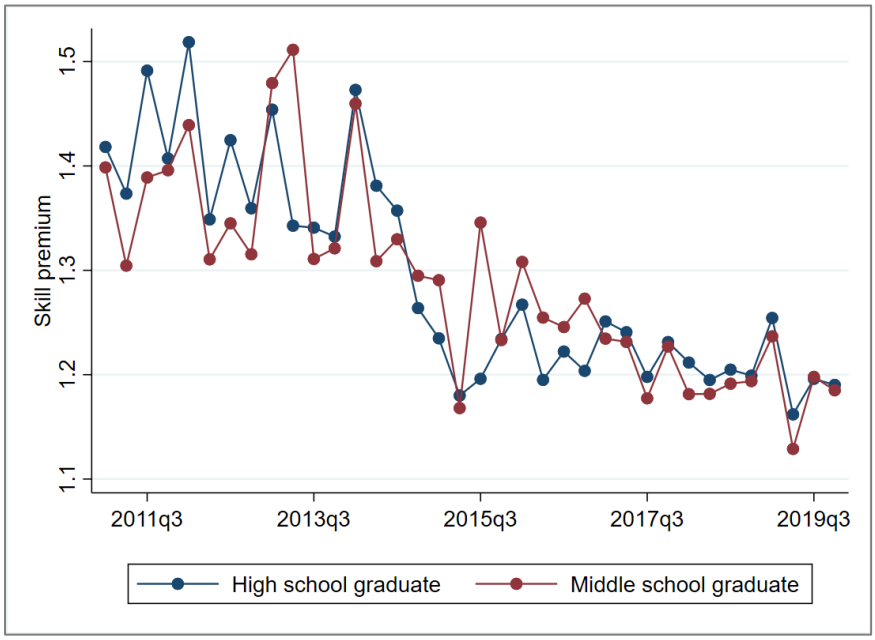
Vu, T.M. and H. Yamada (2020), 'Convergence of Public and Private Enterprise Wages in a Transition Economy: Evidence from a Distributional Decomposition in Vietnam, 2002–2014', *Economic Systems*, 44(1), pp.100737.

World Bank (2020), *Taking Stock August 2022: Educate to Grow*, Washington, DC: World Bank.

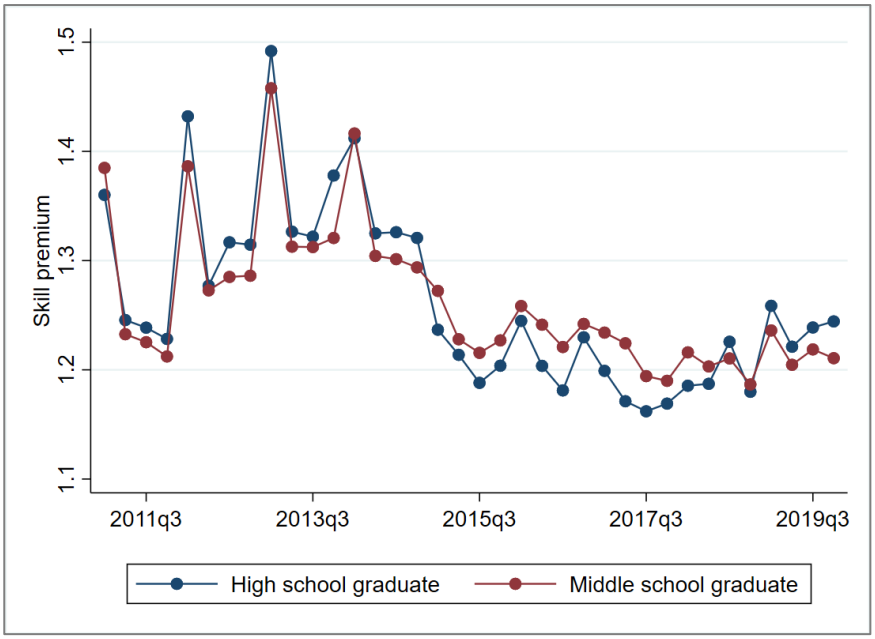
World Bank (2020), *World Development Report 2020: Trading for Development in the Age of Global Value Chains*. Washington, DC: World Bank.

Appendix: Quarterly Skill Premium Data

(a) Manufacturing Wages



(b) Service Wages



Data source: LFS.

ERIA Discussion Paper Series

No.	Author(s)	Title	Year
2023-02 (No. 474)	Ha Thi Thanh DOAN, Kunhyui KIM and Mahdi GHODSHI	Divergence in Non-Tariff Measures and the Quality of Traded Products	May 2023
2023-01 (No. 473)	Dionisius A. NARJOKO	Foreign Direct Investment, Agglomeration, and Production Networks in Indonesian Manufacturing	May 2023
2022-43 (No. 472)	Peter WARR and Huy Quynh NGUYEN	Productivity Effects of Viet Nam's Rice Land Restrictions	March 2023
2022-42 (No. 471)	Yuki HIGUCHI, Vu Hoang NAM, and Tetsushi SONOBE	Do Management Interventions Last? Evidence from Vietnamese SMEs	March 2023
2022-41 (No. 470)	Huong-Giang PHAM, Tuong-Anh T. NGUYEN, and Hoang-Nam VU	Adoption of Sustainable Practices for Improving Agricultural Productivity in Viet Nam	March 2023
2022-40 (No. 469)	Quang Hoan TRUONG and Van Chung DONG	Impacts of FDI Presence and Product Sophistication on the Demand for Skilled and Unskilled Labour: Evidence from SMEs in Viet Nam	March 2023
2022-39 (No. 468)	Araba SEY	Availability of Gender-Disaggregated Data on the ASEAN Digital Economy	January 2023
2022-38 (No. 467)	Yose R. DAMURI and Deni FRIAWAN	RCEP and Indonesia: Economic Reform and Prospects for Implementation	January 2023
2022-37 (No. 466)	Lurong CHEN	The Indo-Pacific Partnership and Digital Trade Rule Setting: Policy Proposals	December 2022
2022-36 (No. 465)	Araba SEY	Gender Security and Safety in the ASEAN Digital Economy	December 2022
2022-35 (No. 464)	Araba SEY and Sara KINGSLEY	Women and Leadership in the ASEAN Digital Economy: Mapping the Rhetorical Landscape	December 2022
2022-34 (No. 463)	Upalat KORWATANASAKUL and Tran Thi HUE	Global Value Chain Participation and Labour Productivity in Manufacturing Firms in Viet Nam: Firm-Level Panel Analysis	October 2022
2022-33 (No. 462)	Fusanori IWASAKI and Keita OIKAWA	The Role of the Economic Research Institute for ASEAN and East Asia (ERIA) in Promoting the Regional Comprehensive Economic Partnership (RCEP)	October 2022
2022-32 (No. 461)	Mie OBA	Japan and the Regional Comprehensive Economic Partnership (RCEP)	October 2022
2022-31 (No. 460)	Chandra T. PUTRA	Global Value Chain Indicators: A Survey and Application to RCEP	October 2022
2022-30 (No. 459)	Cassey LEE	Economic and Technical Cooperation in the Regional Comprehensive Economic Partnership: Focus Areas and Support for Small and Medium-sized Enterprises	October 2022

ERIA discussion papers from previous years can be found at:
http://www.eria.org/publications/category/discussion-papers