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Young Lives
An International Study of Childhood Poverty

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Abstract

This paper examines whether Vietnamese schools are providing children with the education that is needed by an industrialising middle-income country. International comparisons show that, despite Vietnam's generous spending on education, the country's school enrolments and attainments are relatively low compared to its competitors in east and south-east Asia. The 2007 Labour Force Survey is used to examine the qualifications that new labour market entrants need to obtain skilled employment, and to investigate the returns to different levels of education. The results suggest that there is currently not a strong demand in manufacturing for workers with either professional or tertiary education. Labour market entrants with post-secondary qualifications earn manufacturing wages that are, on average, only 40 to 50 per cent higher than workers with primary education. This is consistent with the relatively routine nature of most jobs in manufacturing, which has focused on products which can be produced by assembly line workers with limited schooling. Finally, Rounds 2 and 3 of the Young Lives data are used to investigate which children are being left behind by the education system. A small but significant group of children who are failing to complete lower secondary school, and are therefore very unlikely to gain wage employment in the manufacturing or government sectors, is identified.

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About Young Lives

Young Lives is an international study of childhood poverty, following the lives of 12,000 children in 4 countries (Ethiopia, India, Peru and Vietnam) over 15 years. **www.younglives.org.uk**

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1. Introduction

Vietnam has recently become a lower middle-income country and aspires to be a 'largely modern industrialised' country by the year 2020 and a member of the OECD by 2050 (MPI 2010). Vietnam's rapidly industrialising and urbanising economy poses significant challenges for its education system, which has some of the shortest formal school hours and lowest teacher–class ratios in Asia (World Bank 2010). The education system also tends to focus on the development of cognitive rather than non-cognitive skills, which has led to concerns that Vietnamese students lack the critical thinking and 'soft' skills necessary for high-technology, skill-intensive industries (*Thanh Nien News* 2009; Luong 2010; *Viet Nam News* 1 March 2011). As has been observed in other countries, a key challenge for Vietnam is that the adoption of new technologies may cause the demand for well-educated workers to outstrip their supply, resulting in lower growth and rising levels of wage inequality (Goldin and Katz 2010).

This paper seeks to examine whether Vietnam's education system is providing its children with the education that will be needed by an industrialised upper middle-income country in 2020. In particular, attention is paid to manufacturing, as low-value manufacturing has boomed in Vietnam during the last decade, and the Government seeks to move into medium- to high-value manufacturing over the next decade. After a brief discussion of the country context/Vietnamese education system, the paper examines international data to see how Vietnam's educational attainment, expenditure and returns to education compare with those of other Asian countries. In particular, it compares the current situation in Vietnam with those of five neighbouring countries which have succeeded in graduating to lower middle-income (Philippines), upper middle-income (China, Malaysia, Thailand) or high-income (South Korea) status.

Having examined the international context, the paper assesses the mix of qualifications needed by skilled workers, using the 2007 Labour Force Survey.[1] A multinomial logit model is used to identify the qualifications that new labour market entrants require to obtain skilled employment in five broad sectors, and wage regressions are used to examine the returns to different levels of education. Relatively low demand and low returns to education are found in both low- and medium-value manufacturing.

Finally, data from Rounds 2 and 3 of the Young Lives study is analysed to discover which groups of children are being left behind by the education system. Logistic models of drop-out are estimated to determine the socio-economic characteristics of the 19 per cent of children in the Older Cohort who have dropped out of school between Rounds 2 and 3. A small but significant group of children who are failing to graduate from lower secondary school, and are therefore very unlikely to obtain skilled wage employment, is identified.

The paper concludes by summarising the main findings and drawing out their implications for Vietnamese education policy over the next decade.

1 Unfortunately the 2009 Labour Force Survey did not include questions on workers' schooling.

2. Country context and literature review

After China, Vietnam is the fastest-growing economy in east Asia, consistently recording GDP growth rates of 7 to 8 per cent per annum during most of the 1990s and 2000s.[2] Profound changes have taken place in the structure of the economy, with the share of agriculture in GDP falling from 31.8 per cent in 1990 to 17.1 per cent in 2009, while the share of GDP accounted for by industry and construction rose from 25.2 per cent to 41.9 per cent in the same period (GSO 2011). Such structural changes have been accompanied by rapid urbanisation, with the share of the population living in cities and towns rising from 19.4 per cent in 1989 to 23.5 per cent in 1999 and 29.6 per cent in 2009 (GSO 2010). As a consequence of these changes and the Doi Moi economic renovation more generally, poverty has fallen dramatically. Using the poverty line established by the General Statistics Office, the poverty headcount has fallen very rapidly from 58 per cent in 1993 to 14.5 per cent in 2008 while non-income indicators of housing, infrastructure and access to basic services have also improved markedly (VASS 2008).

The Vietnamese Government has consistently given high priority to education in both its strategy documents and budgetary allocations. Official statistics report near-universal enrolment in primary school together with high and rising enrolment at lower and upper secondary school. Vocational, professional and tertiary education are also expanding fast in Vietnam. The draft Strategy for Education and Training seeks to raise the net lower secondary school enrolment rate to 85 per cent and ensure that nearly 44 million workers (approximately 70 per cent of the labour force) have received vocational or professional training by 2020. Concerns are, however, frequently voiced about the quality of education which Vietnamese schools provide, together with the increasing cost of schooling (World Bank 2008; *Viet Nam News* 25 August 2009; *Viet Nam News* 23 August 2010). Many employers argue that Vietnamese students lack the critical thinking and life skills needed by a modernising economy (*Thanh Nien News* 10 March 2009; *Viet Nam News* 1 March 2011).

Vietnamese schools operate on a 5:4:3 basis: five years in primary school, followed by four years in lower secondary school, and three years in upper secondary school (Nguyen 2004). Children start attending school when they are 6 years old, and education is compulsory until the age of 14. After completing lower secondary school, the best pupils go on to 'general' upper secondary (high) schools (*Trung Học Pho Thong*) while others enrol in professional secondary schools (*Trung Học Chuyen Nghiep*) or join the workforce. Competition for places at the best (state) high schools is fierce, with only approximately a quarter of applicants gaining admission to them. After three years in high school, most pupils apply for admission to college (*Cao Dang*) or university (*Dại Học*), although the competition for higher education places is very fierce.[3] In the 2008/9 academic year, there were 223 colleges and 146 universities in Vietnam, with 206,351 and 323,842 students respectively (MOET 2010). Students who do not succeed in gaining admission to a college or university can still apply for

2 Even during the East Asian financial crisis of 1997–8 and the more recent global financial crisis, Vietnam recorded annual GDP growth rates of 4 to 5 per cent.

3 In the 2009/10 academic year, 349,653 students were admitted to university and 244,186 students to (non-vocational) colleges (MOET 2010). This compares to approximately 1.2 million pupils in the last year of high school in 2008/9.

a professional college (*Truong Dại Học Cao Dang Chính Quy*) where, along with graduates of the professional secondary schools, they can study for a technical diploma (which is typically awarded after one to two years study). Many new labour market entrants also attend vocational schools (*Truong Trung Cap Nghe)*, often on a part-time or short-term basis. In the 2008/9 academic year, there were 282 professional colleges and 273 vocational training schools in Vietnam with 251,766 and 389,718 students respectively (MOET 2010).

While the vast majority of academic and professional schools and colleges are state-funded and managed, around a third of universities are non-state (i.e., essentially private) institutions, with the number of non-state universities expected to increase quickly in the near future. This has raised concerns about standards of teaching and the adequacy of facilities in the new universities on the part of employers and the Government (*Thanh Nien News* 11 June 2010).

One feature of the Vietnamese education system which deserves comment is that the responsibility for vocational and professional training is split between two ministries: the Ministry of Labour, Invalids and Social Affairs, which oversees vocational training schools, and the Ministry of Education and Training, which is responsible for professional schools and colleges. While this division of responsibilities provides the basis for distinguishing between vocational and professional training, it has attracted criticism as some of the courses taught in each system are similar (*Saigon Economic Review* 25 July 2011). Furthermore, the General Department of Vocational Training has been moved between the two ministries on three occasions.

To the best of our knowledge, there are no previous studies of how schooling affects wage employment and wage determination in Vietnam using the 2007 Labour Force Survey (which has only recently become available to researchers). However, a number of studies of the determinants of wages and the returns to education have been conducted using the Vietnam Living and Household Living Standards Surveys. These include, inter alia, Gallup (2004), Liu (2006), Pham and Reilly (2007), Doan and Gibson (2010), Oostendorp and Doan (2010), Sakellariou and Fang (2010) and, most recently, Phan and Coxhead (2011). As Phan and Coxhead note, it is difficult to compare the rates of return estimated by these studies because of differences in their methodologies but three stylised facts regarding the Vietnamese labour market do emerge. First, wage levels increased rapidly in Vietnam during the transition to a market economy in the 1990s and early 2000s. This is similar to what happened in China 10 to 15 years earlier (Cai et al. 2008). Second, while rates of return to education in Vietnam have increased, they remain low by international standards, which is again similar to the experiences of China and a number of ex-Soviet-bloc countries.[4] Third, persistent wage differentials due to ethnicity, gender, region, and whether workers are employed in the state or non-state sector exist.

4 For China, see, *inter alia,* Cai et al. (2008) and Knight and Song (2005). For Russia and the former Soviet Union, see, *inter alia*, Brainerd (1998) and Munich and Terrell (2005).

3. Some international comparisons

This section compares Vietnam's educational performance with those of selected countries in east and south-east Asia. It provides some broad comparisons between educational enrolment and attainment using data from the late 2000s, before examining expenditure and changes in the returns to education. Particular attention is focused on neighbouring Asian countries which have graduated to lower middle-income (Philippines), upper middle-income (China, Malaysia and Thailand) or high-income (South Korea) status.

Table 1 provides some key statistics relating to educational attainment and enrolments in Vietnam and selected Asian countries. At 9.1 years, the average number of years of schooling for the adult population (aged 15+) is lower in Vietnam than in all other countries in the table except for Indonesia. The same is true for gross enrolment rates in lower secondary school, where Vietnam again has the second-lowest figure to Indonesia. Gross enrolment rates for upper secondary school are, however, higher than in all countries except South Korea – although it is likely that the Vietnamese rate is inflated by the inclusion of pupils in professional schools.[5] If we apply these rates to the relevant school-age populations, this suggests that there will be almost 1 million new labour market entrants in Vietnam in 2020 who have not completed lower secondary school and another 1.3 million labour market entrants who have not completed upper secondary school.[6]

Table 1. *Selected statistics relating to education in Vietnam and neighbouring countries*

Country	GDP per capita* (current US dollars)	Average years of schooling,* 15+ years	Gross primary school enrolment rate (%)	Gross lower secondary school enrolment rate (%)	Gross upper secondary school enrolment rate (%)
China	3,414	10.8	110.9	93.6	64.8
Indonesia	2,244	8.7	115.5	84.0	56.4
Malaysia	8,212	12.0	–	92.0	50.9
Philippines	1,921	10.0	105.3	88.4	65.2
South Korea	19,162	13.6	103.8	99.3	93.5
Thailand	4,045	10.5	93.3	88.9	61.3
Vietnam	1,049	9.1	104.1	86.2	66.2

Source: UNESCO Data Center, accessed 2 November 2011 except for * EdStata Query, accessed 25 July 2011. All statistics relate to 2008 except for average years of schooling, which are for 2010.

At present, it is not possible to compare Vietnamese pupils' attainment in language, mathematics or other subjects with those of students in other countries, using any of the available international tests. This will only be possible from 2012 onwards, when Vietnam joins PISA, the Programme for International Student Achievement, which focuses on

5 Vietnamese education statistics do not routinely distinguish between academic and professional upper secondary schools.

6 These are only approximate estimates, as gross rather than net enrolment rates have been applied to the relevant school age populations. Unfortunately, there are no reliable estimates of net enrolment rates at the secondary level available for Vietnam and several of the other countries in Table 1.

measuring the ability of 15-year-olds in reading, mathematics and science. Crude comparison of mathematics scores in the four Young Lives countries (Ethiopia, India, Peru and Vietnam) do, however, suggest that 8- and 15-year-olds in Vietnam do considerably better in mathematics (using standardised questions adapted from the Trends in International Mathematics and Sciences Study) than children of the same age in the other three countries (Rolleston and James 2011).

Table 2 shows that the percentage of upper secondary school students enrolled in vocational or technical training in Vietnam is considerably lower than in China, Indonesia, South Korea and Thailand, although comparable to that in Malaysia. This reflects the traditional preference for academic schooling in Vietnam (and Malaysia), where students will usually only enrol in professional high schools if their lower secondary school grades are poor. In contrast, almost a third of Vietnamese tertiary students attend professional courses compared to less than a fifth in Indonesia, less than a sixth in Thailand, and less than a tenth in the Philippines. Nonetheless, professional course attendance at the tertiary level is still relatively low in Vietnam when compared to countries such as China and Malaysia. In these three countries, the high rate of enrolments in tertiary professional courses reflects the limited number of places available in academic degree-level courses, to which only the best students can gain admission.

Table 2. *Enrolment in vocational courses at upper secondary level, and professional and academic courses at tertiary level, in Vietnam and neighbouring countries (%)*

Country	Upper secondary students enrolled in vocational/ technical courses	Tertiary students enrolled in professional courses	Tertiary students enrolled in academic courses
China	42.6	44.6	49.5
Indonesia	37.2	19.7	78.7
Malaysia	15.9	43.3	55.2
Philippines		9.6	90.0
South Korea	25.5	24.1	74.4
Thailand	39.9	15.5	83.8
Vietnam	16.7	33.5	63.4

Source: EdStats, accessed 23 July 2011. All statistics relate to 2008.

Table 3 provides more information on expenditure on education. Vietnam spends a higher percentage of its GDP on public education than any other country in the table apart from high-income South Korea, although this is partly due to Vietnam's relatively low GDP. However, the share of public education expenditure that is devoted to primary education is lower in Vietnam than any other country in the table, in part because of the declining number of primary school-age children in Vietnam in recent years (Vu 2010). In line with the current government target of achieving net enrolment rates of 85 per cent in lower secondary education by 2020, Vietnam also spends considerably more on lower secondary education than Indonesia, the Philippines and South Korea, though Vietnam's spending on upper secondary education is lower than all these countries except the Philippines. Spending on tertiary education, at 22.2 per cent of total public education expenditure, is relatively high in Vietnam, although less than in more wealthy countries such as Malaysia. While comparable cross-country figures on private education expenditure are not available, it is known that in Vietnam the state budget financed 73 per cent of total education expenditure in 2008 (Vu 2010).

Table 3. *Expenditure on education in Vietnam and selected Asian countries, 2008*

Country	Public expenditure on education as % of GDP	% of public education expenditure on			
		Primary	Lower secondary	Upper secondary	Tertiary
China	n/a	–	–	–	–
Indonesia	2.8	50.7	20.6	15.0	11.2
Malaysia	4.1	39.1	–	–	28.1
Philippines	2.8	50.6	19.9	5.6	10.4
South Korea	4.8	30.6	18.7	20.7	13.9
Thailand	3.8	45.1	–	–	21.2
Vietnam	4.3	29.4	24.2	11.5	22.2

Source: EdStats, accessed 25 July 2011. All figures relate to 2008.

It is instructive to compare how the returns to education have changed in Vietnam in comparison with other Asian countries in recent years. Table 4 shows the returns to education taken from a recent cross-country study of industry and skill premiums in east Asia (Di Gropello and Sakellariou 2010). In this study, changes in returns to different educational qualifications were calculated from nationally representative household surveys and are expressed in percentage terms. The estimates for China and Vietnam show very large increases over time, both for workers with upper secondary and tertiary education. Di Gropello and Sakellariou (2010) suggest this was due both to the compression of earning differentials in the early 1990s (when central planning dominated the Vietnamese, and to a lesser extent, the Chinese economy), and an excess demand for skilled workers in more recent years.[7] In contrast to the Philippines and Thailand, where the returns to education increased more modestly because of increases in the supply of educated workers and industry-specific effects, in China and Vietnam rising returns involved most sub-sectors of the economy. This suggests that wages in Vietnam have risen in part because of the transition to market wages, and in part because of the aggregate demand for educated workers exceeding their aggregate supply.

Table 4. *Percentage change in returns to education over time in selected Asian countries*

Country	Years	Change in returns to education over time (%)	
		Upper secondary and above/lower secondary and below	Tertiary/upper secondary and below
China	1999–2005	75.3	34.1
Indonesia	1994–2007	−1.9	−4.7
Philippines	1988–2006	18.5	5.0
Thailand	1990–2004	15.4	17.2
Vietnam	1992–2006	−10 to +41	273.2

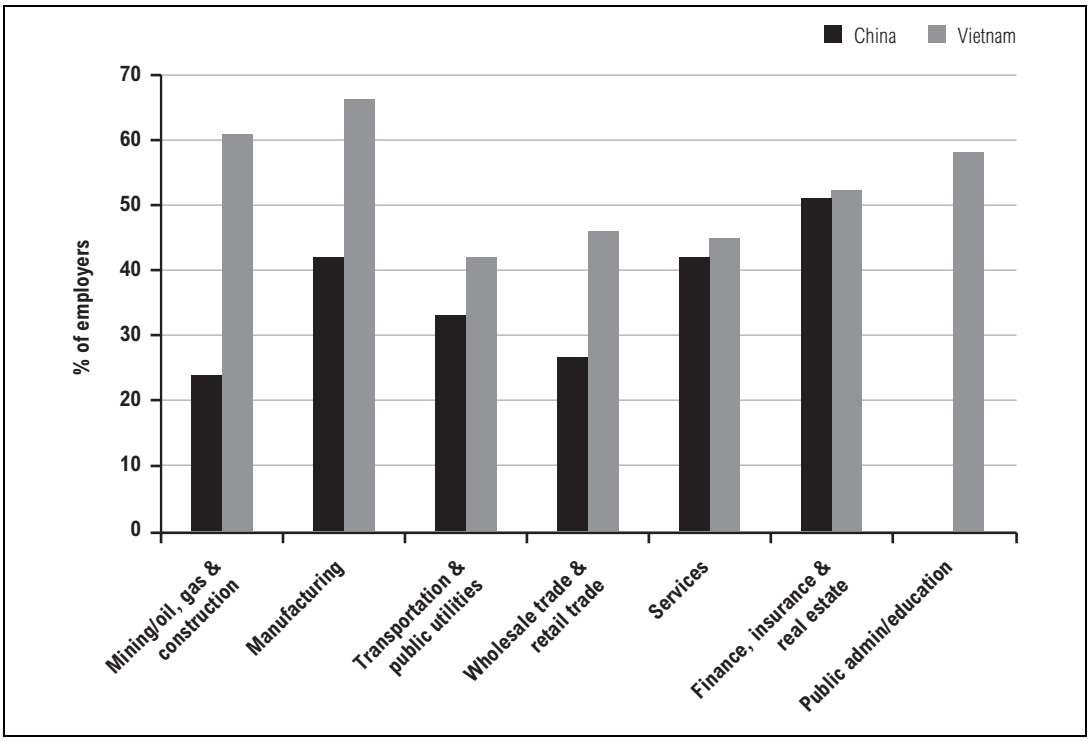
Source: Di Gropello and Sakellariou (2010)

7 In Vietnam, wage compression resulted in negative (−10 per cent) returns to education for high school graduates and barely positive (2.3 per cent) returns for those with tertiary education in 1992. This accounts for the very large percentage change in the final row of Table 4.

A recent paper by Phan and Coxhead (2011) using all available rounds of Vietnam's national household sample survey, supports this view but draws a careful distinction between the state and non-state sectors. It finds that the skill premium (the ratio of wages or workers with higher levels of education to workers who had not completed primary schooling) hardly existed in 1993, but rose quickly during the 1990s before declining slightly during the 2000s for workers with less than college education. However, when the state and non-state sectors are distinguished, Phan and Coxhead find that the skill premium increased most rapidly for workers in the state sector during the 1990s, and it is only during the 2000s that skilled workers in the non-state sector have started to catch up. They explain this unusual pattern of skill premiums in terms of the privileged position of the state sector with respect to trade, access to capital and regulatory treatment.

Further evidence concerning the drivers of wages for skilled workers is provided by a recent Manpower/ILSSA survey of 6,000 enterprises in eight sectors in Vietnam. When these results are compared to those of a similar survey in China (Figure 1), it can be seen that employers in Vietnam face more difficulties in filing job vacancies than their counterparts in China, and that these difficulties are most acute in mining, construction and manufacturing.

Figure 1. *Difficulties in filing job vacancies by sector, China and Vietnam*



Source: ILSSA/Manpower (2011). Reproduced with permission.

Taken together, these international statistics and studies, although fragmented and imperfect, suggest that despite its generous education spending, school enrolment and attainment in Vietnam are low compared to its competitors in east and south-east Asia. Meanwhile, studies of the returns to education show a dramatic rise in the returns to upper secondary schooling and tertiary education during Vietnam's transition to a market economy, although there are some indications that these have slowed down in recent years. The conventional wisdom is therefore that a shortage of skilled workers is emerging in Vietnam which is driving up both wages and skill premiums faster than in neighbouring countries.

Some analysts even argue that this is eroding Vietnam's competitive advantage and that Vietnam is at risk of being caught in the 'middle-income trap' (ILSSA/Manpower 2011; VASS and World Bank 2010; *Viet Nam News* 22 November 2011).

4. Schooling, manufacturing jobs and the returns to education

In this section, we investigate what levels of education and training are required for labour market entrants to gain employment in manufacturing and other sectors, using the 2007 Labour Force Survey. We also investigate the returns to education and training by sector using the same dataset. In so doing, we aim to build up a picture of the mix of education and training that is needed, and to ascertain whether skill shortages are emerging, in Vietnam's manufacturing sector.

The Labour Force Survey, which until recently was conducted biennially in Vietnam, collects data on the employment and labour market outcomes of all household members over 15 years of age (GSO 2008).[8] Of the 361,016 workers surveyed by the 2007 Labour Force Survey, approximately a third (128,454) were wage workers, of whom 93,083 were regarded as skilled and 35,276 as unskilled workers. In our analysis, we focus on labour market entrants defined as workers aged 25 years old or less, of whom there were 28,581 in 2007. The justification for this cut-off is that workers of this age would have entered employment after the passage of the Enterprise Law (QH10/1999/#13), which came into force on 1 January 2000 and marked a turning point in private sector development and associated employment generation in Vietnam, (UNDP 2003).[9]

In addition to unskilled wage employment, we distinguish five broad sectors: agriculture and mining; construction and services; government and administration; low-value manufacturing; and medium-value manufacturing.[10] As shown in Table 5, after unskilled work, skilled workers in agriculture and mining and in low-value manufacturing have the lowest median level of education (corresponding to lower secondary school). Meanwhile workers in government and administration and medium-value manufacturing have the highest median level of education (corresponding to upper secondary school). In addition, more than a third of labour market entrants in government and administration have professional training (defined as possessing a diploma from a professional high school approved the Ministry of Education and Training), compared to less than 15 per cent in medium-value manufacturing. The number of workers with vocational training (defined as possessing a certificate from a vocational training school) in low and medium-value manufacturing is, at just under a fifth, higher than in all other sectors.

8 In order to shorten the length of interviews, the 2009 Labour Force Survey did not ask about workers' completed levels of education, so we have to rely on the older 2007 Labour Force Survey for our analysis in this section. The 2009 Labour Force Survey also had a much smaller sample size (18,025 households).

9 The Enterprise Law simplified business registration practices, eliminated the discretion of local officials and provided a measure of investor protection. It led to a surge of enterprise registrations (USAID 2008).

10 Medium-value manufacturing comprises computers, electronics, machinery, metals, motor vehicles, pharmaceuticals and textiles.

Table 5. *Education and training of labour market entrants by sector, 2007*

Broad sector of employment	Years of education (mean)	Highest level of education (median)	Vocational training (%)	Professional training (%)	Number of observations
Unskilled	7.2	Primary	3.4	1.9	10,248
Agriculture & mining	8.9	Lower secondary	15.8	12.9	671
Construction & services	11.6	Professional training	11.1	21.4	8,706
Government & administration	13.2	Upper secondary	2.6	36.6	1,282
Low-value manufacturing	9.3	Lower secondary	18.9	5.5	5,039
Medium-value manufacturing	10.6	Vocational training	17.0	14.7	2,485
All wage workers	9.4	Lower secondary	10.4	10.4	28,431

Source: Computed from Labour Force Survey, 2007.

To deepen this analysis, we use a multinomial logit model to investigate the effect of the level of completed education on labour market entrants' sector of employment.[11] In this model, we use the five broad sectors shown in Table 5, and set the base level of education as completed primary education (which 22 per cent of labour market entrants in the 2007 Labour Force Survey had). The covariates in the model include workers' age, ethnicity, gender and marital status, the size of their households, and whether or not they live in an urban area (see Appendix 1). The final estimation sample includes 10,242 unskilled wage workers and 18,168 skilled wage workers. So, with 28, 410 observations, our estimation sample is relatively large.[12]

Figure 2 summarises the results of the multinomial logit model in terms of the probabilities of a labour market entrant obtaining employment in manufacturing, using the Labour Force Survey 2007.[13] Full results of the estimation are in Appendix 1. The four quadrants in Figure 2 show how the probability of employment in low- and medium-value manufacturing in rural and urban areas vary according to the education, training and gender of the worker. Several important findings emerge. First, whatever their level of education or training, females are much more likely to work in low-value manufacturing while males are more likely to work in medium-value manufacturing. At all levels of education, women are more than twice as likely as men to be employed in low-value manufacturing. This reflects the large number of young females who are recruited for assembly-line work in the footwear and garment industries in Vietnam. Many of these jobs are known to offer lower wage rates while being associated with longer working hours and to be of a semi-permanent nature (VASS 2009–10). In contrast, men are more likely to be employed in medium-value manufacturing – with this difference being most marked for workers with lower secondary schooling plus vocational training or upper secondary schooling. The apparent preference of firms in medium-value manufacturing for male employees may, in part, be explained by the greater use of heavy machinery in this sector.

11 We prefer the multinomial logit model to the alternative sequential logit model that could be used for this analysis on the grounds on ease of interpretation, even though the former involves the controversial independence of irrelevant alternative assumption. In practice, results from the two models are broadly consistent with one another.

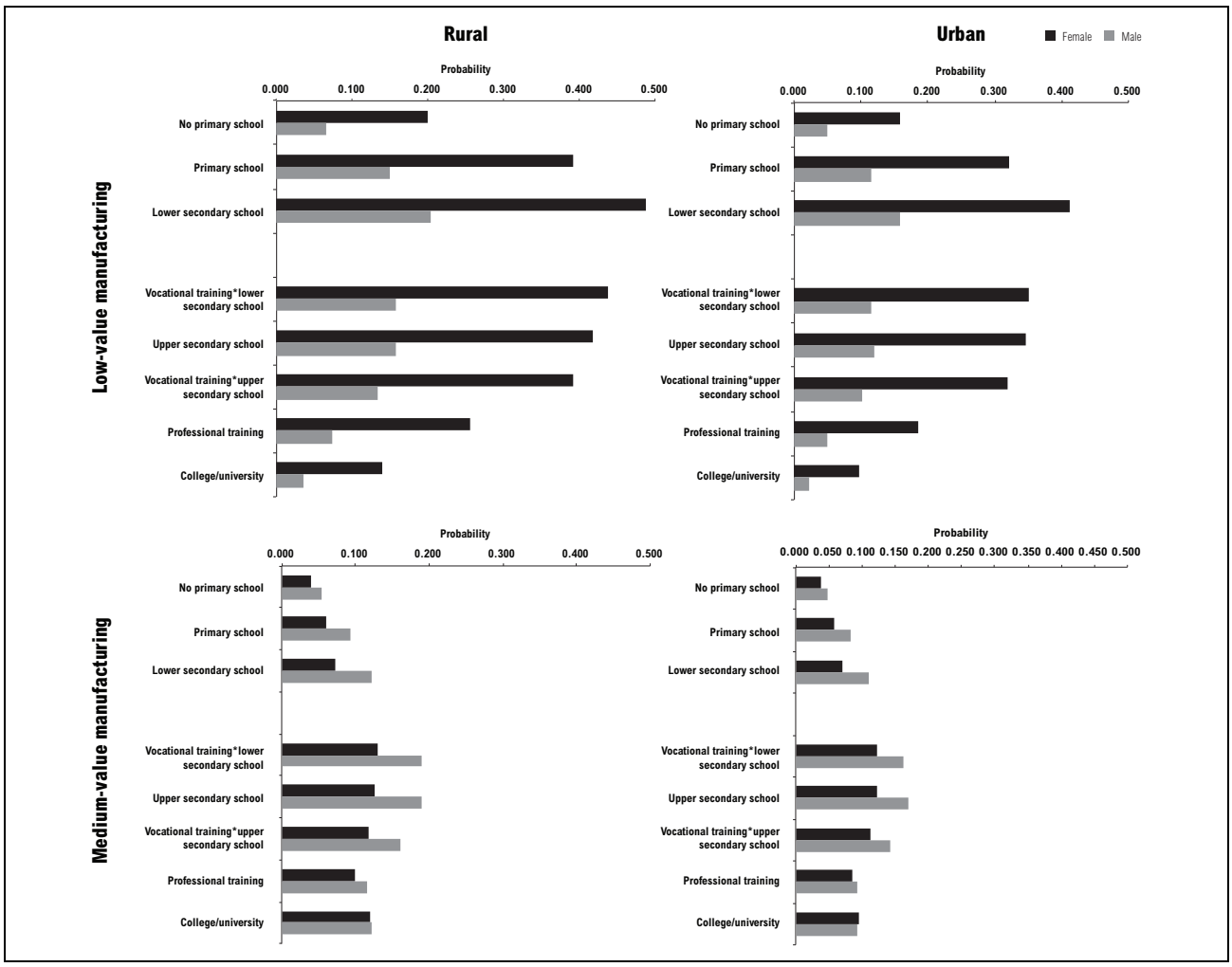
12 Because of incomplete data, 21 workers who are included in Table 5 are not included in the remaining analysis.

13 The underlying probabilities were calculated using the prchange command (Long and Freese 2001) following estimation of the multinomial logit model in Stata.

Second, whether or not a worker resides in a rural or urban area makes little difference to her/his probability of employment in manufacturing. This initially surprising result may be explained by the fact that the majority of manufacturing jobs in Vietnam are located in industrial parks and export zones located outside the major urban areas.[14]

Third, and of most importance to this paper, the top two panels of Figure 2 show that education and training are of relatively limited importance in low-value manufacturing. Labour market entrants with lower secondary schooling (which is the median level of education) have the highest probabilities of being employed in low-value manufacturing, while those with upper secondary schooling are most likely to be employed in medium-value manufacturing. Whether a worker has completed vocational training makes little difference to the probability of employment in low-value manufacturing. However, vocational training matters for medium-value manufacturing, with the probability of employment for workers with lower secondary schooling plus vocational training being almost equal to that of workers with upper secondary schooling. Completing professional training, college or university decreases the probability of employment in both types of manufacturing.

Figure 2. *Probability of employment in manufacturing by education and gender, 2007*



Source: Estimated by the authors from Labour Force Survey, 2007.

14 In early 2008, Vietnam had 154 export processing and industrial zones in 55 localities (Vietnam Economic News 16 January 2008).

Having investigated how education and training influence workers' sector of employment, we now examine the wage premiums associated with different levels of schooling. Table 6 summarises the results of a series of semi-log wage regressions using the Labour Force Survey of 2007 (see Appendix 2 for full results). As in the previous analysis, the sample is labour market entrants (wage workers under 25 years old) and the dependent variable is monthly income including bonuses, overtime and other allowances.[15] A standard Mincerian wage equation is estimated for each sector using two different methods: ordinary least squares (OLS) and a two-stage correction for selection bias. The selectivity correction follows the multinomial framework suggested by Bourguignon et al. (2007), which is described in Appendix 3. The instruments for sector of employment are parental education, the worker's age, marital status, and position in the household plus the size and dependency ratio of his/her household.[16] Parental education is a useful instrument for predicting their children's sector of employment because it partially proxies for 'network' status (Pham and Reilly 2007). Explanatory variables include workers' highest level of education or training, experience, gender, ethnicity, urbanisation and whether or not the worker is employed in the state sector. A standard inverted quadratic on experience (calculated as worker's years in the current employment) is observed.

Table 6. *Summary of wage regressions results*

Highest level of education/training completed	Medium-value manufacturing	Low-value manufacturing	Government & administration	Construction & services	Agriculture & mining
OLS					
No primary school	0.0518	−0.0634*	0.4818**	−0.0116	−0.0176
Lower secondary school	−0.0659**	−0.0075	−0.0578	−0.0008	0.0557
Upper secondary school	0.0747***	0.0491***	0.0959	0.1010***	0.1774**
College/ University	0.5173***	0.4201***	0.7161***	0.4512***	0.3084***
Professional training	0.0978***	0.1273***	0.3509***	0.0915***	−0.0151
Vocational training*lower secondary school	0.2612***	0.0460	1.0580**	0.2326***	0.2123
Vocational training*upper secondary school	0.0541	0.0414	0.1762	0.1447***	0.2122**
Selectivity Correction					
No primary school	0.0965	−0.0558	0.4965**	0.0760*	0.1703
Lower secondary school	−0.1136**	−0.0361	0.0066	−0.0256	−0.0974
Upper secondary school	−0.1218	−0.1082*	0.1268	−0.0268	−0.0461
College/ University	0.0005	−0.0232	−0.0648	−0.2041*	−0.1930
Professional training	−0.2115	−0.1673	−0.2461	−0.3604***	−0.3884
Vocational training*lower secondary school	0.0585	−0.0485	0.4384	−0.1852	−0.4907
Vocational training*upper secondary school	−0.0705	0.0010	−0.0472	−0.1194	−0.5046*

Note: *** p<0.01, ** p<0.05, * p<0.1
Source: Estimated by the authors from Labour Force Survey, 2007.

15 Bonus and other allowances are particularly important in supplementing basic wages.

16 Some 76 per cent of wage workers under 25 years old in the Labour Force Survey 2007 were still living with their parents. For the remaining 24 per cent of workers, we use the head of the household's education as the instrument for workers' sector of employment.

The OLS results show the returns to education in manufacturing are quite modest. Using primary education as the reference group, lower secondary schooling is associated with a small decrease in earnings for new workers in medium value manufacturing, but does not affect earnings significantly in low-value manufacturing or any other sector. Upper secondary school and professional training is associated with earnings that are 5 to 8 per cent higher in the manufacturing and 10 per cent higher in construction and services. When combined with long-term vocational training, lower secondary schooling raises workers' incomes by around a quarter in medium-value manufacturing and in construction and services, and doubles them in government and administration. This is consistent with the slightly higher probability of employment in medium-value manufacturing which workers with lower-secondary schooling plus long-term vocational training had in the multinomial logit model. Workers with college- or university-level education earn incomes which are 40 to 50 per cent higher than those with primary education in low-value and medium manufacturing as well as in construction and services. Furthermore, as Appendix 2 shows, if a worker is female, her earnings are 10 to 20 per cent lower in all sectors except for government and administration (where equal pay legislation tends to have more force). Coming from an ethnic minority is also associated with substantially lower earnings in all sectors except for government and administration, where there are implicit quotas for ethnic minority officials.

When corrections for selectivity are implemented using the multinomial framework proposed by Bourguignon et al. (2007), the wage premiums associated with post-secondary education in manufacturing disappear, although the negative impact of lower secondary schooling on wages in medium-value manufacturing is retained. The gender of the worker also ceases to be a statistically significant determinant of wages after correction for selectivity in high- and low-value manufacturing, and in agriculture. However, the negative impact of ethnicity and inverted quadratic on experience are retained with the selectivity correction (see Appendix 2). Working within the state sector is associated with wages that are 3 to 4 per cent higher in low-value manufacturing, 8 to 9 per cent higher in construction and services, and more than a quarter higher in agriculture and mining. This is consistent with the privileged position which state-owned enterprises enjoy with respect to capital, regulatory treatment and trade noted in Section 2. Most importantly, the wage premiums associated with upper-secondary and tertiary education disappear completely with the selectivity correction. Overall, however, the evidence in favour of selectivity is not strong, with more than a third of the selection terms not being statistically different from zero at the 5 per cent level of significance or higher. In common with other researchers (Pham and Reilly 2007; Phan and Coxhead 2011) who have estimated wage function models with selectivity using Vietnamese data, we therefore place more reliance on the OLS results.

Our results do, however, show more modest returns to education and training than previous studies. That returns to education were not higher in manufacturing in 2007 can be explained in two alternative ways. First, Vietnam could still be in the transition to market-determined wages and wage compression could still exist in some sectors. Second, Vietnam could have made the transition to market-determined wages already but the demand for educated workers remains low because her manufacturing sector has focused on low-value products which can be produced by assembly-line workers with limited schooling. While it is not possible to come to a definite conclusion with the available data, we feel that the second explanation is more plausible given the rapid liberalisation of the Vietnamese economy in the 1990s and early 2000s. The rapid increase in returns to education which other studies find took place in the 1992–2006 period (see Section 2) supports this view. This does not, of course, bode well for Vietnam's desire to move up the

value chain into more sophisticated manufacturing industries such as designer and fashion products, computer and electronic products, electrical equipment, motor vehicles, precision machinery and pharmaceuticals.

5. Who is being left behind by Vietnam's education system?

This section uses data from Rounds 2 and 3 of Young Lives to analyse which groups of children are being left behind by the education system. As shown in previous sections, completing lower secondary schooling significantly increases labour market entrants' ability to gain employment in low-value manufacturing in Vietnam. Furthermore, labour market entrants need to have completed upper secondary school or lower secondary school plus vocational training to maximise their chances of employment in medium-value manufacturing, government and services. There is thus, a real danger that a child who drops out from lower, and to a lesser extent upper, secondary school, will be unable to obtain wage employment in the future.

Young Lives is a longitudinal study of child poverty which is tracking the development of 12,000 children in four countries (Ethiopia, Andhra Pradesh in India, Peru and Vietnam). The Young Lives sample in each country includes 2,000 children born in 2000–01 and 1,000 children born in 1994–5. In Vietnam, the Young Lives sample is drawn from 20 sentinel surveillance sites (across 31 communes) in five purposively selected provinces.[17] To date, Young Lives children and their families have been surveyed three times: in 2002, 2006–7, and 2009.[18] Unfortunately, due to the age of children, we cannot investigate the issue of children who have dropped out of upper secondary school fully until Round 4 of Young Lives is completed. However, as three-fifths (60.5 per cent) of children in the Older Cohort had finished lower secondary school by the time of the Round 3 survey, we can investigate what the determinants are of drop-out in the last years of lower and first years of upper secondary school.

Before proceeding to estimate logistic models of the determinants of drop-out for these two sub-samples, it is useful to examine the pattern of school drop-out among the Older Cohort of the Young Lives children. Figure 3 shows empirical hazard functions constructed for: (a) all children in the Older Cohort; and, (b) Young Lives household members aged between 24 and 34 years old. The left-hand panel shows that the rate of drop-out in the Older Cohort accelerates during lower secondary school (Grades 6 to 9) with most drop-out occurring during Grade 9. Just over three-fifths (60.5 per cent) of children completed lower secondary school, with half (50.4 per cent) of all Older Cohort enrolling in upper secondary school.[19] For comparison purposes, the right-hand panel shows the hazard function for 24–34-year-olds in

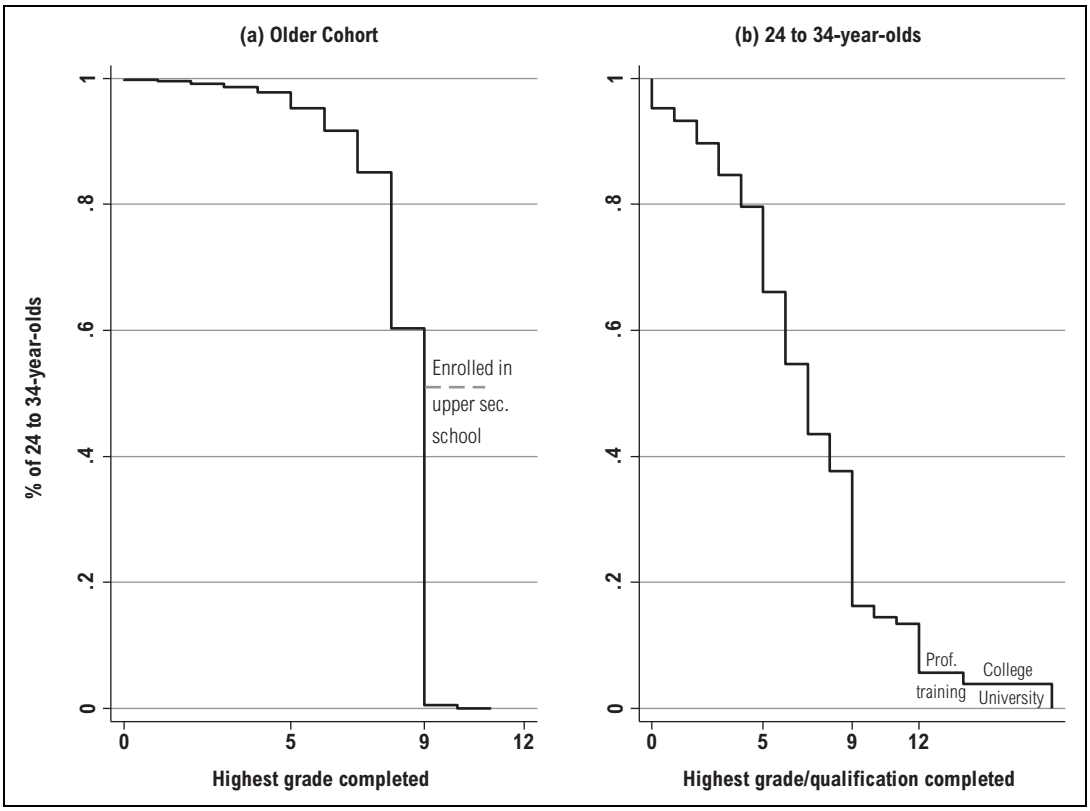
17 These are, moving from North to South, Lao Cai, Hung Yen, Da Nang, Phu Yen and Ben Tre.

18 See www.younglives.org.uk/where-we-work/vietnam for further information and documentation on Young Lives in Vietnam.

19 Due to their age, very few Older Cohort children had completed Grades 10 or 11 in Round 3.

the Young Lives data (the youngest group who can reasonably be expected to have completed post-secondary education). Drop-out for this older age group is much more evenly spread across the age distribution, with just under two-fifths of 24–34-year-olds having completed lower secondary school and a fifth proceeding to and completing upper secondary school. Less than 10 per cent of young adults in Young Lives had completed vocational or professional training while just 3.5 per cent had college or university qualifications.[20] This is consistent with Vietnam's relatively low level of enrolment in vocational and professional training when compared to other countries (see Section 3).

Figure 3. *Hazard functions for Older Cohort children and 24 to 34-year-olds, 2009*



Source: Young Lives.

20 Unfortunately, the Young Lives questionnaires do not distinguish between vocational and professional training very clearly.

Among the 16 per cent of Older Cohort children who had dropped out of school, only 3.2 per cent had obtained regular salaried employment by the time of the Round 3 survey. Young Lives children who had dropped out of school reported their most important activities as 'household chores' (44.2 per cent), followed by self-employment in agriculture (33.6 per cent) and self-employment in business (5.3 per cent).

Table 7 shows a logistic model of school drop-out for the three-fifths of Older Cohort children who had completed lower secondary school by Round 3 of Young Lives. Across this sub-sample, almost 84 per cent of these children have continued to either upper secondary school or professional secondary school. Put differently, 16 per cent of these children dropped out of school between Rounds 2 and 3. To ease interpretation, results are presented as odds ratios with the set of explanatory variables restricted to those which can reasonably be regarded as pre-determined by time of the Round 3 survey. Variables whose odds ratios are significantly greater than one are variables which are statistically associated with children dropping out of school, while odds ratios less than one indicate the reverse.

The strongest predictors of drop-out at the upper secondary level are the education of the child's mother and father, the amount of paid or unpaid work undertaken by the child in Round 2, and whether the commune has a paved road. Each additional year of parental education reduces the probability of drop-out from upper secondary school by 17 to 20 per cent, with the mother's years of education being a little more important than the father's. Children who worked in Round 2, whether in the home or for wages, are also significantly more likely to drop out of upper secondary school. Each additional hour of work in Round 2 increases the probability of dropping out by more than a quarter. This may be related to the large (but only weakly statistically significant) odds ratio for male pupils, as boys typically face better and earlier opportunities for casual wage work than girls. Living in a commune which is accessible via a paved road reduces the probability of dropping out by more than 70 per cent because it makes travelling to upper secondary school much easier.[21] The value of assets in Round 2, which has been transformed to reduce multicollinearity, has a highly significant effect on the probability of dropping out although, as shown by the odds ratio, the size of this effect is not large. Finally, living in an urban area or in the Mekong River Delta reduces the probably of drop-out very substantially (relative to the Red River Delta).

21 Note that 8 of the 34 communes in the Young Lives sample had upper secondary schools, while 32 of them had lower secondary schools.

Table 7. *Logistic model of school drop-out among children who have completed lower secondary school*

Explanatory variable	Odds ratio	Robust std. Err.	P>z
Male	1.625	0.428	0.065
Ethnic minority	1.073	0.447	0.865
Mother's years of education	0.790	0.042	0.000
Father's years of education	0.833	0.037	0.000
Education aid received, Round 2	0.665	0.254	0.285
Hours spent in family chores, farm work and paid work per day, Round 2	1.277	0.111	0.005
Upper secondary school in commune	1.080	0.317	0.793
Programme 135 commune	0.547	0.242	0.172
Unsafe drinking water	1.024	0.367	0.946
Paved road	0.176	0.079	0.000
Square root of asset value, Round 2	0.987	0.004	0.001
Urban	0.182	0.076	0.000
Northern Uplands	0.683	0.364	0.474
Central Coast	0.281	0.110	0.001
Mekong River Delta	0.080	0.049	0.000
Number of observations	=	539	
% of correct predictions	=	87.8	
Wald chi2(8)	=	92.840	
Prob> chi2	=	0.000	
Pseudo R2	=	0.284	
Log pseudolikelihood	=	−168.303	

Source: Young Lives.

It should be noted that a number of policy variables which might be expected to be associated with school drop-out are not significantly different from zero at conventional levels in Table 7. Most surprising of these is whether the child received education aid (whether in the form of a scholarship, an exemption or reduction in school fees, or free school books and materials) in Round 2, which has no statistically significant impact on school drop-out. This is most probably related to endogenous programme placement, as most educational aid in Vietnam is geographically targeted, with children living in 'extremely difficult' (Region 3) communes being entitled to exemptions from school fees, free textbooks and other school materials (Nguyen and Baulch 2008). Similarly, the variables for whether the child comes from a remote (Programme 135) commune or its household has unsafe drinking water (a proxy for poor infrastructure) have no statistical relationship with drop-out, although there may again be an issue with endogenous programme placement here. A number of other variables that could have been included in the model (such as the number of school-age siblings a child has, various types of shocks, and religion) also did not have statistically significant effects on the probability of a child dropping out between lower and upper secondary school.

We now turn to the smaller sample of children who had not completed lower secondary school at the time Round 3 of Young Lives was conducted. Although this sub-sample is much smaller than the previous one, their share of drop-out (23 per cent) is substantially higher than that of the sub-sample of children who have completed lower secondary school (16 per cent). It is more difficult to build a satisfactory model of drop-out for this sub-sample

of children, as indicated by the lower percentage of correct predictions and pseudo R-squared value. However, some interesting contrasts between the logistic models for children who have (Table 7) and have not (Table 8) completed lower secondary school emerge. First, while age and ethnicity are not important determinants of drop-out, the interaction terms show that children who are aged 15 or 16 years old and are of Kinh ethnicity are almost four times more likely to have dropped out than their 14-year-old counterparts. This suggests that the sub-sample of children who have not completed lower secondary school contains two groups of children: (a) a group of ethnic minority children, who enrol in school late but are not particularly likely to drop out; and, (b) a group of Kinh children, who enrol in school at the correct age, and whose parents are unwilling to let them repeat a grade. Second, while mother's education continues to be an important determinant of drop-out, father's years of education is no longer important. This may reflect the greater voice that mothers have in the decisions governing the education of younger children, although mother's and father's education are naturally highly correlated. Third, hours spent on family chores, farm or paid work in Round 2 are not a significant determinant of drop-out from lower secondary school. This is due to the generally shorter school day in lower secondary school, as well as the shorter travel times to lower secondary school. The square root of assets continues to have a statistically significant but small effect on drop-out.

Table 8. *Logistic model of school drop-out among children who have not completed lower secondary school*

Explanatory variable	Odds ratio	Robust std. Err.	P>z
15 or 16 years old	1.091	1.091	0.877
Male	1.250	1.250	0.362
Ethnic minority	1.127	1.127	0.871
15 or 16 years old interacted with Kinh ethnicity	3.979	3.979	0.040
Mother's years of education	0.886	0.886	0.030
Father's years of education	0.936	0.936	0.206
Education aid received, Round 2	0.964	0.964	0.113
Hours spent in family chores, farm work and paid work per day, Round 2	1.146	1.146	0.116
Programme 135 commune	1.190	1.190	0.695
Unsafe drinking water	1.331	1.331	0.452
Paved road	0.987	0.987	0.963
Square root of asset value, Round 2	0.984	0.984	0.002
Urban	1.107	1.107	0.868
Northern Uplands	0.602	0.446	0.493
Central Coast	2.276	1.437	0.193
Mekong River Delta	0.969	0.588	0.958
Number of observations	=	328	
% of correct predictions	=	74.1	
Wald chi2(8)	=	90.0	
Prob> chi2	=	0.000	
Pseudo R2	=	0.205	
Log pseudolikelihood	=	−158.970	

Source: Young Lives.

None of the commune level and policy variables, including the paved road variables, are statistically different from zero in Table 8. The fact that all but two of the Young Lives communities had their own lower secondary schools may explain the lack of significance of paved roads, but the lack of significance of the education aid variable remains puzzling. Finally, none of the geographic variables are statistically different from the rural Red River Delta at conventional levels after controlling for other factors. This is most probably due to the smaller number of observations in the sub-sample of children who have not completed lower secondary school, as tabulations show that the rate of drop-out is considerably higher in the Northern Uplands and rural Central Coast. Again a number of other variables that could have been included in this model (e.g., the number of school-age siblings a child has and religion) also did not have statistically significant effects on the probability of a child dropping out of lower secondary school.

To conclude this section, the Young Lives data reveal a small but significant group of children who are failing to complete lower secondary school. The highest proportion of children are found to drop out in the last year of lower secondary school, with policy variables such as educational aid having little impact on drop-out. Parents' education and living in a community with a paved road reduce school drop-out once lower secondary school has been completed, while working inside or outside the home increases it. That almost a fifth (19 per cent) of children dropped out of school between Rounds 2 and 3 of Young Lives should be a source of concern. These children are unlikely to possess the schooling to obtain wage jobs in manufacturing or services, let alone government and administration, and are therefore likely to earn low incomes throughout their lives. Studies in other countries show that such workers are disproportionately likely to pass on both their educational disadvantages and their poverty to their children.[22]

Summary and conclusions

This paper has investigated whether Vietnamese schools are providing children with the education that is needed by an industrialising, middle-income country. International comparisons reveal that despite its generous public spending on education, school enrolments and attainment in Vietnam are relatively low compared to other countries in east and south-east Asia which have graduated to middle- and high-income status. Current school enrolment rates suggest that by 2020 there will be almost 1 million labour market entrants who have not completed lower secondary school, and another 1.3 million who have not completed upper secondary school. Furthermore, a relatively low percentage of Vietnam's young people are enrolled in vocational and technical training. In these dimensions, Vietnam resembles two south-east Asian countries (Malaysia and Thailand) which have been identified as 'caught in the middle-income trap'.

The Labour Force Survey of 2007 has been used to examine the qualifications which new labour market entrants need to obtain skilled employment in five broad sectors, and to investigate the returns to different levels of schooling and training. The results suggest that there is currently not a strong demand for workers with either professional training or tertiary education in either low-value or medium-value manufacturing. This is consistent with the

22 See Bird (2007) for a useful overview of this literature.

relatively routine nature of most jobs in manufacturing, which has focused on products that can be produced by assembly line workers with limited schooling. Consequently, the education level of the majority of workers in Vietnamese manufacturing does not exceed the upper secondary level. Labour market entrants with post-secondary qualifications in manufacturing earn wages that are, on average, only 40 to 50 per cent higher than those with primary education. Workers with post-secondary qualifications are therefore likely to gravitate towards better-remunerated jobs in government and administration and the services.

Finally, the Young Lives data reveal a small but significant group of children who are failing to complete lower secondary school, and are therefore very unlikely to gain wage employment in the manufacturing or government sectors. This group tend to be the children of poorly educated parents and, in contrast to upper secondary school pupils, educational assistance and other development programmes are not contributing to these children staying in school. Unless urgent action is taken to ensure they gain access to adult education and training opportunities, this group of children are likely to earn low incomes throughout their lives and pass their educational disadvantages on to their own children.

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Appendix 1: Multinomial logit model estimation results

Explanatory variable	Medium-value manufacturing		Low-value manufacturing		Administration & government		Construction & service		Agriculture & mining	
	RRR	P-value	RRR	P-value	RRR	P-value	RRR	P-value	RRR	P-value
Ethnic minority household head	0.180	0.000	0.222	0.000	1.964	0.000	0.529	0.000	0.747	0.131
Urban	0.897	0.136	0.768	0.000	0.786	0.038	1.314	0.000	0.742	0.004
Age: 15–17	Omitted category									
Age: 18–25	0.633	0.000	0.601	0.000	0.309	0.045	0.481	0.000	0.575	0.005
Male	1.213	0.008	0.301	0.000	1.442	0.001	1.334	0.000	2.022	0.000
Household size	0.997	0.889	0.962	0.008	0.992	0.799	0.962	0.019	0.893	0.000
Ever married	1.016	0.863	1.223	0.002	1.176	0.253	1.250	0.001	1.519	0.003
No primary school	0.427	0.000	0.329	0.000	1.399	0.598	0.504	0.000	0.659	0.025
Primary school	Omitted category									
Lower secondary school	1.603	0.000	1.693	0.000	7.264	0.000	1.407	0.000	0.801	0.154
Upper secondary school	3.178	0.000	1.654	0.000	34.228	0.000	2.123	0.000	0.886	0.548
College/University	36.032	0.000	6.580	0.000	1539.808	0.000	105.455	0.000	22.302	0.000
Professional training	4.412	0.000	1.772	0.000	12.962	0.000	11.177	0.000	10.105	0.000
Long-term vocational training*primary or lower secondary school	5.555	0.000	2.907	0.004	2.926	0.311	5.937	0.000	5.195	0.001
Long-term vocational training*upper secondary school	3.536	0.000	1.845	0.011	0.294	0.016	3.435	0.000	8.423	0.000
HH head's education and training										
No primary school	0.712	0.001	0.783	0.000	0.744	0.093	0.716	0.000	1.106	0.468
Primary school	Omitted category									
Lower secondary school	1.370	0.000	1.094	0.170	0.700	0.015	1.076	0.299	1.009	0.952
Upper secondary school	1.067	0.614	0.880	0.237	0.748	0.136	1.019	0.862	0.477	0.006
College/University	1.086	0.690	0.788	0.258	1.313	0.238	1.238	0.208	1.053	0.872
Professional training	1.305	0.125	0.930	0.653	1.925	0.002	1.215	0.187	1.967	0.024
Long-term vocational training	1.142	0.583	0.754	0.230	0.871	0.703	0.809	0.313	1.357	0.323
Dependency ratio	0.728	0.051	0.645	0.001	0.852	0.536	0.928	0.569	1.542	0.121
Household head	0.998	0.990	0.694	0.002	0.766	0.282	0.793	0.056	1.601	0.033
Number of observations	28410									
Log pseudolikelihood	−34899.662									
Prob> chi2	0.000									
Pseudo R2	0.166									
Wald chi2(105)	4327.130									

Note: RRR – relative risk ratio
Source: Estimated by the authors from Labour Force Survey, 2007.

Appendix 2: Wage regressions for labour market entrants

Explanatory variable	Medium-value manufacturing		Low-value manufacturing		Administration and government		Construction and service		Agriculture		Unskilled	
	OLS	Selection correction	OLS	Selection correction	OLS	Selection correction	OLS	Selection correction	OLS	Selection correction	OLS	Selection correction
No primary school	0.0518	0.0965	-0.0634*	-0.0564	0.4818**	0.5027**	-0.0116	0.0725	-0.0176	0.1598	-0.0634***	0.0257
	(0.0594)	(0.0704)	(0.0330)	(0.0484)	(0.2257)	(0.2498)	(0.0331)	(0.0468)	(0.0802)	(0.1368)	(0.0145)	(0.0316)
Primary school	Omitted category											
Lower secondary school	-0.0659**	-0.1136**	-0.0075	-0.0364	-0.0578	0.0056	-0.0008	-0.0242	0.0557	-0.0968	0.0097	0.0087
	(0.0289)	(0.0511)	(0.0155)	(0.0323)	(0.1520)	(0.2783)	(0.0198)	(0.0338)	(0.0627)	(0.1142)	(0.0121)	(0.0240)
Upper secondary school	0.0747**	-0.1218	0.0491***	-0.1112*	0.0959	0.1120	0.1010***	-0.0283	0.1774**	-0.0406	0.0997***	0.1255**
	(0.0291)	(0.0897)	(0.0171)	(0.0613)	(0.1433)	(0.3717)	(0.0204)	(0.0525)	(0.0771)	(0.2050)	(0.0150)	(0.0548)
College/University	0.5172***	0.0005	0.4201***	-0.0372	0.7161***	-0.1516	0.4512***	-0.2316*	0.3084***	-0.1269	0.2874***	-0.0581
	(0.0375)	(0.2319)	(0.0327)	(0.1974)	(0.1423)	(0.5142)	(0.0202)	(0.1377)	(0.0890)	(0.5898)	(0.0582)	(0.2522)
Professional training	0.0978***	-0.2115	0.1273***	-0.1765	0.3509***	-0.3056	0.0915***	-0.3790***	-0.0151	-0.3364	0.0719**	-0.1845
	(0.0282)	(0.1485)	(0.0257)	(0.1346)	(0.0389)	(0.2371)	(0.0177)	(0.0833)	(0.0782)	(0.3752)	(0.0315)	(0.1364)
Long-term vocational training*primary or lower secondary school	0.2612***	0.0585	0.0460	-0.0529	1.0580**	0.3162	0.2326***	-0.2013*	0.2123	-0.4365	0.2038**	-0.1515
	(0.0910)	(0.1382)	(0.0716)	(0.1460)	(0.4654)	(0.4129)	(0.0544)	(0.1133)	(0.1710)	(0.3520)	(0.1026)	(0.1715)
Long-term vocational training*upper secondary school	0.0541	-0.0705	0.0414	-0.0015	0.1762	-0.0949	0.1447***	-0.1346	0.2122**	-0.4699*	0.0357	-0.1734*
	(0.0451)	(0.1151)	(0.0507)	(0.0958)	(0.1573)	(0.2567)	(0.0360)	(0.0857)	(0.1061)	(0.2830)	(0.0563)	(0.1012)
Experience	0.0759***	0.0728***	0.0860***	0.0824***	0.0831***	0.0757***	0.0793***	0.0721***	0.1034***	0.0940***	0.0552***	0.0492***
	(0.0112)	(0.0116)	(0.0077)	(0.0076)	(0.0196)	(0.0218)	(0.0064)	(0.0064)	(0.0256)	(0.0273)	(0.0057)	(0.0062)
Experience^2	-0.0068***	-0.0065***	-0.0068***	-0.0065***	-0.0089***	-0.0084**	-0.0061***	-0.0059***	-0.0069**	-0.0065**	-0.0055***	-0.0054***
	(0.0015)	(0.0016)	(0.0011)	(0.0010)	(0.0031)	(0.0036)	(0.0009)	(0.0008)	(0.0030)	(0.0032)	(0.0007)	(0.0008)
Female	-0.1387***	0.0488	-0.1021***	0.0052	-0.0229	0.0869	-0.1809***	-0.0744**	-0.1278***	-0.0922	-0.2008***	-0.1888***
	(0.0185)	(0.0669)	(0.0125)	(0.0751)	(0.0270)	(0.0842)	(0.0110)	(0.0300)	(0.0474)	(0.1608)	(0.0099)	(0.0408)
Ethnic minority household head	-0.2156***	-0.2158**	-0.1769***	-0.2258***	0.0871**	-0.0037	-0.0501**	-0.1100***	-0.2313***	0.0454	-0.1692***	-0.1230***
	(0.0553)	(0.0862)	(0.0383)	(0.0618)	(0.0413)	(0.0931)	(0.0203)	(0.0360)	(0.0811)	(0.1522)	(0.0159)	(0.0336)
Urban	0.0260	-0.0065	-0.0216*	-0.0263	0.0802**	-0.0415	0.0755***	0.0414	-0.0468	0.0754	0.0120	-0.0326
	(0.0186)	(0.0430)	(0.0120)	(0.0305)	(0.0326)	(0.0796)	(0.0119)	(0.0277)	(0.0462)	(0.0859)	(0.0098)	(0.0225)
Working for state sector or state enterprises	0.0499*	0.0436	0.0389**	0.0356**			-0.0793***	-0.0855***	0.2878***	0.2558***	0.0745***	0.0647***
	(0.0260)	(0.0265)	(0.0178)	(0.0170)			(0.0126)	(0.0143)	(0.0499)	(0.0535)	(0.0168)	(0.0171)
Selection correction: Unskilled		0.1174		-0.0082		0.8731		0.3265		1.5284		0.0289
		(0.4704)		(0.2154)		(0.7335)		(0.2519)		(1.1712)		(0.1434)
Selection correction: Agriculture and mining		-0.0922		-0.7966		-0.9448		-1.7484***		-0.5260***		-1.0168*
		(0.6774)		(0.5937)		(1.4497)		(0.4282)		(0.1864)		(0.5268)
Selection correction: Construction and services		-0.4280		-0.2272		-1.0093		-0.4072***		0.4089		-1.2677***
		(0.5445)		(0.3590)		(1.1597)		(0.0974)		(0.9264)		(0.2723)
Selection correction: Administration and government		-0.8327		-1.8152***		0.0870		-0.4941*		0.4575		0.9934*
		(0.5990)		(0.6312)		(0.2262)		(0.2588)		(1.2576)		(0.5291)
Selection correction: Low-value manufacturing		0.4574		0.0233		0.6612		0.0908		-0.3402		-0.3705
		(0.4725)		(0.1134)		(0.8543)		(0.2294)		(1.0807)		(0.2880)
Selection correction: Medium-value manufacturing		-0.2102		-0.2655		1.1653*		0.3184		-0.9277		0.6942**
		(0.1417)		(0.4244)		(0.7053)		(0.3003)		(0.9302)		(0.3184)
Sigma squared		0.3790		0.4817**		0.8883		0.6273***		1.1261		0.8606***
		(0.2332)		(0.2242)		(0.7730)		(0.1342)		(1.1466)		(0.2012)
rho1		0.1907		-0.0118		0.9264		0.4123		1.4403**		0.0312
		(0.5505)		(0.2932)		(0.5884)		(0.3207)		(0.7103)		(0.1600)
rho2		-0.1498		-1.1478		-1.0025		-2.2075***		-0.4957***		-1.0961*
		(0.8571)		(0.7504)		(1.0984)		(0.3938)		(0.1242)		(0.5762)
rho3		-0.6952		-0.3274		-1.0709		-0.5141***		0.3853		-1.3665***
		(0.6650)		(0.4915)		(0.8537)		(0.1292)		(0.6372)		(0.2134)
rho4		-1.3526*		-2.6155***		0.0923		-0.6239*		0.4311		1.0709**
		(0.7285)		(0.6027)		(0.1973)		(0.3224)		(0.8223)		(0.5394)
rho5		0.7429		0.0335		0.7015		0.1147		-0.3206		-0.3994
		(0.5587)		(0.1586)		(0.6902)		(0.2955)		(0.7304)		(0.3113)
rho6		-0.3414*		-0.3826		1.2364**		0.4020		-0.8742		0.7483**
		(0.1830)		(0.5345)		(0.5323)		(0.3813)		(0.6278)		(0.3333)
Constant	6.8276***	7.2363***	6.8180***	6.6061***	6.0907***	6.3922***	6.8031***	7.4670***	6.8610***	8.7220***	6.7399***	6.3970***
	(0.0294)	(0.5855)	(0.0181)	(0.1813)	(0.1421)	(0.8437)	(0.0188)	(0.2073)	(0.0618)	(1.1265)	(0.0126)	(0.0752)
Observations	2379	.	4783	.	1250	.	8446	.	644	.	9649	.
R-squared	0.170		0.107		0.239		0.139		0.182		0.079	

Standard errors in parentheses ***p<0.01, **p<0.05, *p<0.1
OLS – ordinary least squares
Source: Estimated by the authors from Labour Force Survey, 2007.

Appendix 3: Details of selectivity correction

The model underlying the selectivity correction used in this paper may be described as follows:

(1) $$y_s = X_s\beta_s + \varepsilon_s$$

(2) $$y_s^* = Z_s\gamma_s + \eta_s$$

where there are s=1…M , y_s are earning in sector s, y_s^* is a polychotomous variable indicating sector of employment, X_s and Z_s are the covariates in each equation, and the disturbance term satisfies $E(\varepsilon_s|X)$ and $V(\varepsilon_s|X,Z)$. When using OLS, the earning equations are run separately for each sector. However, with the selectivity correction, variable y_s is viewed as observed only if sector s is chosen. In this case, ε_s and η_s are not independent and least squares estimates of β_s are inconsistent.

To correct for this inconsistency, Durbin and McFadden (1984) extended Heckman's (1979) two-step model to the multinomial case using the following estimation equation:

(3) $$y_s = X_s\beta_s + \sigma_s\frac{\sqrt{6}}{\pi}\sum_{s=2}^{M} r_s\left(\frac{P_s\ln(P_s)}{1-P_s}\right) - r_1\ln(P_1) + \gamma_2$$

where r_s are the correlation between ε_s and η_s, and P_j is the probability of choosing sector s from the multinomial logit model. Dubin and McFadden use the linearity assumption $E(\varepsilon_1|z_1\ldots\eta_M) = \sigma\frac{\sqrt{6}}{\pi}\sum_{s=1\ldots M} r_s(\eta_s - E(\eta_s))$ but a preferable strategy is to assume a linear association between ε_s and η_s: $\varepsilon_s = \sigma_s\sum_s r_s\eta_s + \omega_s$ which subsumes the independence of irrelevant alternatives assumption (Bourguignon et al. 2007). This yields the following bias-corrected equation:

(4) $$y_s = X_s\beta_s + \sigma_s[r_s m(P_s) + \sum_{j\neq s} r_j\frac{P_j}{(P_j-1)}m(P_j)] + \upsilon_s$$

where $m(P_s) = \int\Phi^{-1}(v - logP_j)g(v)dv \quad \forall s$

In this revised version of the selectivity correction, the bias correction terms incorporate the correction coefficients (r_s) between the disturbance terms in both equations and the probabilities ($m(P_s)$ and $m(P_j)$) of choosing a certain sector s from the multinomial logit model.

In Table 6 and Appendix 2, we report the results from OLS and the selectivity correction in equation (4). While the second stage estimates from (4) are consistent, they have inefficient standard errors (Bourguignon et al. 2007). Hence we obtain standard error by using bootstrapping with 150 replications.

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