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Globalization and school-work choices in an emerging economy: Vietnam¹

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Abstract

This paper examines the effect of increased access to industrial jobs on educational attainment using data from the 2009 Vietnam Census of Population and Housing. Vietnam's accession to the WTO, concluded in 2006, was the signal for a fourfold increase in foreign direct investment, primarily by firms seeking low-cost blue-collar labor for assembly and light manufacturing. We find that the district-level intensity of jobs in foreign-invested firms has a significant negative association with the likelihood that teenagers will be recorded as being in school, for urban males and females and (to a lesser extent) for rural females. High dropout rates in the hinterlands of booming industrial areas like Ho Chi Minh City are due in part to relatively easy access to industrial labor markets that offer almost no premium for learning acquired in high school. The decision to enter the labor force before completing high school will likely have long-term implications for the individuals themselves, and for aggregate economic growth since competitiveness in the global economy depends on sustained increases in labor productivity.

Key words: Human capital, schooling, globalization, Vietnam

JEL Classification: I25, F63, 015

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1. Introduction

Globalization is a process that can be defined as “the integration of economic activities, across borders, through markets” (Wolf 2004:15). Globalization in product markets is dominated by trade liberalization. This has the potential to bring about dramatic changes in a country’s internal terms of trade and resource allocation, typically raising relative prices and activity levels in sectors in which a country has comparative advantage and lowering them in other tradable sectors. Globalization in factor markets is dominated by increases in foreign investment and the cross-border movement of labor, each of which alters the net resource endowments available for domestic production. Product and factor market trends are correlated: new investment flows faster into sectors displaying comparative advantage. As a result, their expansion is due both to supply response and to the Rybczynski effects of factor endowment growth.

In developing Asian economies, labor is usually the beneficiary of globalization because many of the sectors that expand and receive new investment are labor-intensive. Globalization is not a zero-sum game: there is net new job creation, and unless the supply of labor is highly elastic, real wages rise.

Globalization’s implications for returns to skills are less clear. Some of the industries that contract as trade becomes more open are skill-intensive, such as producers of import substitutes whose tariff protection falls. Expansion in other industries creates some new skilled jobs. The net change in skilled labor demand – and thus in the premium for more educated relative to less educated workers – could take either sign.² In the longer run, of course, secular GDP growth raises the skill premium because the demand for many skill-intensive services such as banking, insurance, finance, health care and more, is highly income-elastic. In an initially poor economy, however, income effects might become dominant only many years after the onset of globalization-related structural change.

Perhaps as the result of these conflicting trends in demand for labor and skills, globalization in labor-abundant low and middle-income countries – which in many instances begins in earnest

² This change will also depend on technology, specifically the degree of capital-skill complementarity (CSC) in expanding and contracting industries. The evidence on CSC in developing economies is nowhere near as conclusive as in advanced ones (Lian 2015).

only after 1990 (Estevadeordal and Taylor 2013) – is not unambiguously associated with definitive increases in measures of educational attainment. A higher rate of unskilled job arrivals raises the opportunity cost of schooling, while returns to additional education years or credentials may rise or fall. Among today's middle-income economies, the absence of a definitive increase in schooling incentives is a striking contrast to earlier experience in advanced economies and even to the first generation of East Asian industrializers- Japan, South Korea and Taiwan.

Structural changes in the market for labor and skills are part of the fabric of macroeconomic change, and also have microeconomic impacts on household and individuals. Underinvestment in education, even as a transitional phenomenon, may create a cohort of workers who, as the economy matures and the least skill-intensive industries contract, will encounter severe challenges to maintaining or increasing their earning power. These workers may enjoy real wage growth but their lifetime real earnings profiles will be flatter (and probably diminish sooner) than for workers with higher educational attainment. The macroeconomy will also experience diminished growth potential due to the intertemporal misallocation of labor between work and skills acquisition. Bottlenecks in the supply of skills may drive emerging economies into a middle-income growth trap (Eichengreen et al. 2013). Finally, as education is the key to social mobility, an economy in which educational investments and attainment are not rewarded is one at risk of rising and persistent inequality (Yi et al. 2012; Coxhead and Phan 2013).

In this paper we examine links between changing job market opportunities and educational attainment using data from Vietnam, a rapidly globalizing and growing economy in Southeast Asia. Using a probit model of school attendance, we find that individuals aged 15-19 are less likely to be in school in districts that have greater concentration of employment in foreign-invested firms, which represent the penetration of globalization in the district. Furthermore, we find evidence of an important link between the school-work choice and internal migration. The tension between schooling and unskilled work is strongest in urban areas and for females.

The remainder of this paper proceeds as follows. In section 2 we present a brief survey of the Vietnamese economy, and in section 3 we review models and empirical findings from comparable developing-country cases. In section 4 we describe our data, estimation strategy and results, and in section 5 we draw some conclusions and identify avenues for future research.

2. Globalization, labor and schooling in Vietnam

Vietnam's export-oriented manufacturing sector has boomed in the past two decades, and continues to attract new capital. Each new greenfield investment generates many more additional jobs in a variety of domestic industries from construction to personal services. These industries have two important features in common: they are located in just a few cities and industrial zones, and they offer relatively high wages but a very flat wage/skill profile, meaning that the expected returns to additional schooling, measured in terms of wages or opportunities for promotion, are low. Are booming opportunities in the low-skill wage-labor market causing Vietnamese adolescents to attenuate schooling?

In Vietnam, most new employment opportunities are found in cities or their hinterlands. Since the majority of the population lives outside these areas, migration for work is increasingly common. According to census data, internal migration rates have approximately doubled each decade since the beginning of economic liberalization and reform in the late 1980s, from about 2% in 1989, to 4% in 1999 and over 8% in 2009 (Phan and Coxhead 2010; GSO 2009). Over this time farm employment has stagnated in absolute terms, and as a result has fallen sharply as a share of Vietnam's labor force, from over 50% in the 1980s to about 20% today. Migration destinations are highly concentrated: 63% of all interprovincial migrants in 2004-09 moved to or within the four-province of Ho Chi Minh City metropolitan area, and another 20% moved to one of the other three large urban areas, Hanoi, Da Nang and Can Tho (GSO 2009 and Figure 1). Migration rates are far higher for young people than for the population as a whole (Figure 2).

Figure 1 Regional migration patterns in Vietnam

Figure 2 Age distribution of internal migrants

Source: computed from VHLSS 2012

These migration patterns reflect the regionally concentrated nature of Vietnam's economic growth, where, as noted, the vast majority of new jobs created are in just a few of the country's 63 provinces (Figure 3). Most new jobs have been in small or medium manufacturing enterprises, in foreign-invested light manufacturing and assembly, or in sectors, such as construction and personal services, whose growth is driven by manufacturing expansion.

Figure 4 The growth of foreign employment in Vietnam. Source: General Statistics Office (gso.gov.vn)

Figure 5 Proportion of 20-40 year olds employed in foreign-owned firms by district in 2009. Source: Census 2009

Few of the new jobs being created are demanding of formal skills, and employers rarely insist on formal educational credentials. More skill-intensive sectors (heavy industry, infrastructure and transportation, energy generation, mining, banking, insurance and finance – sectors still dominated by state-owned enterprises) or those (such as jobs in public administration or government services, like education) for which a formal higher educational credential is required or expected, have grown much less quickly. Moreover, job rationing by state-owned firms and government has created a segmented market for skills, in which job-seekers with special access through family ties obtain skilled jobs while the majority are excluded. This in turn has created a dualistic wage premium, with high returns to schooling in state and government sectors, and generally very low returns elsewhere (Phan and Coxhead 2013). Thus for many young Vietnamese, the expected returns to upper-secondary and post-secondary schooling are quite low, given low likelihood of obtaining a job that will reward such investments.³

Over 94% of Vietnamese children complete primary school, but the middle school completion rate is just 76%, and only 46% complete high school. These rates are considerably lower for poor households and in rural areas. There is also considerable variation by geographic region. Some of the lowest middle and high school completion rates in the country are observed in the Mekong River Delta region, the agricultural hinterland of the Ho Chi Minh City metropolitan area.

³ Mincer equations fitted to Vietnamese earnings data for workers *of all ages* reveal significant wage premia for high school attainment. However, the same models fitted only to data for younger workers (up to 40 years old) show no statistically significant premium between for high school over middle school credentials. See figures 8 and 9. Estimation details available from the authors.

The 2009 census also reveals that areas that host foreign-owned enterprises have a flatter age-education profile. In Figure 6, the fraction of individuals aged 18 and above with lower secondary education or less is much higher in provinces with low penetration of foreign-owned firms. In provinces that host a high proportion of foreign-invested employment, younger individuals are not more highly educated than older cohorts.

Figure 6 Age-education profiles by districts with different rates of employment in foreign-invested firms.
Source: Calculation from 2009 Census.

Part of this effect is driven by migration: there is a clear link between labor force participation and internal movement.⁴ As seen in Figure 2, young people form the largest cohort of internal migrants in Vietnam, and this group migrates with much higher frequency than do other age groups (GSO 2011). High dropout rates in the rural hinterlands of rapidly-growing urban areas

⁴ According to the 2009 Census, school attendance rates of children aged 11-18 are the lowest among interprovincial migrants. Only 44% of interprovincial migrants aged 11-18 are attending school, against 64% of intradistrict migrants, 71% of interdistrict migrants, and 75% of nonmigrants (GSO 2011, fig. 2.24). Of course, there could be many reasons for lower school attendance by migrant children, but another study using microdata, the Urban Poverty Survey conducted in Hanoi and Ho Chi Minh City in 2012, found labor force participation rates (LFPRs) for migrant children that are far higher than for children who are registered city residents. For 10-14 year old children, urban residents had a LFPR close to zero, while that for migrants was found to be over 30%. For 15-19 year old youths, residents' LFPR was about 11% while that for migrants was over 60% (UPS 2014). Migrant LFPRs are also higher in all other age groups, but for 20-55 year old groups the differences are very small.

may be due in part to relatively easy access to metropolitan labor markets. However, the hinterland regions are not so close to where jobs are being created that teenagers can combine participation in the industrial labor force with continued schooling. They must migrate in order to work, and this disrupts or terminates their education (UPS 2014). If opportunity cost is really driving dropout rates, then Vietnam's rural teenagers face the same "learn or earn" dilemma seen during Thailand's economic boom of the 1990s (Booth, 2003), and also in contemporary rural China (Yi et al., 2012).

The urban-rural divide, while coarse, captures the essence of variation in schooling and employment rates for young Vietnamese. Table 1 shows the school and labor force status of 15-19 year olds as reported in the 2009 census. The school attendance rate for this group as a whole is slightly less than 70 percent for urban males and females, and about 50 percent in rural areas. Five to eight percent of this age group are neither attending school nor in the labor force. The remainder, however, are either working or seeking work. This proportion of 15-19 year olds ranges from 22.5 percent for urban females to 46.6 percent for rural males.

Table 1: Activities of 15-19 year olds

	Male Urban	Male Rural	Female Urban	Female Rural
Attending	0.681	0.485	0.696	0.518
Not attending, not in labor force	0.074	0.048	0.080	0.066
Unemployed (in labor force)	0.015	0.008	0.010	0.006
Employed	0.229	0.458	0.215	0.410

Source: Calculations from 2009 Census

The distribution of employed 15-19 year olds by ownership of the firm also reveals an interesting pattern. The rate of foreign employment is much higher among females than males. About 17 percent of urban females and 8 percent of rural females are employed in foreign-invested firms. This compares to 5 percent and 2 percent for urban and rural males.

Table 2: Employment of 15-19 year olds by ownership

	Male Urban	Male Rural	Female Urban	Female Rural
Individual	0.035	0.012	0.060	0.014
Household	0.735	0.907	0.531	0.815
Collective	0.003	0.001	0.003	0.001
Private	0.141	0.046	0.201	0.073
State	0.033	0.008	0.034	0.011
Foreign investment	0.052	0.024	0.170	0.084
Unknown	0.001	0.001	0.002	0.001

Source: Calculations from Census 2009

3. Globalization, migration and school dropouts: literature

The history of now-wealthy economies suggests that growth and improvements in educational attainment are correlated. The reasoning behind this synergistic dynamic is easy to intuit, and has been enshrined in a number of theoretical models (Findlay and Kierzkowski 1983; Harris and Robertson 2013). Yet data from contemporary developing economies reveal widely divergent rates of increase in educational attainment. In 2010, the populations of six Southeast Asian countries including Indonesia, Thailand and Vietnam had average years of schooling lower than those reached in South Korea and Taiwan in 1980, and China was barely ahead (Phan and Coxhead 2015). It may be that Vietnam is simply undergoing the same transition experienced by other globalizing economies at similar levels of income. The nature and duration of the transition is important, however, because if human capital is the key to social mobility then during the transition through middle income, one (or perhaps more) generations of young workers face a difficult choice between joining the low-skill industrial labor force at an early age, or staying on at school in the hope that additional years of education will pay off in the future.

Several developing-country studies have displayed similar evidence of high opportunity costs of schooling during export booms. Federman and Levine (2012) used district-level Indonesian data during a period of rapid industrialization, 1985-95, and found “a modestly positive correlation” between industrial job growth and school enrollment by adolescents. However the causal channels remain unclear; as the authors wrote, “what remains to be understood is what drives the relationship” (p.28). In Mexico, Atkin (2012) used municipal-level data and found that a higher

arrival rate of export manufacturing jobs was associated with increased local dropout rates among children of middle-school age.

The above studies focus on local job arrival and local labor markets, but in typical export booms job creation is concentrated around ports, cities and other infrastructure, giving rise to internal migration. China's labor-intensive manufacturing boom has been associated with persistently high middle school dropout rates among adolescents in rural communities, especially where migration and factory employment are linked (Yi et al., 2012). In Nepal, growth of urban employment opportunities was found to drive down children's total employment hours but to increase the share of market-related employment (Fafchamps and Wabha 2006).

In the longer run, rising incomes increase the propensity for households to withhold their children's labor from the market in favor of schooling (Edmonds 2005; Fafchamps and Wahba 2006). However, the preference for children's schooling is strongly influenced by parental education, so this is a process that may build only *across* generations rather than *within* them.

4. Model, data and estimation

Standard models of schooling choice specify that each additional year or level of schooling generates an expectation of higher income in the future, but incurs costs in terms both of direct schooling expenses and the opportunity cost of forgone earnings. Other things equal, a child should acquire education up to the point at which the marginal costs of additional schooling are just equal to its marginal expected benefits (Becker 1964). Higher costs, including wage offers from the labor market, should reduce the optimal time spent at school while higher expected benefits should increase it.

Empirical studies make it clear that for children in many households, the option of continuing in school is constrained by circumstances. Location, parental education, household income, ethnicity, and sex of the child, among other factors, are all frequently found to be important constraints. Thus, a reasonable model of persistence in school can be written in its most simple form as $H = f(W, P, X)$, where H is the probability of a given schooling outcome, W is a measure of opportunity cost, P is a measure of the earnings premium associated with continuing in school, and X is a set of individual, household and community characteristics that constrain

the school-work decision. Optimizing behavior leads us to expect $\partial H/\partial W < 0$, and $\partial H/\partial P > 0$ once constraints have been taken into account.

An additional complication specific to Vietnam is that the economy has undergone a major transition since the mid-1990s, with large changes in the structure and skill-intensity of employment, especially outside of government or state enterprises. Most notably among a raft of reforms since the late 1980s, a new Enterprise Law (2000) created a legal basis for domestic firms with hired workers, and a revised Law on Investment greatly facilitated entry by foreign investors. In the same year Vietnam signed a bilateral trade agreement with the United States. This move sparked large FDI inflows, especially those directed at industries producing light manufactures such as garments and footwear for the US market, which very soon thereafter became Vietnam's largest export destination. Workers who entered the Vietnamese labor force before these reforms took effect faced different employment opportunities, and may well have, or at least be perceived to have, qualitatively different lifetime earnings paths. The experience of older workers may appear to a prospective new worker as of little relevance.

Finally, the model just sketched makes no explicit allowance for variation in individual aptitude or motivation for schooling (Eckstein and Wolpin 1999). These traits are typically not directly observable. On aptitude, a large literature has been devoted to the search for proxies (Currie 2009; Almond and Currie 2011). Our data lack any widely accepted proxies, such as childhood health or adult height (Case and Paxson 2006).⁵

Despite its compactness and relatively small size, Vietnam is diverse in a variety of ways. Poverty is most severe, and most highly concentrated, in relatively remote areas of the country, especially the mountainous zones of the far north and central Vietnam (Figure 6). Outmigration rates are highest in intermediate areas, especially the north-central coast region and the Mekong River delta (Figure 7). Though far from wealthy, neither region is extremely poor by national standards.

⁵ The best available measure is a child's age relative to the expected age for her school grade. Children much older than the norm for their grade may have entered school later or been held back at an earlier grade. Incorporating this information in estimation is the subject of ongoing work.

Figure 6 and Figure 7

Regional variation in schooling is illustrated in Figures 6 and 7. These figures use selected regions to highlight structural differences, rather than presenting complete regional data. Figure 6 shows net enrollment rates by age for the nation as a whole and for the Mekong River Delta (MRD) and North-Central Coast (NCC) regions. Although similar in many other respects, these two regions display strong contrasts in enrolment rates at almost every age. Only in primary school (ages 6-11) do enrollment rates seem similar. Children in the MRD region start school later, and drop out sooner and in much larger numbers than their counterparts in the NCC region. Figure 8 underlines this by presenting net enrollment rates relative to the national average. The MRD region has a large "enrollment gap", beginning at age 12 and continuing through the end of formal education. By contrast, the NCC region has a positive gap, and that in the Red River Delta region, Hanoi's hinterland, is larger still. These regional contrasts beg the question of whether there is anything inherent in location that influences school persistence.

Figure 8

Figure 9

In order to assess the impact of globalization on school-work choice in Vietnam, we use data from the 2009 census to examine the effect of district-level employment rate in foreign firms on the likelihood of attending school for individuals aged 15-19. As seen in Table 2, foreign firms are not the dominant employers of young workers; however, job creation by foreign firms is arguably a very strong indicator of rapid economic growth, and expansion of jobs in foreign-owned firms is matched by corresponding employment growth in construction and many other service industries. For this reason we choose the intensity of employment by foreign-owned firms as an indicator of opportunity cost for school-aged adolescents.

We run the estimation separately for males and females, and for urban and rural areas. The main dependent variable of interest is school attendance status. The dependent variable is a dummy that takes the value 1 if the individual is attending school. In our sample, the attendance rate is in the eighties up to age 14, but drops quite sharply at higher ages. By age 18, only 60% of urban individuals and 34% of rural individuals are reported as in school (Table 2).

Table 2: School attendance rate by age for different samples

	Male Urban	Male Rural	Female Urban	Female Rural
Age 11	0.963	0.944	0.973	0.947
Age 12	0.951	0.918	0.955	0.917
Age 13	0.917	0.874	0.934	0.887
Age 14	0.880	0.820	0.905	0.849
Age 15	0.814	0.697	0.838	0.734
Age 16	0.746	0.595	0.771	0.651
Age 17	0.714	0.534	0.740	0.601
Age 18	0.596	0.336	0.616	0.348
Age 19	0.558	0.204	0.574	0.195
Observations	246590	921814	243704	869521

Source: Census 2009

Since the left-hand side variable is a dummy, we use a probit model. Standard errors are clustered at the district level. The explanatory variable of interest is the district-level foreign employment rate, defined as the fraction of individuals aged 20-40 who reported working for a foreign-owned firm. This variable is intended to capture local labor market conditions faced by individuals, and in particular to serve as a measure of exposure to globalization. As discussed earlier, a greater availability of low-skill intensive employment opportunities presents a lucrative alternative to continued schooling. We interact this variable with an indicator for each age between 16 to 19, with age 15 as the base group, in order to assess age-specific effect.

To account for supply side factors, the regression also controls for pre-existing educational attainment in the district. This is constructed as the proportion of 20-40 year olds with less than secondary education. In the average district, 82% of 20-40 year olds have less than secondary education, but values range as high as 97%. In an alternative specification, we control for highest education of an adult household member to account of household-level determinants of education. All specifications also control for province fixed effects so as to analyze within-province impacts.

Table 4 shows the results of the probit regression, and Table 5 shows corresponding marginal effects by age. Each column in the tables represents a different sample: urban males, rural males, urban females, and rural females. The results indicate a strong negative impact of foreign employment on likelihood of school attendance for males and females in urban areas. For urban

males, the results show a U-shaped effect, with the strongest (negative) effect on 17 year olds. For this age group, a one percent increase in the district-level foreign employment rate lowers the probability of school attendance by 2.9 percentage points. This effect is even larger for urban females, with a marginal effect of 4.8 percentage points for 17 year olds. The larger effect on females is explained by the greater concentration of 15-19 year old females on foreign-owned enterprises.

The marginal effects are insignificant for rural males but not so for rural females. Moreover, the effects on rural females are economically significant. For ages 15 and higher, the marginal effect of increased FDI jobs on female school participation in rural districts ranges between 10-25% of that in urban areas. The highest ratios are for ages 16-18, suggesting a high propensity for dropout from upper secondary education.

Table 3: Results from probit regression of school attendance

	Male (1) Urban	(2) Rural	Female (3) Urban	(4) Rural
Prop. for emp in dist	-1.727*** (0.479)	0.151 (0.223)	-2.793*** (0.511)	-0.566* (0.320)
Age 16	-0.241*** (0.0129)	-0.296*** (0.00688)	-0.209*** (0.0138)	-0.253*** (0.00674)
Age 17	-0.344*** (0.0135)	-0.468*** (0.00772)	-0.316*** (0.0151)	-0.401*** (0.00781)
Age 18	-0.806*** (0.0222)	-0.965*** (0.0111)	-0.813*** (0.0270)	-1.037*** (0.0125)
Age 19	-0.995*** (0.0377)	-1.414*** (0.0214)	-1.012*** (0.0433)	-1.574*** (0.0240)
Age 16 X Prop. for emp in dist	-0.372** (0.180)	-0.0244 (0.129)	-0.749*** (0.207)	-0.288** (0.136)
Age 17 X Prop. for emp in dist	-0.737*** (0.189)	-0.159 (0.132)	-1.047*** (0.189)	-0.515*** (0.119)
Age 18 X Prop. for emp in dist	0.537* (0.322)	-0.377** (0.164)	-0.168 (0.269)	-0.794*** (0.194)
Age 19 X Prop. for emp in dist	1.061** (0.444)	0.120 (0.231)	0.449 (0.351)	-0.0968 (0.286)
Prop. low educ in dist	-2.180*** (0.535)	-3.020*** (0.303)	-2.913*** (0.577)	-4.695*** (0.350)
Constant	3.396*** (0.419)	3.307*** (0.207)	4.054*** (0.460)	4.773*** (0.245)
Prov dummies	Yes	Yes	Yes	Yes
Observations	171090	581810	173124	548170

Standard errors in parentheses are clustered at the district level. * $p < .1$, ** $p < .05$, *** $p < .01$

Table 4: Marginal effect of a percent change in district foreign employment on probability of school attendance

	Male (1) Urban	(2) Rural	Female (3) Urban	(4) Rural
Age 15	-0.0155*** (0.00449)	0.000971 (0.00142)	-0.0262*** (0.00519)	-0.00370* (0.00217)
Age 16	-0.0232*** (0.00608)	0.000934 (0.00191)	-0.0412*** (0.00663)	-0.00658** (0.00266)
Age 17	-0.0292*** (0.00621)	-0.0000593 (0.00215)	-0.0478*** (0.00673)	-0.00882*** (0.00292)
Age 18	-0.0160** (0.00698)	-0.00165 (0.00190)	-0.0425*** (0.00633)	-0.0106*** (0.00218)
Age 19	-0.00917 (0.00811)	0.00166 (0.00183)	-0.0346*** (0.00693)	-0.00414* (0.00216)
Observations	171090	581810	173124	548170

Standard errors in parentheses. * $p < .1$, ** $p < .05$, *** $p < .01$

Table 6 shows the results after controlling for categories of highest education of an adult household member.⁶ Controlling for household education reduces some magnitudes, but the qualitative results remain the same.

Table 5: Marginal effect of a percent change in district foreign employment on probability of school attendance, added household education control

	Male (1) Urban	(2) Rural	Female (3) Urban	(4) Rural
Prop. for emp in dist				
Age 15	-0.00665** (0.00263)	0.00105 (0.00121)	-0.0157*** (0.00342)	-0.00275 (0.00176)
Age 16	-0.0113*** (0.00388)	0.00129 (0.00167)	-0.0257*** (0.00455)	-0.00467** (0.00215)
Age 17	-0.0163*** (0.00409)	0.0000898 (0.00194)	-0.0316*** (0.00453)	-0.00671*** (0.00243)
Age 18	-0.00929** (0.00380)	-0.00225 (0.00157)	-0.0283*** (0.00396)	-0.00941*** (0.00163)
Age 19	-0.00186 (0.00453)	0.000679 (0.00134)	-0.0185*** (0.00405)	-0.00396*** (0.00144)
Observations	163776	575703	162100	540769

Standard errors in parentheses. * $p < .1$, ** $p < .05$, *** $p < .01$

⁶ Only marginal effects are reported. Regression results are available upon request.

5. Robustness checks

There is some concern that the results might be driven by some other factors that are correlated with the rate of employment in foreign-invested firms. Since we cannot completely rule out endogeneity concerns, we perform some robustness checks to test the extent of the issue.

Younger individuals' education choices should not be effected by growth of employment opportunities. Therefore, we run the estimation on individuals aged 11-14 in urban areas, where the effect of foreign employment boom seems to be concentrated. Table 7 below reports the marginal impacts on individuals aged 11-14. The results show minimal impact. Even though the results are statistically significant, the magnitudes are quite small. Therefore, we argue that the results are not completely driven by education supply-side factors such as availability of schooling. It is still possible that other education demand factors – such as other sources of opportunity cost – might be driving some of these results.

Table 6 Marginal effect of a percent change in district foreign employment on probability of school attendance, aged 11-14

	(1) Urban Male	(2) Urban Female
Age 11	-0.00517*** (0.00196)	-0.00206 (0.00146)
Age 12	-0.00252 (0.00210)	-0.00343** (0.00167)
Age 13	-0.00649** (0.00269)	-0.00542** (0.00265)
Age 14	-0.00526 (0.00395)	-0.00851** (0.00365)
Observations	115620	109710

Standard errors in parentheses * $p < .1$, ** $p < .05$, *** $p < .01$

We also conduct robustness checks with a sample of 15-19 year olds from the 1999 census. We run the same specification on this sample to check whether we find similar effect as with the 2009 sample. If the results are driven by other district-specific time-invariant factors that are correlated with both intensity of employment in foreign-owned firms and schooling attendance, then we should find similar impacts on this sample.

The results are reported in Table 8 below. For males, the marginal impact of foreign employment intensity in a district statistically and economically insignificant for the 1999 sample in both rural and urban areas. For urban females, the results show negative marginal effects. However, the

magnitudes of the marginal impacts are far smaller—about half of those found in the 2009 sample (Table 5). Moreover, the effects on rural females are insignificant in the 1999 sample. This suggests that with the possible exception of urban females, time-invariant unobserved district factors are not driving our main findings.

Were there time-varying district level factors that simultaneously increased employment in foreign-owned firms and reduced demand for schooling? Although there is no direct evidence, it seems unlikely that district characteristics that attract foreign firms also discourage schooling other than through the labor market channel. Foreign investment requires provision of adequate infrastructure, for example, which should actually improve likelihood of schooling.

Table 7: Marginal effect of a percent change in district foreign employment on probability of school attendance, 1999 sample

	Male		Female	
	(1) Urban	(2) Rural	(3) Urban	(4) Rural
Age=15	-0.00455 (0.00447)	0.000716 (0.00145)	-0.00702 (0.00472)	0.00306* (0.00170)
Age=16	-0.00680 (0.00512)	0.000168 (0.00151)	-0.0131** (0.00588)	0.00135 (0.00186)
Age=17	-0.00898* (0.00526)	0.00143 (0.00169)	-0.0225*** (0.00634)	0.000926 (0.00192)
Age=18	-0.00777 (0.00733)	-0.00125 (0.00163)	-0.0249*** (0.00567)	-0.00197 (0.00155)
Age=19	-0.00466 (0.00942)	-0.000133 (0.00160)	-0.0208*** (0.00595)	-0.000340 (0.00135)
Observations	306898	1013970	313416	978293

Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

While the results reported here appear robust, they must still be regarded as tentative, as there may be alternative or supplementary explanations for observed patterns in the data. One of these, for example, concerns intra-household optimization over labor supply. Some children may truncate their own education in order to support their families in some way, for example by working and remitting their earnings to finance the education of siblings. A complete accounting for the schooling decision, like that of migration itself, should properly incorporate measures of the motivation to provide such support through remittances. This would require an integrated model of the kind developed by Garip (2012).

5. Discussion and conclusions

In this study we find that among Vietnamese adolescents, the decision to complete middle school (and perhaps more schooling) or to drop out is strongly influenced by labor market signals. In particular, we find that in locations with a greater presence of foreign-invested firms there is a significantly higher probability that a given 18-19 year old will have ended schooling, most often after middle school, and a lower likelihood that he or she will remain in education. A large fraction of adolescents in the labor force in FDI-intensive areas are internal migrants.

The issue of educational attainment and dropout rates has macroeconomic significance in Vietnam because that country, like other regional middle-income economies, now stands at a development crossroads. High-income East Asian countries like Korea and Taiwan are often presented as models of sustained growth accompanied by near-universal high school completion rates. However, their experiences are less obviously relevant to the Vietnamese case, not least because today's emerging economies confront very different national, regional and global economic conditions, with consequences for the viability of industrial progression up the technological and skills ladder. Building human capital is a development target that in today's Vietnam faces much stronger headwinds, yet remains essential if economic growth and poverty alleviation are to be sustained.

Over the long term, disparities in educational decisions also give rise to concerns about income distribution. Children from poorer households or those whose parents are themselves poorly educated are more susceptible to opportunity costs and other things equal, will leave school in larger numbers to pursue unskilled employment. The intergenerational effect on education, and thus on economic and social mobility, is highly persistent.

What can be done to prevent teenagers from dropping out? Clearly, supply-side reforms and expenditures (more schools, better schools, more and better teachers) are part of the solution. Bringing schools closer to students has an impact on school attendance. But a large and expanding literature based on conditional cash transfers and other interventions indicates that supply-side interventions are costly and not especially effective (Alatas 2011; Baird et al., 2013)—at least not in isolation. Edmonds (2005) shows the potential for income effects to change households' propensity to keep children (especially girls) in school. Perhaps the direct approach in Vietnam is to find ways to reinforce behaviors associated with higher income levels,

through some combination of direct interventions, demonstration effects and appeals to the greater good. To be effective, these interventions will need to be designed and targeted by community and region.

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