Policy Research Working Paper 5379

Industry and Skill Wage Premiums in East Asia

Emanuela di Gropello
Chris Sakellariou

The World Bank
East Asia and Pacific Region
Education Unit, Human Development Sector
July 2010

Policy Research Working Paper 5379

Abstract

This paper focuses on the estimation of skill/industry premiums and labor force composition at the national and sector levels in seven East Asian countries with the objective of providing a comprehensive analysis of trends in demand for skills in the region. The paper addresses the following questions: Are there converging or diverging trends in the region regarding the evolution of skill premiums and labor force composition? Are changes in skill premiums generalized or industry-related? How have industry premiums evolved? The analysis uses labor and household surveys going back at least 10 years. The main trends emerging from the analysis are: (a) increasing proportions of skilled/educated workers over the long run across the region; (b) generally increasing demand for skills in the region; (c) the service sector has become the most important driver of demand for skills for all countries (except Thailand); (d) countries can be broadly categorized into three groups in relation to trends and patterns of demand for skills (Indonesia, Philippines, and Thailand; Vietnam and China; and Cambodia and Mongolia); and (e) industry premiums have increased in three countries of the region (Philippines, Thailand, and Cambodia). These trends point to several policy implications, including that governments should focus on policies promoting access to education to address the increasing demand for skills and/or persistent skill shortages; support general rather than specific curricula given broad-based increases in skill premiums in most countries; better tailor curriculum design and content and pedagogical approaches to the needs of the service sector; and target some social protection programs to unskilled workers to protect them from the "unequalizing" impact of education.

This paper—a product of the Education Unit, Human Development Sector, East Asia and Pacific Region—is part of a larger effort in the department to assess demand for skills in East Asia and its implications for skill development. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The author may be contacted at edigropello@worldbank.org.

Industry and Skill Wage Premiums in East Asia (*)

Emanuela di Gropello
Human Development Unit
East Asia Region
The World Bank
e-mail: edigropello@worldbank.org

Chris Sakellariou
Economics, HSS
Nanyang Technological University
Singapore
e-mail: acsake@ntu.edu.sg

(*) This paper is part of the Study on Openness and Labor Demand in East Asia (DECRG Research Grant (RSB-P110368)), which contributes to the broader Regional Study on Skills in East Asia. The paper also counted with the contribution of Hong Tan for the processing and analysis of Philippines data and indicators.

1. Context

East Asian countries are undergoing deep structural changes, with resources shifting from agriculture to manufacturing and services, from resource-based products to labor-intensive low technology products, and -- in some countries -- from the latter to medium/high technology products. Some countries like Malaysia and Thailand are ahead of others in this process, but most of the other countries of the region, including lower income ones like Vietnam, are following close behind. The nature and the skills content of jobs are changing in response to these deep structural shifts. Many jobs are being created in relatively more skilled activities in manufacturing, but also in certain service activities that require low and medium level skills that are nonetheless different from those of the jobs being destroyed. In some rapidly-growing economies, such as China, emerging skill shortages threaten to undermine the competitiveness of export oriented firms. This evolving context raises key issues regarding the links between skills, labor reallocation and productivity growth in East Asian economies, but this type of analysis and research, which is rapidly developing for other regions including the OECD, LAC and ECA, is still fairly scarce in East Asia.

The regional study on skills attempts to close this gap in two ways. First, it wants to document in a systematic and comparable manner the evolution of skill/industry premiums, and of the labor force composition across East Asian economies to identify trends in the demand for skills and emerging skill gaps. Second, it wants to analyze the relationship between openness and changes in labor demand. The central question in this section will be whether openness is accompanied or not by skill upgrading, or, in other words, is consistent with evidence of skill-biased technological change. A related question is whether increased openness has benefited only skilled workers, or all workers in certain sectors. The analysis will be performed by comparing how skill/industry premiums and labor force composition relate to openness in a systematic and comparable way across countries.

Understanding the evolution and determinants of the demand for skills is relevant from both an academic and policy perspective. From an academic perspective, trade theory indicates that increased trade has an ambiguous effect on skill premiums and demand for

skills in general (see, for instance, O'Connor and Lunati, 1999). On the one hand, traditional trade theory suggests that with increased trade skill premiums should decrease in labor-intensive countries. Recent studies, however, show that skill premiums can increase if trade leads to the adoption of better performing skill-biased technologies (Berman et al., 1998; Keller, 2004), or to increased skill-enhancing investments (Feenstra and Hanson, 1997; Harrison and Hanson, 1999). Very few studies have documented these issues in East Asia (see World Bank (2007) on Vietnam; Alatas and Bourguignon (2005) and Abu-Ghaida and Connolly (2003) on Indonesia; Zeufack and Udomsaph (2006) on Thailand; and Heckman and Li (2003) and Fajnzylber and Fernandes (2004) on China) and most of them have not gone beyond the analysis of trends. Additionally, methodologies differ across existing studies making it difficult to compare them. As little is known about the evolution and drivers of skill premiums in East Asia, constructing comparable measures to understand how skill demand evolved in these rapidly growing countries, and linking these changes to variables such as trade and FDI will help shed light on consequences of rapid export-led growth. From a policy perspective, understanding the extent to which skill demand has increased, what has driven the changes, which sectors have become more skill intensive, and which types of workers remain vulnerable, can lead to key policy recommendations ranging from the expansion and improved relevance of education opportunities, to a better targeting of social protection and pro-poor policies in the region and reforms to improve the functioning of labor markets.

This paper focuses on the estimation of skill/industry premiums and the labor force composition (i.e., the proportion of skilled labor by sector) at the national and sectoral level (one or two digit) with the objective to provide a comprehensive description of trends in skill premiums and labor force composition over several years. Although no attempt will be made to explain these trends, a comprehensive description will already allow answering relevant questions such as: Did income inequalities increase or decrease? Can we observe converging or diverging trends in the region regarding the evolution of skill premiums and of the labor force composition? Are changes in skill premiums generalized or industry-related? Is there evidence of labor market segmentation?

The analysis in this report covers Indonesia, Philippines, Thailand, Vietnam, Cambodia, Mongolia and urban China. Availability of data going back at least 10 years is a requirement which was generally met. In the case of Cambodia there were only 3 usable surveys available in the 1997-2007 period and in the case of China only 2 urban surveys covering the 1999-2005 period.

2. Methodology

We will be looking at measures of skill and education premiums, and labor force composition, focusing on both levels and trends. Subsequently, the analysis is extended to industry premiums and sector/sub-sector analysis to reach a more precise definition and fuller understanding of the role of skill premiums. In this broader analysis, skill premiums are estimated following an approach similar to Goldberg and Pavcnik (2005). Specifically, for each country and year the log of worker i's wage ($\ln(w_{ijt})$) is regressed on worker i's characteristics (H_{ijt}) such as gender and age; on whether, based on her education, the worker is skilled or unskilled (S_{ijt}); and on a set of industry j indicators (I_{ijt}) reflecting worker i's industry affiliation[1]:

$$\ln(w_{ijt}) = H'_{ijt}\beta_H + S_{ijt} \cdot I_{ijt}\ sp_{jt} + I_{ijt}\ wp_{jt} + \varepsilon_{ijt} \qquad (1)$$

where sp_{jt} represents the sectoral return to education (or skill premium) of sector j at time t, and wp_{jt} represents the industry premium. The estimated wage premiums will be then presented as deviations from the employment-weighted average wage premium.

3. Data

Choosing among the datasets available for different countries focused on the existence of an Industry of Employment variable, preferably at the 2-digit level. A 2-digit industry classification was available for Indonesia and the Philippines; For Vietnam and Cambodia, taking the smaller sample sizes into consideration, a 1-digit industry classification was used. For Thailand, a 2-digit industry classification was available only

[1] Location factors, such as region, province, city, etc, where also included in the regression for most countries without however significantly changing any of the results.

for heads of household, while a 1-digit classification was available for all members. The surveys and years for different countries are as follows: Indonesia – Sakernas Survey for years 1994, 1996, 1999, 2001, 2003, 2005 and 2007; Philippines – LFS Survey for years 1988, 1991, 1994, 1997, 2001, 2004, 2006; Thailand - - Socio-economic Survey for years 1990, 1992, 1994, 1996, 1998, 2000, 2002, 2004; Vietnam – VLSS for years 1992, 1998, 2004, 2006; Cambodia – Socio-economic Survey for years 1997, 2003-4 and 2007; China – China Urban Labor Survey for years 1999 and 2005; and Mongolia – LSMS 1998, 2002 and 2007-8.

In estimating equation (1), the datasets were standardized across countries and years in terms of variables used. The dependent variable is the logarithm of hourly wage, except for Thailand where the dependent variable is the monthly wage, as the data did not contain the necessary information for the calculation of the hourly wage. The estimation sample contains workers over the age of 15. Data issues did not permit standardization of the composition of the sample of workers across countries: thus for Indonesia and Vietnam earnings are reported for those in wage employment; for the rest of the countries the sample includes a mixture of workers employed for wages.

4. Results

4.1. Educational Attainment and Skilled Labor

Trends in educational attainment by country are reported in Tables A1- A7 in the Appendix. The comparative percentage change in highest education qualifications over time is reported in Table 1 below. At the beginning of the 1990s with the exception of Cambodia, Thailand had the lowest educational attainment of the working population, as reflected in the average years of schooling as well as the proportion of workers with secondary or higher qualifications. Between 1990 and 2004 educational attainment in Thailand increased dramatically at all levels, especially at the upper secondary and tertiary levels with the proportion of workers with upper secondary and tertiary qualifications doubling during the same period. A similar evolution of educational attainment is observed in Indonesia. The proportion of workers with tertiary

qualifications (university and diploma) increased by more than 190 percent, with the proportion of workers with university degrees increasing by almost 4 times. The Philippines, prior to 1990 was the most educationally advanced among the countries examined, with about 10 percent of its working population having university degrees by 1988. Subsequently, the proportion of workers with upper secondary or higher qualifications increased further, albeit at a slower rate compared to Indonesia and Thailand, having started from a higher base.

Vietnam faced considerable constraints to competitiveness and growth due to insufficient education and labor skills in its workforce. The proportion of university educated working population increased from 1.8 percent in 1992 to about 3.6 percent in 2006, while the corresponding increase for those employed for wages (i.e., excluding the self-employed) was from 6.7 percent in 1992 to about 13 percent in 2006. Smaller increases are observed in upper secondary qualifications.

Table 1: Percentage change in highest education qualifications over time (workers with positive reported earnings)

Education	% change						
	Indonesia 1994-07	Philippines 1988-06	Thailand 1990-04	Vietnam 1992-06	Cambodia* 1997-07	China** 1999-05	Mongolia 1998-2007
Years of schooling	29.3		23.8	15.6	5.1	4.6	-
Less than primary complete	-69.8	-33.7	-32.9	-33.2	4.0	-59.3	-
Primary	-32.7	-30.9	31.4	-12.1	2.3	-45.0	31.2
Lower secondary	24.6	5.3	45.2	11.6	-12.2	-16.6	9.8
Upper secondary general	59.3	45.0	100.0	20.2	-22.1	19.3	59.7
Upper sec. voc./higher voc.	-9.6	-	14.7	42.2	-	-	180.6
Tertiary	190.3	37.1	98.4	94.0	65.0	15.2	-44.5

* Registered declines in the proportion of workers with secondary qualifications between 2003-4 and 2007 in Cambodia are probably attributable to differences in the composition of the sample of workers by type of employment.
** Urban areas only.

Establishing the evolution of educational attainment in Cambodia and comparing it to other countries in SE Asia proved problematic: first, the time frame (1997-2007)[2] is shorter and does not extend to the early 1990s; second, comparison between cross sections is problematic, as the composition of the (smaller) 2007 sample of workers with

[2] Pending acquisition of the 1993 CSES.

reported wages is different from the 2003-4. The CSES data used suggest that between 1997 and 2007, educational attainment as measured by average years of schooling of working population increased by about 31 percent (mostly because of large increases in secondary and tertiary qualifications); however, when we consider the much smaller sample of workers with reported earnings, the increase in average educational attainment (years of schooling) is only about 5 percent over the 1997-2007 period, reflecting a small increase in workers who are primary school educated and a large increase in tertiary qualifications. Furthermore, the proportion of workers with secondary qualifications shows a decline (Table 1).

In the case of China, the results are based on only 2 surveys of urban population spanning the 1999-2005 period. Even during this relatively short period, the composition of educational qualification of the working population changed substantially; the proportion of workers with lower secondary or lower qualifications decreased drastically, while those with upper secondary and tertiary qualifications increased by almost 20 percent and 15 percent respectively.

In Mongolia and the sample of wage employees with reported earnings, the composition of education qualifications changes substantially over time, with the proportion of those with upper secondary qualifications (especially vocational qualifications) increasing substantially over the last decade and (counter-intuitively) the proportion of those with tertiary (diploma or university) qualifications decreasing by 45 percent. This implies that the 2007 sample of wage employees used was less skilled compared to the 1998 sample, especially for those with tertiary qualifications.

Table 2 summarizes the over time changes in labor force composition by 1-digit industry group (Tables A8 to A14 provide the details by country). One common finding is the shift away from agriculture. The industries which gained in employment in Indonesia, Philippines, Thailand, Vietnam and China (Cambodia is discussed separately), are Retail and Wholesale trade as well as the Finance/Business sector within services. The share of manufacturing increased somewhat in Thailand, while it decreased somewhat in Indonesia the Philippines, Vietnam and the urban centers of China.

Table 2: Percentage change in Labor Force composition by selected industry group over time
(Workers with positive reported earnings)

Industry	% change						
	Indonesia 1994-07	Philippines 1988-06	Thailand 1990-04	Vietnam 1992-06	Cambodia 1997-07	China 1999-05	Mongolia 1998-07
Agriculture/Forestry/Fishery	-19.0	-27.8	-22.1	-36.8*	-19.0*	-81.8*	10.7
Mining	123.1	-66.7	0.0	-	-	-	-
Manufacturing	-11.7	-12.1	10.6	-10.0	96.7	-38.6	104.1
Utilities	20.0	0.0	-37.5	22.2	n/a	-60.8	35.3
Construction	-16.0	22.0	16.0	53.5	94.1	-50.0	168.6
Trade	28.4	37.2	60.8	97.9	-47.2	74.1	24.0
Transportation/Communication	6.8	54.0	-12.5	0.0	26.2	16.9	95.5
Finance/Business	34.6	117.6	-	122.2	171.4	n/a	-
Other Services	2.5	-1.8	-9.5	8.5	-45.8	36.5	-31.3

* Combined with Mining

Using the sample of workers with reported earnings, in Cambodia (as reported in Table 2), besides the decline in the share of agriculture, other sectors which declined are trade and other services (mostly due to a decline in the share of public administration). The shares of manufacturing, construction and finance/business exhibited large increases over the last decade. However, when using the larger sample of employed individuals, the results are different with respect to the change in the share of trade: now this share shows a small increase as opposed to a large decline; otherwise, the two sets of results for Cambodia are generally consistent between the two samples.

With the exception of Cambodia (for upper secondary and above) and Mongolia, the proportion of skilled workers in Indonesia, Philippines, Thailand, Vietnam and China increased substantially on average (especially the proportion of workers with tertiary education) as well as across almost all major industries (Tables 3a and 3b). Increasing shares of skilled workers in the service sector combined with changing employment shares in its favor make it as a particularly dynamic market for skilled workers – as will be further confirmed with the wage skill premium analysis. The largest increase in Indonesia, Thailand and the Philippines is observed in agriculture where the proportion of skilled workers (defined as those with upper secondary education or higher), while it still remains low, nearly tripled in Indonesia and more than doubled in Thailand. In Vietnam the largest increase is found in transportation/communication, while the proportion of

skilled workers in agriculture decreased moderately. In China, substantial increases are observed in all industries except agriculture, utilities and other services.

Table 3a: Proportion of skilled workers by selected industry group over time
(Workers with positive earnings)

Industry	% Upper Secondary and above											
	Indonesia			Philippines			Thailand			Vietnam		
	1996	2007	Change	1988	2006	Change	1990	2004	Change	1992	2006	change
Agriculture	6.2	16.1	9.9	29.6	41.0	11.4	2.4	5.6	3.2	8.6	7.7	-0.9
Mining	32.4	40.0	7.6	54.6	47.7	-6.9	25.0	33.3	8.3	46.9	47.0	0.1
Manufacturing	33.5	40.1	6.6	59.5	77.8	18.3	16.4	28.9	12.5	21.4	22.6	1.2
Utilities	72.4	79.9	7.5	89.9	98.0	8.1	52.8	57.6	4.8	65.0	88.1	23.1
Construction	20.3	29.9	9.6	52.9	66.0	13.1	9.9	13.8	3.9	17.7	20.0	2.3
Trade	54.3	56.3	2.0	60.4	77.9	17.5	17.5	28.5	11.0	29.5	43.3	13.8
Transp/Comm.	36.2	45.7	9.5	67.4	77.5	10.1	21.0	30.4	9.4	31.1	61.5	30.4
Finance/Business	86.4	84.1	-2.3	94.9	96.5	1.6		-		70.0	81.6	11.6
Public Admin.	67.9	80.8	12.9	92.1	91.2	-0.9		-			-	
Other Services		-		92.3	91.8	-0.5	42.8	67.0	24.2	64.3	78.6	14.3
*Mean **		-						-			-	
Mean (1)	44.2	55.5	11.3	49.6	65.9	16.3	17.7	28.8	11.1	29.1	36.7	7.6
Mean (2)	9.0	19.1	10.1	19.2	27.3	8.1	6.1	12.1	6.0	6.7	13.0	6.3

Table 3a continued

Industry	% Upper Secondary and above								
	Cambodia			China			Mongolia		
	1997	2007	Change	1999	2005	Change	1998	2007	change
Agriculture	6.2	2.3	-3.9	64.5	68.0	4.5	69.4	63.7	-5.7
Mining		-			n/a			-	
Manufacturing	17.2	16.4	-0.8	49.0	60.3	11.3	81.2	81.7	0.5
Utilities		-		57.5	57.6	0.1	82.2	77.1	-5.1
Construction	10.4	14.1	3.7	48.4	74.1	25.7	80.4	70.0	-10.4
Trade	13.2	23.9	10.7	46.2	61.0	14.8	80.6	81.1	0.5
Transp/Comm.	16.4	16.9	0.5	55.4	62.4	7.0	89.6	83.0	-6.6
Finance/Business	54.5	52.4	-2.1		n/a			-	
Public Admin.	49.4	53.4	4.0	74.3	86.2	11.9	90.8	91.3	0.6
Other Services	51.4	67.7	16.3	66.8	69.3	2.5	85.4	88.3	2.9
*Mean **	26.9	24.5	-2.4		-			-	
Mean (1)	10.5	10.0	-0.5	56.4	66.5	10.1	84.9	82.2	-2.7
Mean (2)	0.02	0.033	1.3	21.0	24.3	3.3	58.2	32.8	-25.4

Table 3b: Percentage change in the proportion of skilled workers by selected industry group over time
(Workers with positive reported earnings)

Industry	% Upper Secondary and above						
	Indonesia 1996-07	Philippines 1988-06	Thailand 1990-04	Vietnam 1992-06	Cambodia 1997-07	China 1999-05	Mongolia 1998-07
Agriculture	159.7	38.5	133.3	-11.4	-62.9	7.1	-8.1
Mining	23.5	-12.6	33.2	0.2	-	n/a	-
Manufacturing	19.7	30.8	76.2	5.6	-4.6	23.1	0.6
Utilities	10.4	9.0	9.1	1.1	-	0.0	-6.2
Construction	47.3	24.8	39.4	-10.7	35.5	53.1	-12.9
Trade	3.7	29.0	62.9	23.7	81.1	32.0	0.6
Transportation/Commun.	26.2	15.0	44.8	34.7	3.0	12.6	-7.4
Finance/Business	-2.7	1.7	-	13.1	-2.0	n/a	-
Public Admin.	19.0	-1.0	-	-	8.1	16.0	0.6
Other Services	-	-0.5	56.5	12.8	22.9	3.7	3.4
*Mean % change **	-	-	-	-	-8.9	-	-
Mean % change (1)	25.6	32.9	62.7	26.1	-4.8	17.9	-3.2
Mean % change (2)	112.2	42.2	98.4	94.0	65.0	15.7	-43.6

(1) Secondary education and above; (2) Tertiary education and above. * Lower secondary and above.

In Cambodia, once again the findings with respect to changes in skilled labor need to be contrasted between sample compositions (all employed workers vs. workers with reported earnings). In the case of the former, the proportion of skilled workers increased across the board and much more in agriculture, trade and construction (by 127, 79 and 69 percent respectively) and by only slightly in manufacturing and services. Overall, the proportion defined as those with lower secondary and higher qualifications increased by 60 percent, while the proportion of workers with upper secondary or tertiary qualifications increased by 45 percent. Once the sample is restricted to workers with reported earnings (Table 3), the findings change drastically, especially with respect to changes in agriculture. Now the proportion of skilled workers in agriculture exhibits a large decline of about 63 percent over the 1997-2007 period. Overall, the proportion of skilled workers independently of industry group registers a decline. On the other hand, the proportion of workers with tertiary qualifications exhibits a large increase.

Finally in Mongolia, small changes in skill composition are observed across industries, with most industries showing declines in the proportion of skilled workers. As in the case of Cambodia, here too there are data issues; as reported earlier, in the (lager) 2007 LSMS

the proportion of skilled workers (especially those with diplomas and university qualifications) is significantly smaller compared with the (smaller) 1998 and 2002 samples.

4.2. Estimates of Education/Skill Premiums and Labor Force Composition

The tables below summarize the changes in skill premiums in each country. In interpreting the estimates in Tables 4-10, the base education level/skill on which other dummy variables are based are as follows: in Tables 4a-10a the base (reference) education level is "less than completed primary"; however, the presented return estimates for education levels higher than primary are given in comparison to primary. Thus, in Indonesia in 1994, the estimate of 1.125 for tertiary over primary is the difference in coefficients for tertiary and primary in the estimated earnings equation. Dividing 1.125 by the difference in years of education between tertiary and primary education (10 years) implies an annualized return of about 11.2%. Similarly, if one wants to derive an estimate of the return to tertiary over senior secondary (instead of primary), this would be the difference between 1.125 and 0.596, that is 0.529; annualized this implies an average return of 13.2% for each year of tertiary education over senior secondary. In Tables 4b-10b a single dummy for skill is used with two alternative specifications: senior secondary and above vs. lower secondary and below and tertiary vs. senior secondary and below. Tables A15 to A21 provide more details on returns by education level by country.

In Indonesia, education premiums declined with the exception of primary education. The largest decline in education premiums over time occurred in junior and senior secondary education, with a smaller decline in tertiary education premiums and a small increase in the premium of primary education. Within senior secondary education, most of the decline in premiums is associated with vocational-technical education. To a large extent, the findings are similar for Thailand: Accounting for the effect of industry affiliation in the regressions, we see declining premiums in junior and senior secondary education and a smaller decline in tertiary education, along with a small increase in primary education premiums. As in the case of Indonesia, most of the decline in premiums in secondary education is associated with vocational-technical education. In fact, with only basic controls, premiums are on the rise in general senior Ssecondary and tertiary education. In

Vietnam, with the exception of tertiary education, education premiums were negative prior to the *Doi Moi* reforms. Following the reforms, premiums soared for every education level and more so for tertiary qualifications. Very large increases in returns were observed for technical/Vvocational secondary education which was associated with significantly negative returns (compared to primary) in 1992. Subsequently, the increase in returns to secondary TVET outpaced that of secondary general education, and by 2006 the return to TVET slightly exceeded that of general education. In Cambodia and the Philippines, comparison of estimates without and with controlling for industry affiliation suggests that a large part of the increases in returns to education is industry-specific. In Cambodia, even after controlling for industry affiliation, education premiums have roughly doubled for secondary and tertiary education; while premiums decrease in the Philippines after controlling for industry affiliation. In urban China, between 1999 and 2005, the largest increases in education premiums were observed for secondary education, followed by tertiary education; no evidence of an increase in primary education premiums was found. Finally, in Mongolia, skill premiums seem to have been stagnant between 1998 and 2002 and subsequently increased drastically by 2007. This suggests that during recent years an excess demand for skilled workers may have developed. Within education levels, the largest increases were for tertiary diplomas and university education.

Indonesia

Table 4a : Returns to levels of education - Employed for wages

	1994	2007	Change (%) 2007-1994
Basic controls only			
- Primary	0.213	0.242	*13.6*
- Junior Sec./primary	0.234	0.128	*-45.3*
- Senior Sec./ primary	0.596	0.508	*-14.8*
- Tertiary/primary	1.125	1.084	*-3.6*
Basic controls + Industry dummies			
- Primary	0.195	0.243	*25.1*
- Junior Sec./primary	0.235	0.126	*-46.4*
- Senior Sec./ primary	0.610	0.498	*-18.4*
- Tertiary/primary	1.137	1.070	*-5.9*

	1994	2007	Change (%) 2007-1994
Basic controls only			
- High school general/ primary	0.527	0.486	*-7.8*
- High school vocational/ primary	0.663	0.547	*-17.5*
- Tertiary/primary	1.123	1.084	*-3.5*
Basic controls + Industry dummies			
- High school general/ primary	0.545	0.479	*-12.1*
- High school vocational/ primary	0.678	0.526	*-22.4*
- Tertiary/primary	1.139	1.056	*-7.3*

Table 4b:Returns to skill over time – Employed for wages

	1994	2007	Change (%) 2007-1994 (2007-1996)
Basic controls only			
- Upper Sec. and above/ Low sec. and below	0.696	0.683	*-1.9*
- At least some tertiary/Secondary and below	0.891	0.849	*-4.7*
Basic controls + Industry dummies			
- Upper Sec. and above/ Low sec. and below	0.677	0.622	*-8.1 (-6.2)*
- At least some tertiary/Secondary and below	0.819	0.771	*-5.9 (-2.1)*

Philippines

Table 5a: Returns to levels of education - Employed for wages

	1988	2006	Change (%) 2006-1988
Basic controls only			
- Secondary/primary	0.415	0.492	*18.5*
- Tertiary/primary	1.075	1.184	*10.1*
Basic controls + Industry dummies			
- Secondary/primary	0.254	0.201	*-20.9*
- Tertiary/primary	0.691	0.593	*-14.1*

Table 5b: Returns to skill over time – Employed for wages

	1988	2006	Change (%) 2006-1988
Basic controls only			
- Some Sec. and above/ Primary. and below	0.415	0.492	*18.5*
- At least some tertiary/Secondary and below	0.660	0.693	*5.0*
Basic controls + Industry dummies			
- Some Sec. and above/ Primary and below	0.254	0.201	*-20.9*
- At least some tertiary/Secondary and below	0.437	0.392	*-10.3*

Thailand

Table 6a: Returns to levels of education - Employed for wages

	1990	2004	Change (%) 2004-1990
Basic controls only			
- Primary	0.301	0.394	*30.9*
- Junior Sec./primary	0.374	0.316	*-15.5*
- Senior Sec./ primary	0.636	0.603	*-5.2*
- Tertiary/primary	1.093	1.289	*17.9*
Basic controls + Industry dummies			
- Primary	0.221	0.253	*14.5*
- Junior Sec./primary	0.306	0.214	*-30.1*
- Senior Sec./ primary	0.571	0.430	*-24.6*
- Tertiary/primary	1.089	1.072	*-1.5*

	1990	2004	Change (%) 2004-1990
Basic controls only			
- High school general/ primary	0.471	0.482	2.3
- High school vocational/ primary	0.730	0.719	-1.5
- Tertiary/primary	1.097	1.289	17.5
Basic controls + Industry dummies			
- High school general/ primary	0.389	0.327	-15.9
- High school vocational/ primary	0.666	0.533	-20.0
- Tertiary/primary	1.094	1.078	-1.5

Table 6b: Returns to skill over time – Employed for wages

	1990	2004	Change (%) 2004-1990
Basic controls only			
- Upper Sec. and above/ Low sec. and below	0.857	0.989	*15.4*
-At least some tertiary/Secondary and below	1.074	1.259	*17.2*
Basic controls + Industry dummies			
- Upper Sec. and above/ Low sec. and below	0.846	0.696	*-17.7*
- At least some tertiary/Secondary and below	1.056	0.955	*-9.6*

Vietnam

Table 7a: Returns to levels of education - Employed for wages

	1992	2006	Change * 2006-1992
Basic controls only			
- Primary	-0.019	0.094	*0.113*
- Junior Sec./primary	-0.172	0.055	*0.227*
- Senior Sec./ primary	-0.175	0.210	*0.385*
- Tertiary/primary	0.00	0.648	*0.648*
Basic controls + Industry dummies			
- Primary	-0.018	0.080	*0.098*
- Junior Sec./primary	-0.167	0.039	*0.206*
- Senior Sec./ primary	-0.123	0.195	*0.318*
- Tertiary/primary	0.151	0.638	*0.487*

	1992	2006	Change * 2006-1992
Basic controls only			
- High school general/ primary	-0.040	0.147	*0.187*
- High school vocational/ primary	-0.222	0.211	*0.433*
- Tertiary/primary	0.023	0.648	*0.625*
Basic controls + Industry dummies			
- High school general/ primary	0.001	0.142	*0.141*
- High school vocational/ primary	-0.167	0.187	*0.354*
- Tertiary/primary	0.135	0.634	*0.499*

* Changes rather than percentage changes are given.

Table 7b: Returns to skill over time – Employed for wages

	1992	2006	Change * 2006-1992
Basic controls only			
- Lower Sec. and above/ primary and below	-0.206	0.242	*0.448*
- Upper Sec. and above/ Low sec. and below	-0.100	0.414	*0.514*
- At least some tertiary/Secondary and below	0.146	0.545	*0.399*
Basic controls + Industry dummies			
- Lower Sec. and above/ primary and below	-0.082	0.170	*0.252*
- Upper Sec. and above/ Low sec. and below	0.030	0.276	*0.246*
- At least some tertiary/Secondary and below	0.239	0.516	*0.277*

***** Changes rather than percentage changes are given.

Cambodia

Table 8a: Returns to levels of education - Employed for wages

	1997	2007	Change (%) 2007-1997
Basic controls only			
- Primary	0.124	0.330	*166.1*
- Junior Sec./primary	0.087	0.265	*204.6*
- Senior Sec./ primary	0.129	0.462	*258.1*
- Tertiary/primary	0.349	1.097	*214.3*
Basic controls + Industry dummies			
- Primary	0.127	0.173	*36.2*
- Junior Sec./primary	0.063	0.128	*103.2*
- Senior Sec./ primary	0.119	0.208	*74.8*
- Tertiary/primary	0.361	0.761	*110.8*

Table 8b: Returns to skill over time – Employed for wages

	1997	2007	Change (%) 2007-1997
Basic controls only			
- Lower Sec. and above/ primary and below	0.174	0.518	*197.7*
- Upper Sec. and above/ Low sec. and below	0.154	0.595	*286.4*
- At least some tertiary/Secondary and below	0.190	0.939	*394.2*
Basic controls + Industry dummies			
- Lower Sec. and above/ primary and below	0.146	0.256	*75.3*
- Upper Sec. and above/ Low sec. and below	0.155	0.301	*94.2*
- At least some tertiary/Secondary and below	0.302	0.630	*108.6*

China

Table 9a: Returns to levels of education - Employed for wages

	1999	2005	Change (%) 2005-1999
Basic controls only			
- Primary	0.095	0.131	*37.9*
- Junior Sec./primary	0.054	0.159	*194.4*
- Senior Sec./ primary	0.192	0.466	*142.7*
- Tertiary/primary	0.607	0.958	*57.8*
Basic controls + Industry dummies			
- Primary	0.108	0.089	*-17.6*
- Junior Sec./primary	0.052	0.163	*213.5*
- Senior Sec./ primary	0.178	0.468	*162.9*
- Tertiary/primary	0.538	0.930	*72.9*

Table 9b: Returns to skill over time – Employed for wages

	1999	2005	Change (%) 2005-1999
Basic controls only			
- Upper Sec. and above/ Low sec. and below	0.271	0.475	*75.3*
- At least some tertiary/Secondary and below	0.454	0.609	*34.1*
Basic controls + Industry dummies			
- Upper Sec. and above/ Low sec. and below	0.239	0.456	*90.8*
- At least some tertiary/Secondary and below	0.397	0.578	*45.6*

Mongolia

Table 10a : Returns to levels of education - Employed for wages

	1998*	2002**	2007-8***	Change**** 1998-2007
Basic controls only				
Primary	-0.250	0.059	0.116	*0.366*
Junior Sec./primary	0.521	0.203	0.290	*-0.231*
Senior Sec./ primary	0.603	0.249	0.786	*0.183*
Higher Diploma/primary	0.667	0.500	1.306	*0.639*
University/primary	0.979	0.705	1.387	*0.408*
Basic controls + Industry dummies				
Primary	-0.243	0.074	0.108	*0.351*
Junior Sec./primary	0.463	0.195	0.292	*-0.171*
Senior Sec./ primary	0.520	0.259	0.776	*0.252*
Higher Diploma/primary	0.592	0.524	1.294	*0.702*
University/primary	0.896	0.725	1.365	*0.469*

* Estimates not statistically significant except for university. ** Estimates not statistically significant except for higher diploma and university. *** Estimates are all statistically significant except for primary. ******** Changes rather than percentage changes are given.

	1998	2002	2007-8	Change**** 1998-2007
Basic controls only				
High school general/ primary	0.650	0.215	0.743	*0.093*
High school vocational/ primary	0.525	0.325	0.874	*0.349*
Tertiary/primary	0.854	0.603	1.349	*0.495*

Basic controls + Industry dummies				
High school general/ primary	0.567	0.223	0.736	*0.169*
High school vocational/ primary	0.438	0.335	0.865	*0.427*
Tertiary/primary	0.773	0.624	1.332	*0.559*

********Changes rather than percentage changes are given.

Table 10b: Returns to skill over time – Employed for wages

	1998	2002	2007-8	Change**** 1998-2007
Basic controls only				
Upper secondary and above/ Lower Secondary and below	0.315	0.264	0.769	*0.454*
At least some tertiary/ Secondary and below	0.299	0.376	0.701	*0.411*
Industry dummies included				
Upper secondary and above/ Lower Secondary and below	0.280	0.282	0.743	*0.463*
At least some tertiary/ Secondary and below	0.286	0.392	0.684	*0.398*

******** Changes rather than percentage changes are given.

The charts below (Figures 1 to 7) show the evolution of skill premiums along with the evolution of the proportion of skilled labor –indicating increasing demand for skilled labor in most countries. In Indonesia, while the skilled workforce increased and leveled off after 2003, skill premiums slightly declined after 2000, rebounding moderately by 2007. In the Philippines, against the backdrop of increasing supply of skilled labor, without controlling for industry affiliation the return to skill is showing an increasing trend after 1994. However, after controlling for industry affiliation, the return to skill declined slightly especially after 1997. In Thailand, the significant increases in supply of skilled workers were mirrored with a leveling off and slight decline of the skill premium after 1994, but, overall, skill premiums have been increasing over the long run. For Vietnam, there is evidence of significant excess demand of skilled labor. Premiums have increased sharply throughout the period, starting with negative premiums prior to the reforms. In Cambodia, while supply of skills increased only moderately over the last decade, skill premiums increased sharply between 1997 and 2003 (indicating an excess demand for skilled labor during this period), then leveled off indicating sluggish demand for skilled labor in recent years. In China skill premiums increased sharply in urban areas between 1999 and 2005, despite significant increases in the supply of skilled labor. Finally for Mongolia the charts highlight the sharp rebound of skill premiums in recent years.

Figure 1 (a): Indonesia Skill Premiums – basic controls

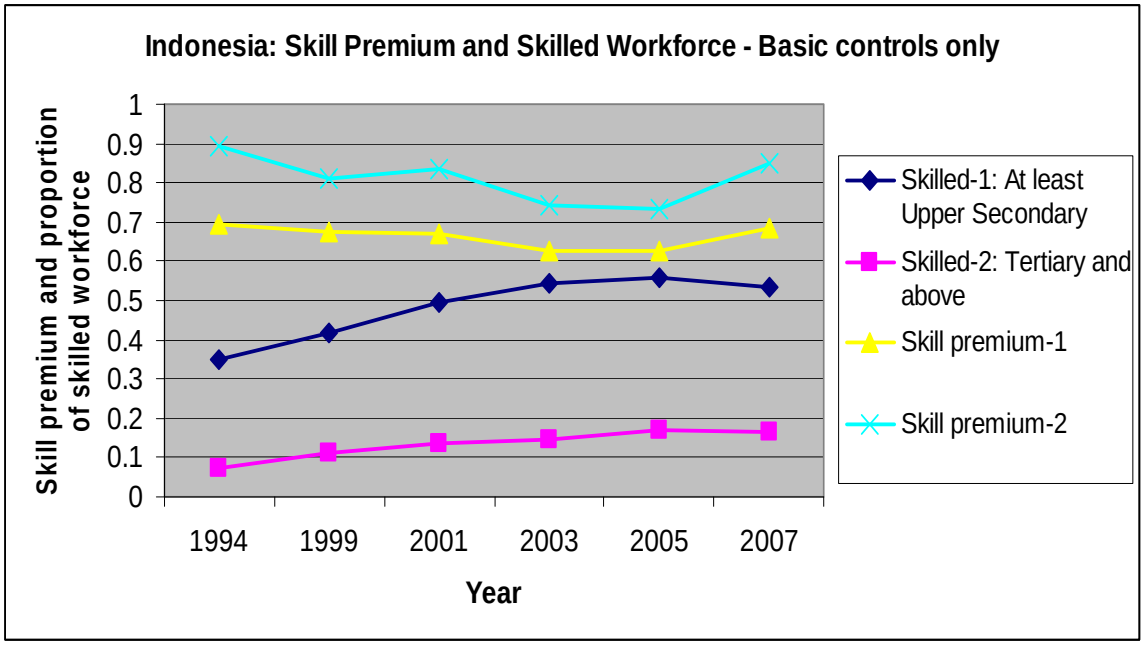


Figure 1 (b): Indonesia Skill Premiums – industry controls

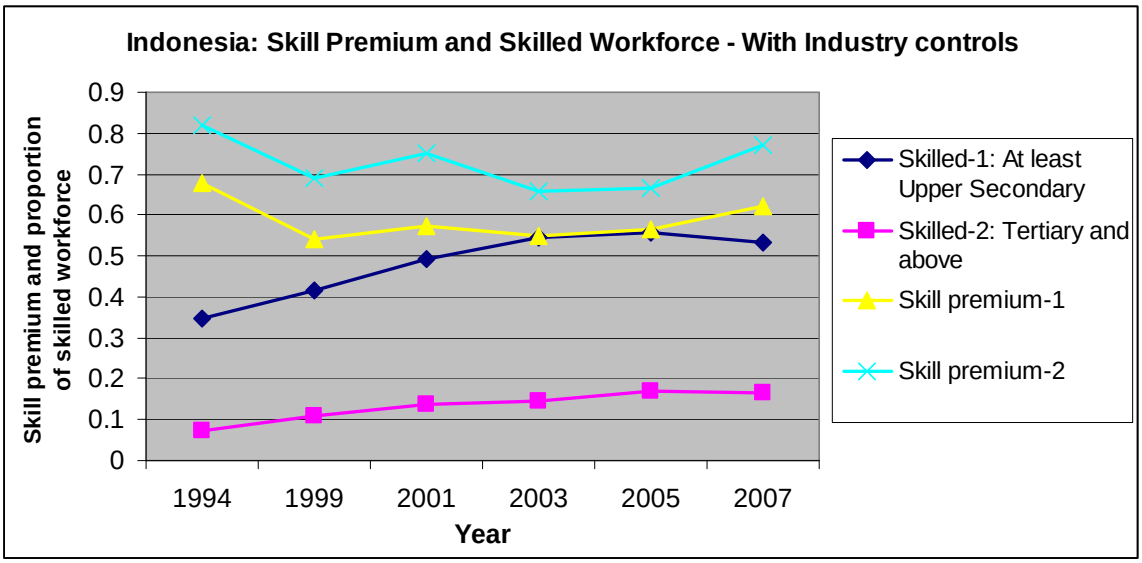


Figure 2 (a): Philippines Skill Premiums – basic controls

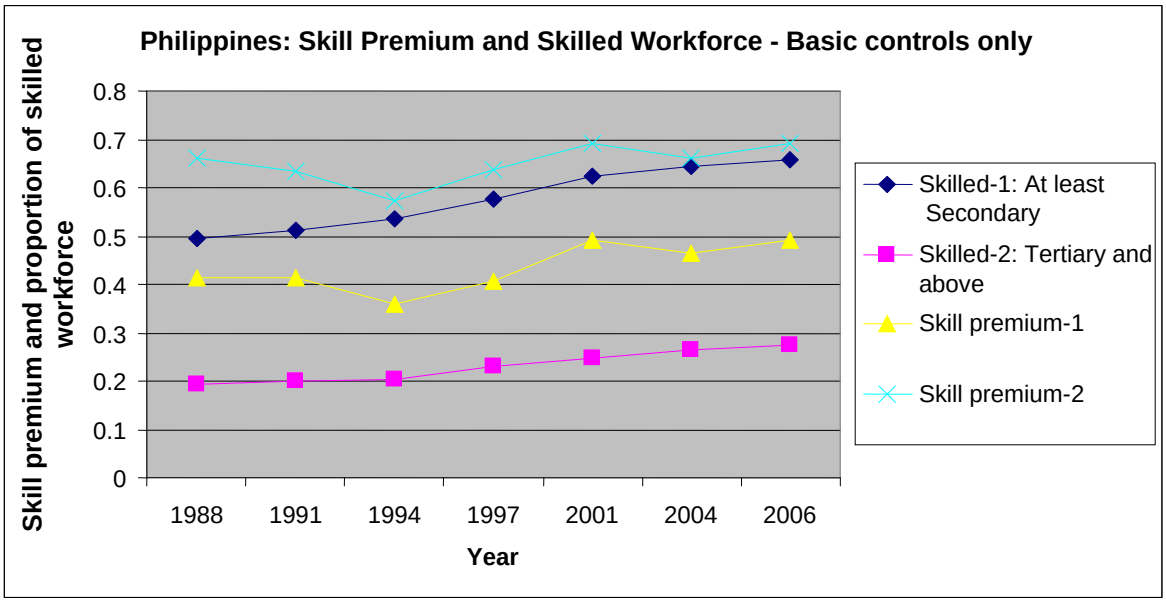


Figure 2 (b): Philippines Skill Premiums – industry controls

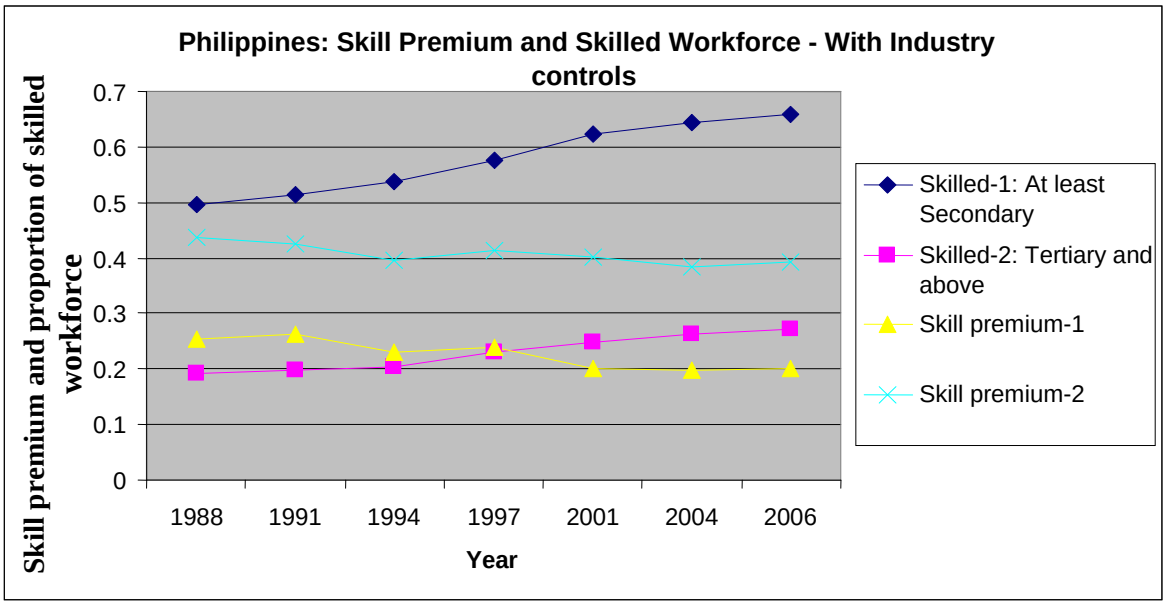


Figure 3 (a): Thailand Skill Premiums – basic controls

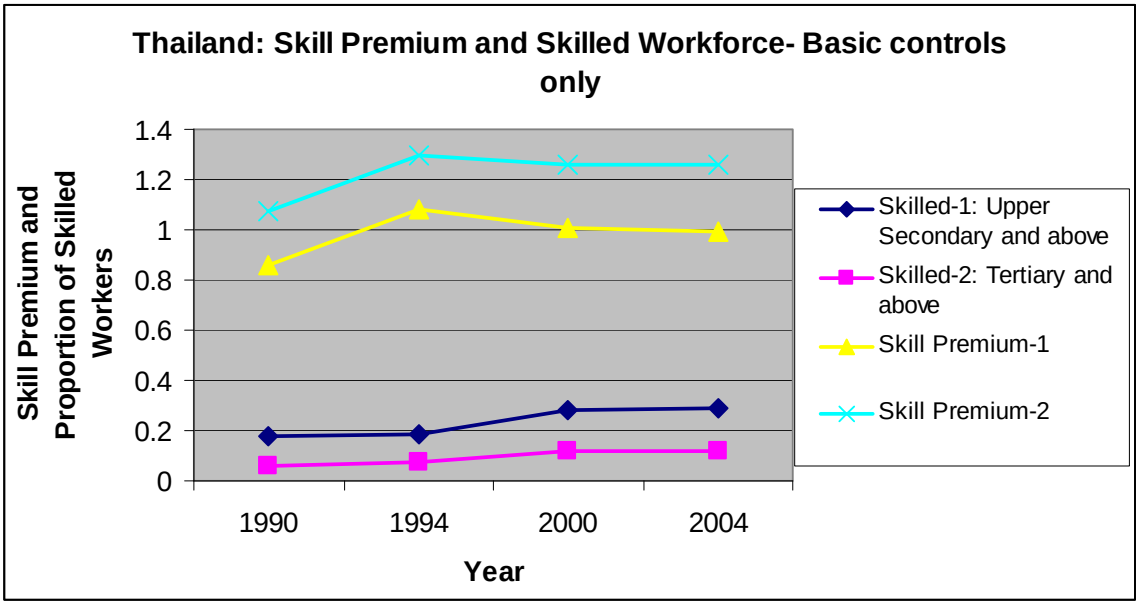


Figure 3 (b): Thailand Skill Premiums – industry controls

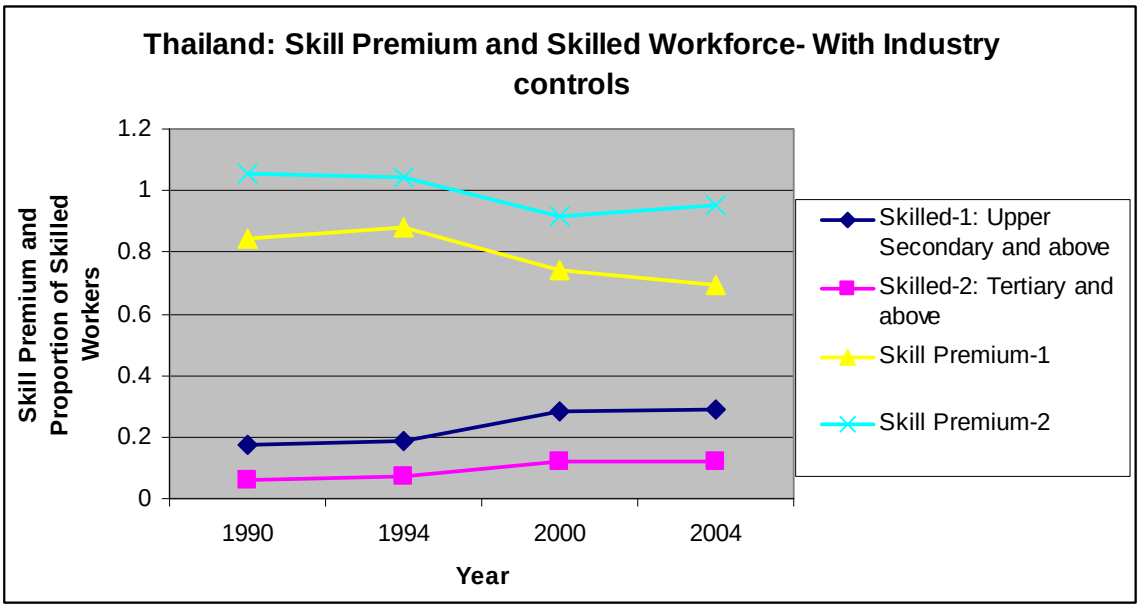


Figure 4 (a): Vietnam Skill Premiums – basic controls

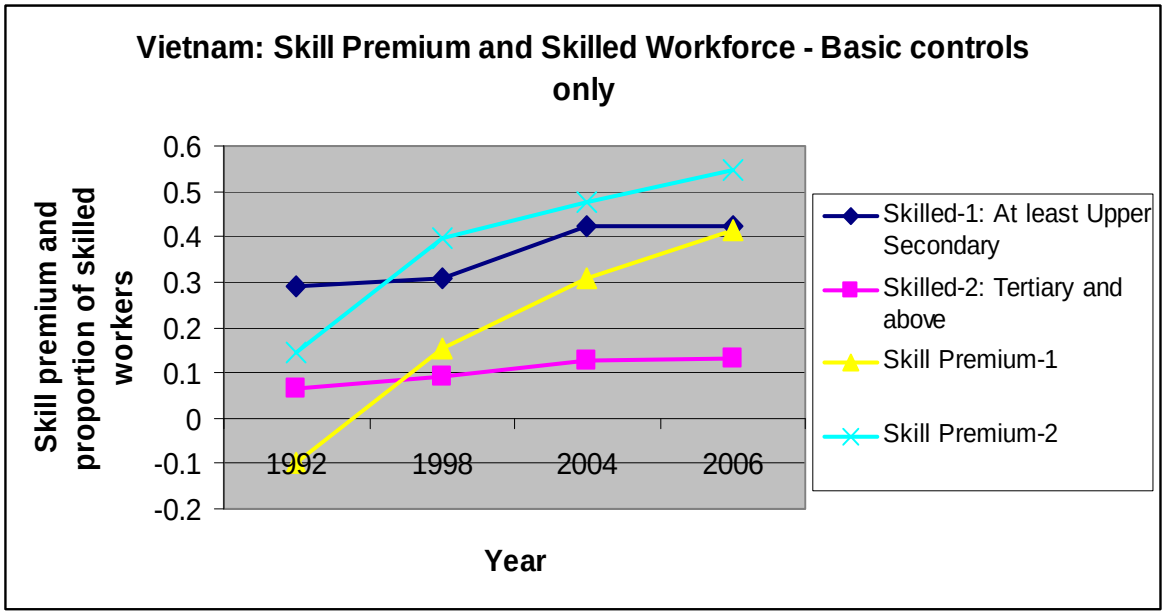


Figure 4 (b): Vietnam Skill Premiums – industry controls

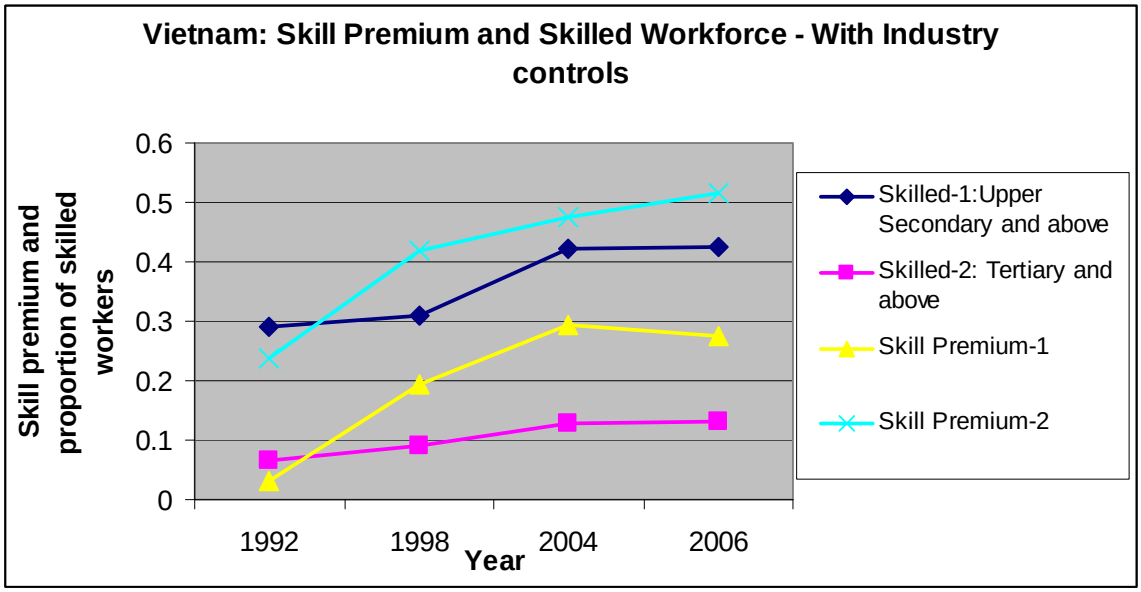


Figure 5 (a): Cambodia Skill Premiums – basic controls

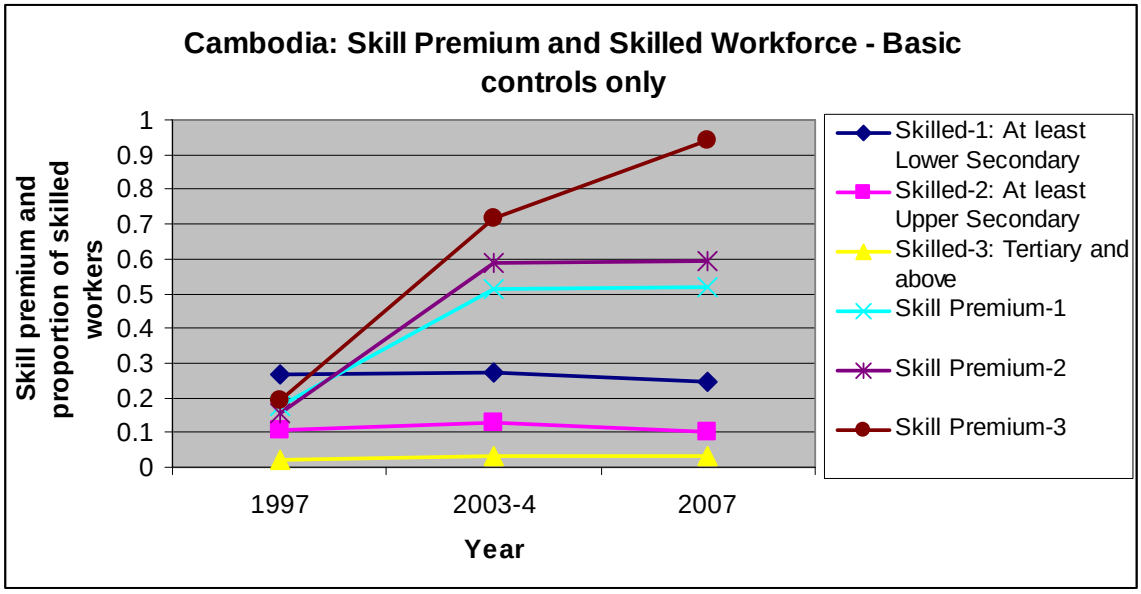


Figure 5 (b): Cambodia Skill Premiums – industry controls

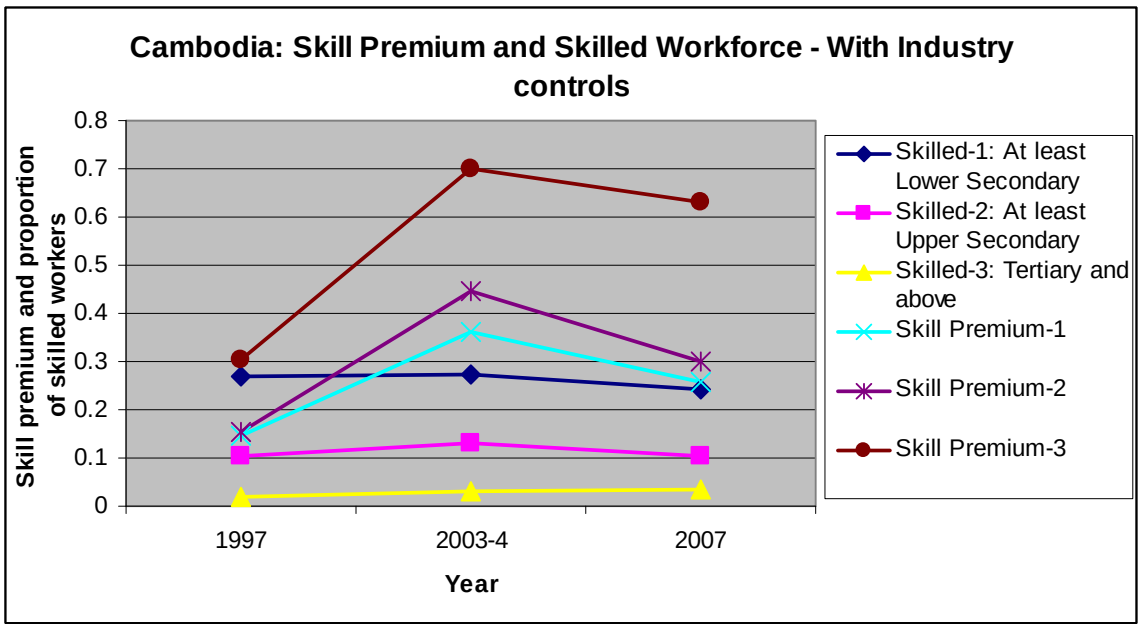


Figure 6 (a): China Skill Premiums – basic controls

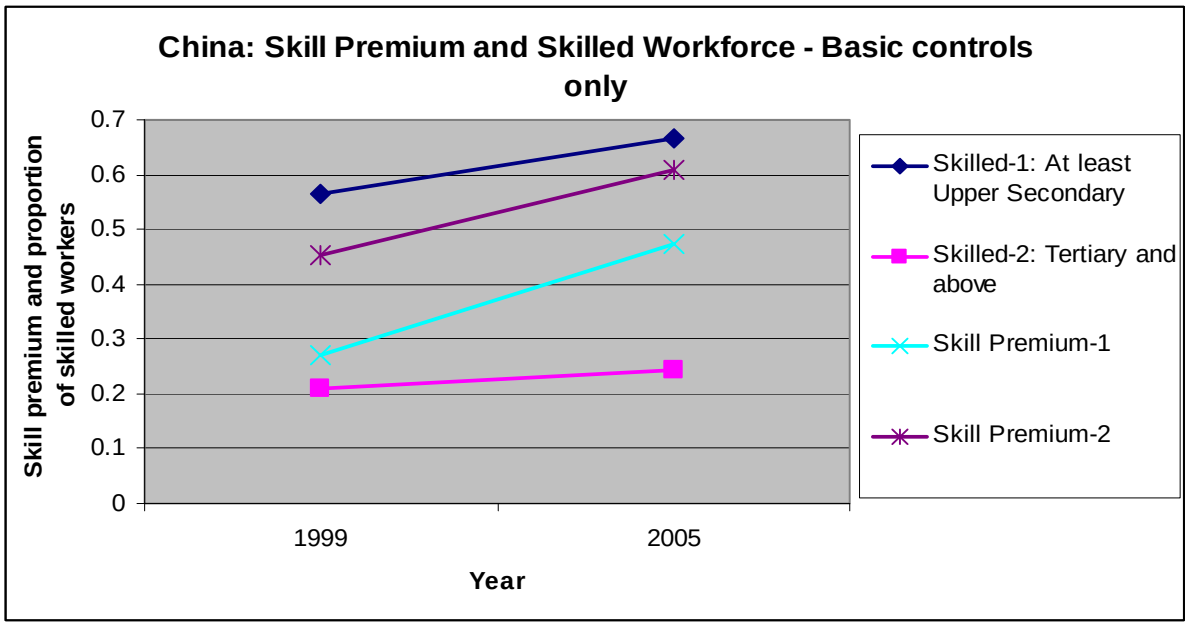


Figure 6 (b): China Skill Premiums – industry controls

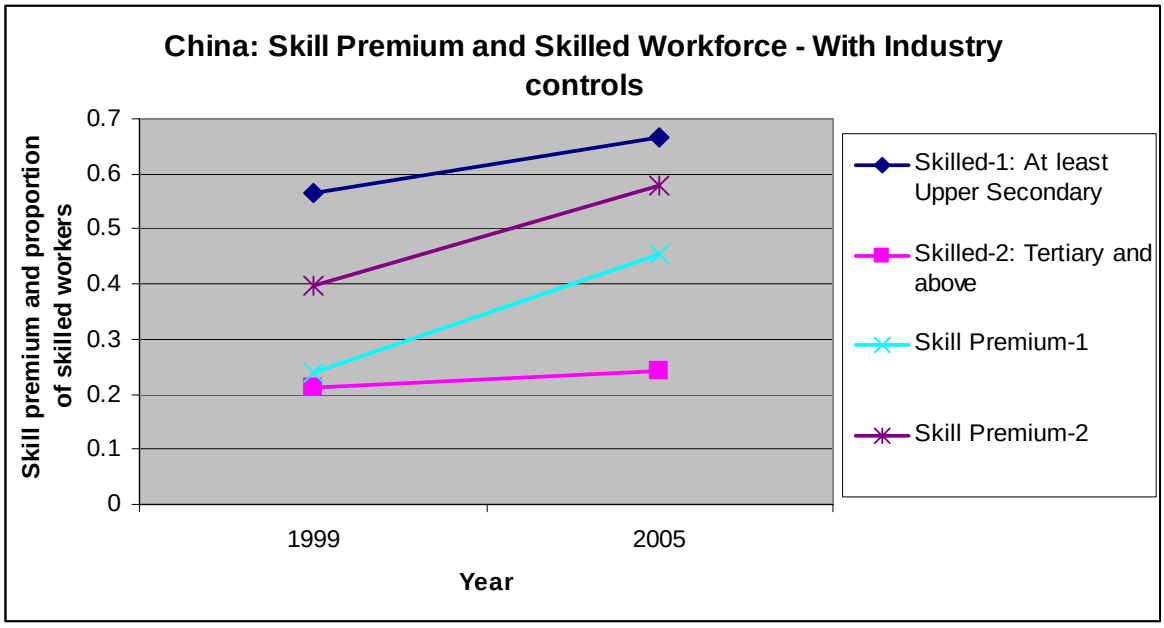


Figure 7 (a): Mongolia Skill Premiums – basic controls

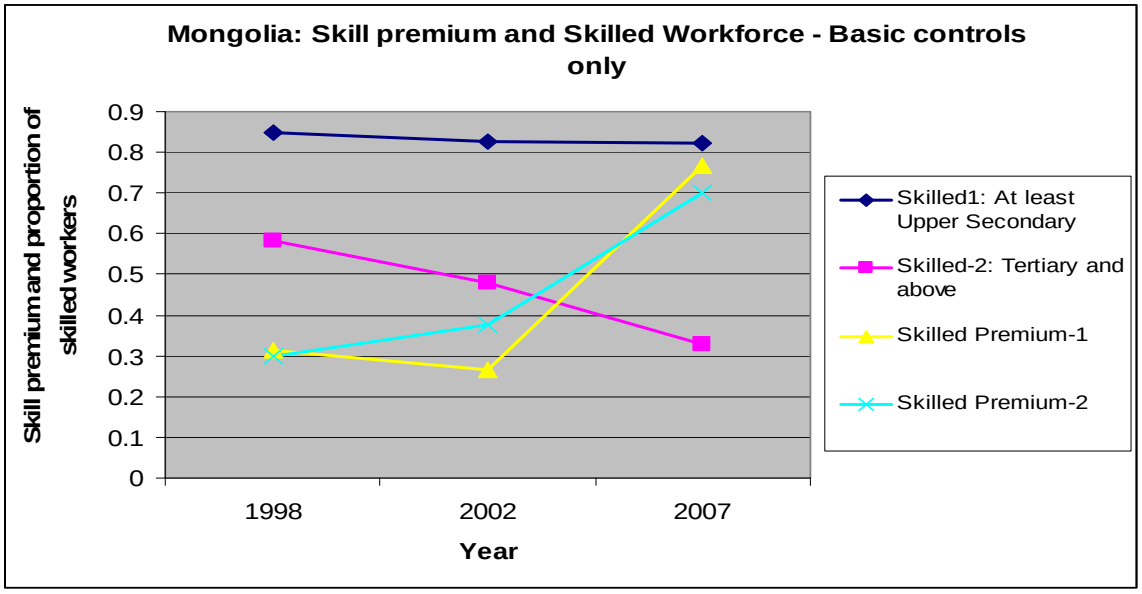
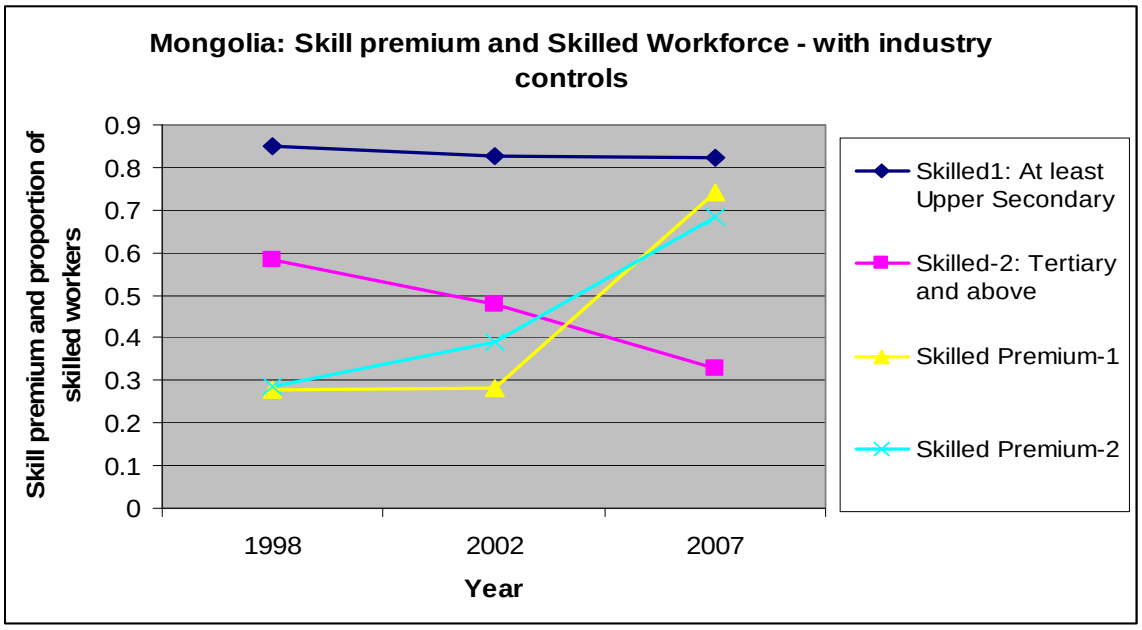


Figure 7 (b): Mongolia Skill Premiums – industry controls



Tables 11a and 11b report changes in wage premiums for selected skill definitions associated to education qualifications. Together with the change in supply of skills, they are revealing of the evolution of excess demand or excess supply of skills over time. There seems to be a divide between three groups of countries: Indonesia, Philippines and Thailand; Vietnam and China; and Cambodia and Mongolia. For the first group of countries, the increase in the supply of skills over time has been very strong and seems to have been accompanied by a slight decrease (Indonesia) or moderate increase in wage skill premiums with only basic controls and a moderate decline in wage skill premiums controlling for industry affiliation. Overall, these trends indicate moderate but still sustained demand for skills, to a large extent driven by industry affiliation in the Philippines and Thailand – that is skills rewards tend to be increasingly industry specific in these two countries.

Table 11a: Percentage change in the return to skill over time with basic controls only

Qualification	% change						
	Indonesia 1994-07	Philippines 1988-06	Thailand 1990-04	Vietnam 1992-06	Cambodia 1997-07	China 1999-05	Mongolia 1998-07
Lower Sec. and above/ Primary and below	-	-	-	*	197.7	-	-
Upper Sec. and above/ Low sec. and below	-1.9	18.5	15.4	**	286.4	75.3	144.1
Tertiary/ Secondary and below	-4.7	5.0	17.2	273.2	394.2	34.1	134.4

* Premium increased sharply from approximately -21% in 1992 to about 24% in 2006.
** Premium increased from -10% in 1992 to about 41% in 2006.

Table 11b: Percentage change in the return to skill over time with industry controls

Qualification	% change						
	Indonesia 1994-07 (1996-07)	Philippines 1988-06	Thailand 1990-04	Vietnam 1992-06	Cambodia 1997-07	China 1999-05	Mongolia 1998-07
Lower Sec. and above/ Primary and below	-	-	-	*	75.3	-	-
Upper Sec. and above/ Low sec. and below	-8.1	-20.9	-17.7	**	94.2	90.8	165.3
Tertiary/ Secondary and below	-5.9 (-2.1)	-10.3	-9.6	115.9	108.6	45.6	134.5

* Premium increased sharply from approximately -8% in 1992 to about 17% in 2006.
** Premium increased by 9 times from 3% in 1992 to about 28% in 2006.

On the other hand, in the case of Vietnam, Cambodia, Mongolia and China we see much higher increase in wage skill premiums, even after controlling for industry affiliation, combined with increases in the supply of skills over time (Vietnam and China) and a stagnation or decrease (Cambodia and Mongolia). An excess in the demand for skills is the most likely explanation for the trends in China and Vietnam; while shortage of skills is a likely explanation for the trends in Cambodia and Mongolia.

The estimates for Vietnam confirm that Vietnam – a country which has experienced strong growth – has faced constraints to growth due to insufficient skills. The increase in wage premiums over the 1992-2006 period has been striking, especially for tertiary qualifications. The reported increases in wage premiums evolved mostly during the 1998-2004 period in the case of secondary qualifications and between 1992 and 1998 for tertiary qualifications

Education reforms, especially at the higher education level were part of the *Doi Moi* market oriented reforms of the 1990s in Vietnam. Before the implementation of the reforms, public sector remuneration policy let to a compression of earnings differentials

across education groups. The process of dismantling the old public sector wage system began in 1990[3]. Salaries of public servants were to be set according to market rates, and the salary wage structure would reward public sector workers according to education level, job responsibility and performance[4]. The implementation of these reforms led to an increase in the demand for certain types of labor, particularly in trade and services. This resulted in a shortage of high level technical experts, skilled technical workers, administrative and managerial experts and researchers, among others (Nguyen et. al 1991; Sakellariou and Patrinos 2000). As a result of the *Doi Moi* policies, employment growth was highest in the private sector which absorbed most new labor market entrants and workers let go from the by government and state enterprises.

What we see with respect to the development of education premiums over time in Vietnam is that the increase in premiums is higher the higher the education qualification (Tables A18a-A18d). For example, Senior Secondary and Tertiary premiums quadrupled over the 1992-2006 period, and most of the increase took place in the middle to late 1990s coinciding with the *Doi Moi reforms.*

In the case of China, as in the case of Vietnam, premiums increase with higher qualifications. Large increases in premiums are found for Senior Secondary and tertiary education, while the premium of primary education remained approximately constant over the 1999-2005 period.

Despite the similarity in the growth of wage premiums over time between Cambodia and Vietnam, the source of the developments in wage premiums in Cambodia is probably different. Wage premiums exhibited an impressive growth at all levels in Cambodia as was the case in Vietnam. However, in Cambodia, the increases in the return to skill took place during the 1997-2003 period and stagnated thereafter. Overall, with the exception of Tertiary education where we observe a large increase in premiums over time (again

[3] Remuneration of public sector workers ceased to be based on length of service and jobs were no longer guaranteed for life (Hiebert 1993; Norlund 1993).

[4] The full impact of these reforms probably came only years later, since those hired prior to 1994 were largely exempted (World Bank 1996).

most of it during the 1997-2003 period) despite the doubling of the proportion of workers with tertiary qualifications, only a modest increase in premiums is observed for lower education qualifications, due to the stagnation of premiums after 2003.

The economy of Cambodia did not go into a phase of high growth as was the case in Vietnam. Ridao-Cano (2003) tried to identify key constraints in the development of new sources of economic growth in terms of the supply of skills. Some of the questions addressed are: (i) What is the supply of skills in the labor market; (ii) What is the demand for skilled and educated workers in the labor market; (iii) How adequate is the current supply of skills to the current demand for skills in the labor market - do these reflect a shortage on the supply side or demand side? (iv) Is the current supply of skills a constraint to the development of new sources of growth (as opposed to current sources of growth)? He found that although the current supply of skills is low, there does not appear to be a strong demand for skills in the current labor market, which results in an overall adequacy of skills supplied and skills demanded. The high and increasing estimated returns to schooling in the labor market reflect a shortage in the supply of skills rather than an excess in the demand for skills.

Finally in Mongolia, skill premiums almost tripled over the last decade, mostly due to a sharp increase in recent years. This increase in skill premiums is mainly due to higher premiums for tertiary education; however the increase in skill premiums for other levels of education is also significant. The increase has been accompanied by decreases in the supply of skilled labor.

4. 3. Evolution of Industry[5] and Skill Premiums across Countries, Sectors and Time

Table 12 summarizes the evolution of average industry and skill premiums weighted by industry shares, across countries and time. Equation (1) was estimated, resulting in

[5] The industry disaggregation varies between countries, depending on whether the industry affiliation variable in the dataset is available at the 1-digit, or 2-digit level, as well as at the cell numbers of useable observations per industry group. For Indonesia and the Philippines industry was available at the 2-digit level. However, in the cases of Thailand, Vietnam, Cambodia and China it was only available at the 1-digit level.

estimates of industry and skill coefficients by industry group. The sum of the weighted coefficients of industry and skill for each country are the average premiums for each year. In estimating industry premiums, the excluded group is Agriculture. In estimating skill premiums, the excluded group is unskilled workers irrespectively of industry affiliation.

The interpretation of the industry premium for a particular industry group is the percentage change in the hourly wage from working in that particular industry in comparison to working in Agriculture. The sum of the weighted premiums over the *n-1* industry premiums for each industry group is a measure of the average industry premium (vs. Agriculture) for that year. For example, in the case of the Philippines, the average industry premium in 1991 was approximately 7.3 percent, with Agriculture being the comparison group.

Similarly, the interpretation of the premium for being a skilled worker (upper secondary or higher / tertiary or higher) within a particular industry group is the percentage change in the hourly wage from being a skilled worker in that particular industry in comparison to being an unskilled worker anywhere. The sum of the *n* skill premiums is a measure of the average skill premium for that year. For example, in the case of the Philippines, the average skill premium (upper secondary and above) for year 1988 was approximately 26.5 percent in comparison to unskilled workers anywhere, and the average skill premium (tertiary and above) for the same year was just over 40 percent.

Table 12: Industry and Skill Premiums across Countries and Time

Mean Wage Premiums	Indonesia	Philippines	Thailand	Vietnam	Cambodia	China	Mongolia
Stand. Industry Premium:	1994-07	1988-06	1990-04	1992-06	1997-07	1999-05	1998-07
Excluded: Agriculture	(1996-07)						
1988		0.085					
1990			0.481				
1991		0.073					
1992				-0.033			
1994	0.045*	0.098	0.584				
1996	0.156						
1997	0.108	0.122			0.086		
1998				-0.15			0.271

1999	0.093					-0.030	
2000			0.734				
2001	0.129	0.226					
2002							
2003	0.101				0.385		
2004		0.207	0.646	-0.007			
2005	-0.008					-0.356	
2006		0.194		-0.011			
2007	-0.01				0.412		0.047
Change in average	***-0.055***	***0.109***	***0.165***	***0.022***	***0.326***	***-0.326***	***-0.224***
Industry Premium	***(-0.166)***						
Stand. Skill Wage Premium (Secondary and above)**							
1988		0.265					
1990			0.837				
1991		0.273					
1992				-0.044			
1994	0.544*	0.245	0.868				
1996	0.604						
1997	0.619	0.269			0.091		
1998				0.090			0.299
1999	0.611					0.274	
2000			0.745				
2001	0.647	0.258					
2002							
2003	0.584				0.324		
2004		0.276	0.662	0.289			
2005	0.607					0.479	
2006		0.296		0.281			
2007	0.650				0.270		0.714
Change in average	***0.106***	***0.031***	***-0.175***	***0.325***	***0.179***	***0.205***	***0.415***
Skill Premium	***(0.046)***						
Stand. Skill Wage Premium (Tertiary and above)***							
1988		0.414					
1990			1.087				
1991		0.406					
1992				0.229			
1994	0.769*	0.381	1.248				
1996	0.803						
1997	0.865	0.402			0.204		
1998				0.266			0.281
1999	0.748					0.412	
2000			1.232				
2001	0.730	0.378					
2002							
2003	0.721				0.455		
2004		0.390	1.088	0.474			
2005	0.694					0.583	

2006		0.377		0.569			
2007	0.810				0.275		0.701
Change in average	***0.040***	***-0.037***	***0.00***	***0.34***	***0.071***	***0.171***	***0.420***
Skill Premium	***(0.007)***						

*The industry variable in the 1994 Sakernas is at the one-digit level;** Lower secondary and above for Cambodia; *** Upper secondary and above for Cambodia.

In Indonesia, the evolution of industry premiums over time suggests that the premium of belonging to an industry other than Agriculture has declined substantially over time, and has turned in favor of Agriculture sometime after 2003. In the Philippines, Thailand and Cambodia the opposite was the case; industry premiums increased over time and the proportional increase was largest in the case of Cambodia (premiums increased fivefold), followed by the Philippines. For the Philippines, most of the increase took place sometime between 1998 and 2001 and for Cambodia sometime between 1998 and 2003. In the case of Vietnam, small premiums in favor of Agriculture were observed over the entire period. In China, the reward of being in an industry other than Agriculture has declined sharply over time.[6] In Mongolia, the premium of belonging to an industry other than Agriculture has declined substantially over time.

The results on skill premiums confirm the previous country grouping, with generally stable premiums for Indonesia, Philippines and Thailand, and increasing ones for the other countries. Average skill premiums in Indonesia, for both definitions, remained fairly stable, exhibiting only a small increase over time during the 1996-2007 period (i.e., discarding 1994), especially for those with tertiary education. This was also the case for the Philippines were practically no change is observed. This finding for the Philippines is somewhere in-between what was reported in table 10a (no controls for industry affiliation) and table 10b (with controls for industry affiliation) where declines in skill premiums of 20 and 10 percent respectively are reported for those with at least some senior secondary and tertiary qualifications.

[6] Note that, the data are for urban populations and, therefore, the agricultural sector is very small in comparison to the other countries examined.

In Thailand, using the first definition of skilled workers (senior secondary education and above), average skill premiums declined over time by about 20 percent (mostly after 1994), while using the second definition skilled premiums remained unchanged. These results for Thailand are based on regressions which included 1-digit industry affiliations and the sample of all members of the household. When the alternative sample of heads of household only was used (a significantly older group of workers) which allowed for 2-digit industry affiliations, average standardized skill premiums show a decline for both definitions (more using the first definition of skill).

The results for Vietnam indicate a spectacular increase in skill premiums over time, consistent with other findings for Vietnam in this report. At the beginning of the period (1992), and before the *Doi Moi* reforms impacted the labor market, average skill premiums were actually negative (secondary and above) or indicated a small skill premium (tertiary qualifications). Subsequently, skill premiums increased monotonically. Most of the increase took place between 1998 and 2004 (secondary and above) and between 2004 and 2006 (tertiary).

In the case of Cambodia the two definitions of skill are Lower Secondary and above and Senior Secondary and above[7]. Between 1997 and 2003-4, large increases in average skill premiums are observed in Cambodia for both skill definitions. Premiums more than tripled (lower secondary and above) and more than doubled (senior secondary and above). However, premiums seem to have declined somewhat subsequently, this possibly reflecting data comparability issues between the 2007 and earlier surveys. Overall, skill premiums tripled (lower secondary and above definition) / displayed a moderate increase (senior secondary or higher definition).

In China, average skill premiums have increased substantially over the 1999-2005 period (second only to Mongolia and Vietnam). Finally in Mongolia, skill premiums for both

[7] This is because the proportion of workers with university education is small, making it difficult to estimate coefficients of skill within certain industry groups.

definitions of skill increased more than any other country in the group, tripling over the last decade.

With respect to the question of whether industry premiums or skill premiums changed more over time, the evidence from Table 12 is mixed: in the Philippines and Cambodia industry premiums changed more than skill premiums –suggesting that they are the main driver of wage differentials; in Thailand, Mongolia and China we observe significant changes in both industry and skill premiums which go in opposite directions – skill premiums are confirmed to be the main wage driver in China and Mongolia, while industry premiums are the main driver in Thailand; in Vietnam we see a spectacular increase in skill premiums and hardly any increase in industry premiums; finally in Indonesia the answer depends on whether we compare over the 1994-2007 or the 1996-2007 period and on the skill definition used.

Table 13 reports estimates of the variance of industry and skill premiums over time. Overall, dispersion of industry premiums for Indonesia, Vietnam, China and Mongolia remained low with little tendency for change, while it increased sharply over time for Cambodia and moderately for the Philippines and Thailand. The variance levels as well as their evolution would seem to indicate that labor markets are more segmented in Cambodia, Thailand and Philippines than elsewhere (noting the evidence above on countries with faster rising industry premiums), pointing to the need for focusing on policies that make labor markets less segmented. An open question for Thailand and the Philippines – which show both evidence of raising industry premiums and increasingly industry-specific skill premiums over the long-run – is to what extent industry-specific skill premiums are associated with higher overall industry premiums in the most skilled intensive sectors or correspond to "real" variation in skill premiums across sectors. The variance and sector analysis of skill premiums provided below will help clarify this issue.

With respect to the dispersion of skill premiums, the dispersion for Cambodia, China and Mongolia remained very low with no significant change over time for both definitions of skill. The dispersion of skill premiums increased for the first definition of skill in the case

of the Philippines (mostly after 2000), but remained broadly stable for the second definition of skill (tertiary and above); showed an overall increase in Indonesia (once year 1994 is discarded) for the first definition of skill and a small decrease for the second definition of skill, after increasing until 2001 and declining thereafter; in Thailand we observe a significant increase in the dispersion of premiums for tertiary education during the early 1990s (but remained unchanged during the 1994-2004 period), but a small decrease in dispersion for senior secondary and above. A notable observation is the sharp decline in the dispersion of tertiary education premiums in Vietnam, which declined continuously after 1992 (while the dispersion of premiums for senior secondary and above remained stable). Overall, the low variance magnitudes and decrease or stability in time in most countries make it clear that investing in general curriculum makes more sense than investing in too specific curricula since demand for skills is not very sector specific. The sector specificity of demand for skills, while a bit higher, has decreased sharply over time in Vietnam pointing to the need for more general education. Where demand for skills has become a bit more sector specific in time is in the Philippines (overall), Thailand (tertiary and above) and Indonesia (secondary and above). These results are broadly aligned with the above evidence which shows lower overall skill premiums after industry affiliation is controlled for in the Philippines and Thailand, and lower premiums for upper secondary education after industry affiliation is controlled for in Indonesia. They also confirm the differentiation of skill premiums across sectors in the Philippines and Thailand – beyond possible industry premiums effects. Overall, these results suggest that there may be more ground for incorporating specific elements in the general curricula of Indonesia, the Philippines and Thailand. The analysis by sector presented below will provide more guidance on the direction of these changes.

Table 13: Variance of Industry and Skill Premiums across Countries and Time

Variance: **Industry Premiums**	Indonesia 1994-07 (1996-07)	Philippines 1988-06	Thailand 1990-04	Vietnam 1992-06	Cambodia 1997-07	China 1999-05	Mongolia 1998-2007
1988		0.050					
1990			0.158				
1991		0.051					
1992				0.016			
1994	0.004*	0.036	0.212				
1996	0.011						
1997	0.010	0.063			0.008		
1998				0.019			0.016
1999	0.009					0.018	
2000			0.276				
2001	0.012	0.079					
2002							
2003	0.009				0.076		
2004		0.076	0.196	0.016			
2005	0.013					0.021	
2006		0.082		0.013			
2007	0.008				0.121		0.009
Change in Variance	**0.004** ***(-0.003)***	***0.032***	***0.038***	***-0.003***	***0.113***	***0.003***	***-0.007***
Variance: Skill Premiums (Secondary and above)**							
1988		0.026					
1990			0.064				
1991		0.025					
1992				0.061			
1994	0.017*	0.019	0.032				
1996	0.047						
1997	0.047	0.024			0.008		
1998				0.101			0.031
1999	0.053					0.020	
2000			0.026				
2001	0.101	0.035					
2002							
2003	0.083				0.034		
2004		0.048	0.036	0.023			
2005	0.060					0.012	
2006		0.047		0.051			
2007	0.071				0.016		0.043
Change in Variance	***0.054*** ***(0.024)***	***0.021***	***-0.028***	***-0.010***	***0.008***	***-0.008***	***0.012***
Variance: Skill Premiums (Tertiary and above)***							
1988		0.008					

1990			0.032				
1991		0.008					
1992				0.274			
1994	0.038	0.007	0.071				
1996	0.045						
1997	0.062	0.010			0.177		
1998				0.133			0.011
1999	0.046					0.009	
2000			0.079				
2001	0.036	0.011					
2002							
2003	0.035				0.043		
2004		0.011	0.078	0.023			
2005	0.023					0.014	
2006		0.010		0.011			
2007	0.017				0.171		0.019
Change in Variance	***-0.021 (-0.028)***	***0.002***	***0.046***	***-0.263***	***-0.006***	***0.007***	***0.008***

*The industry variable in the 1994 Sakernas is at the one-digit level; ** Lower secondary and above for Cambodia; *** Upper secondary and above for Cambodia.

Table 14: Evolution of Skill Premiums by Sector and Country

	Indonesia	Philippines	Thailand	Vietnam	Cambodia	China	Mongolia
Senior Sec. or higher							
1988							
- Agriculture/Mining		0.192					
- Manufacturing		0.343					
- Trade/Services		0.539					
1990							
- Agriculture/Mining			1.812				
- Manufacturing			0.642				
- Trade/Services			0.969				
1991							
- Agriculture/Mining		0.186					
- Manufacturing		0.322					
- Trade/Services		0.560					
1992				-0.586			
- Agriculture/Mining				-0.102			
- Manufacturing				-0.237			
- Trade/Services							
1994							
- Agriculture/Mining	0.809	0.161	1.148				
- Manufacturing	0.419	0.301	0.665				
- Trade/Services	0.722	0.469	1.065				
1997							
- Agriculture/Mining		0.204			-0.263		
- Manufacturing		0.255			0.115		
- Trade/Services		0.511			0.190		

1998						
- Agriculture/Mining				-0.243		0.381
- Manufacturing				0.00		0.266
- Trade/Services				0.00		0.280
1999						
- Agriculture/Mining	0.634				0.454	
- Manufacturing	0.375				0.165	
- Trade/Services	0.689				0.348	
2000						
- Agriculture/Mining			0.898			
- Manufacturing			0.644			
- Trade/Services			0.990			
2001						
- Agriculture/Mining		0.140				
- Manufacturing		0.197				
- Trade/Services		0.621				
2002						
- Agriculture/Mining						
- Manufacturing						0.388
- Trade/Services						0.371
2003						0.296
- Agriculture/Mining	0.551		0.571		0.262	
- Manufacturing	0.394		0.642		0.225	
- Trade/Services	0.689		0.811		0.516	
2004						
- Agriculture/Mining		0.145		0.208		0.301
- Manufacturing		0.189		0.328		0.380
- Trade/Services		0.609		0.463		0.541
2005						
- Agriculture/Mining						
- Manufacturing						
- Trade/Services						
2006						
- Agriculture/Mining		0.122		0.410	0.157	
- Manufacturing		0.201		0.232	0.156	
- Trade/Services		0.698		0.249	0.541	
2007						
- Agriculture/Mining	0.605					1.025
- Manufacturing	0.463					0.631
- Trade/Services	0.734					0.833
Tertiary or higher						
1988						
- Agriculture/Mining		0.364				
- Manufacturing		0.497				
- Trade/Services		0.726				
1990						

- Agriculture/Mining			2.010				
- Manufacturing			1.182				
- Trade/Services			1.048				
1991							
- Agriculture/Mining		0.355					
- Manufacturing		0.387					
- Trade/Services		0.742					
1992							
- Agriculture/Mining				-0.233			
- Manufacturing				0.084			
- Trade/Services				-0.050			
1994							
- Agriculture/Mining	1.432	0.336	2.436				
- Manufacturing	1.075	0.405	1.190				
- Trade/Services	0.770	0.644	1.067				
1997					-		
- Agriculture/Mining		0.405			-0.677		
- Manufacturing		0.389			0.325		
- Trade/Services		0.715					
1998							
- Agriculture/Mining				0.304			0.382
- Manufacturing				0.382			0.259
- Trade/Services				0.191			0.289
1999							
- Agriculture/Mining	1.128					0.356	
- Manufacturing	0.797					0.318	
- Trade/Services	0.691					0.475	
2000							
- Agriculture/Mining			2.051				
- Manufacturing			1.070				
- Trade/Services			1.003				
2001							
- Agriculture/Mining		0.350					
- Manufacturing		0.339					
- Trade/Services		0.769					
2002							
- Agriculture/Mining							0.519
- Manufacturing							0.400
- Trade/Services							0.287
2003					-		
- Agriculture/Mining	0.976		1.487		0.423		
- Manufacturing	0.752		1.077		0.601		
- Trade/Services	0.678		0.97				
2004							
- Agriculture/Mining		0.354		0.503		0.497	
- Manufacturing		0.301		0.517		0.477	
- Trade/Services		0.752		0.594		0.655	
2005							
- Agriculture/Mining							

- Manufacturing						
- Trade/Services						
2006						
- Agriculture/Mining				0.384		
- Manufacturing				0.377		
- Trade/Services				0.547		
2007						
- Agriculture/Mining	1.213	0.303			-	0.868
- Manufacturing	0.903	0.328			1.045*	0.560
- Trade/Services	0.787	0.809			0.843	0.742

* Not statistically significant.

Table 14 and the charts that follow (Figures 8 to 14) show the evolution of return to skill over time by major sector in relation to the evolution of the supply of skilled workers by major sector. Overall, there is indeed some evidence that the evolution of skill premiums has been rather sector specific in Indonesia, Philippines and Thailand (with generally decreasing returns in agriculture, mixed performance in manufacturing, and increasing in services (Indonesia and the Philippines)), while more evident across the board (with an edge for the service sector) in the other countries. The dynamism of the demand in the service sector in most countries points to the importance of ensuring a better tailoring of curriculum design and pedagogical approaches to its needs (all the more in countries such as Indonesia and the Philippines where demand in other sectors has been sluggish).

In Indonesia there was a steady increase in the proportion of skilled workers, especially in trade/services, which leveled of after 2003 in agriculture/mining and manufacturing. Return to skill was declining in agriculture/mining and for those with secondary or higher education in manufacturing until 2003, rebounding thereafter. The return to skill in trade/services remained steady or even slightly increased over the entire period despite the steady increase in the supply of skilled workers in this sector.

In the Philippines, the evidence shows clear patterns of declining skill premiums in agriculture and manufacturing and increasing in services. Together with increasing proportion of skilled workers, this evidence suggests increased demand for skills in the service sector.

In Thailand, there has been a sharp decline in the return to skill in agriculture/minining between 1990 and 2004. On the other hand, the return to skill in the other two major sectors remained roughly unchanged with a slight declining tendency. This is in the backdrop of significant increases in the proportion of skilled workers in manufacturing after 1994 and modest increases in the other two major sectors.

In Vietnam, the return to skill in all sectors increases sharply until 2004 (and more so in agriculture), while the corresponding supply of skills showed a declining trend in agriculture/mining, increased moderately in manufacturing and more sharply in trade/services between 2004 and 2006.

In Cambodia, the proportion of workers with senior secondary and above education declined in agriculture/mining and manufacturing, while it increased in trade/services. The corresponding returns increased sharply between 1997 and 2003-4 and leveled off thereafter. On the other hand, the proportion of workers with tertiary education (which is virtually non-existent in agriculture/mining) increased sharply in trade/services and less so in manufacturing. The sharp increase in the return to tertiary education in manufacturing between 2003-4 and 2007 is indicative of an excess demand for tertiary educated workers in this sector. The return to tertiary skills in trade/services showed a steady increase over the last decade despite the large increase in the supply of tertiary educated workers.

In urban China, with the exception of agriculture/mining (which by 2005 accounted for less that 1% of the workforce in the urban areas), the return to both types of skills increased significantly, in the backdrop of significant increases in the supply of such skills.

Finally, in Mongolia, returns to skill increased significantly for all major sectors, especially for agriculture and services; during the time period the supply of tertiary education skills decreased for the sample of workers examined.

Figure 8(a): Indonesia: Return to skill by sector over time (Senior Secondary and above)

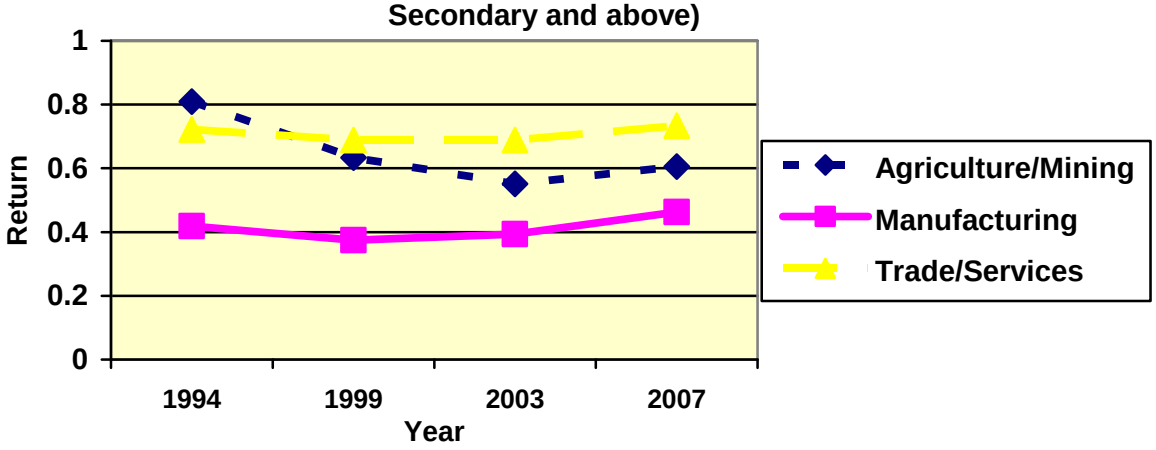


Figure 8(b): Indonesia: Proportion of skilled workers by sector over time (Senior Secondary and above)

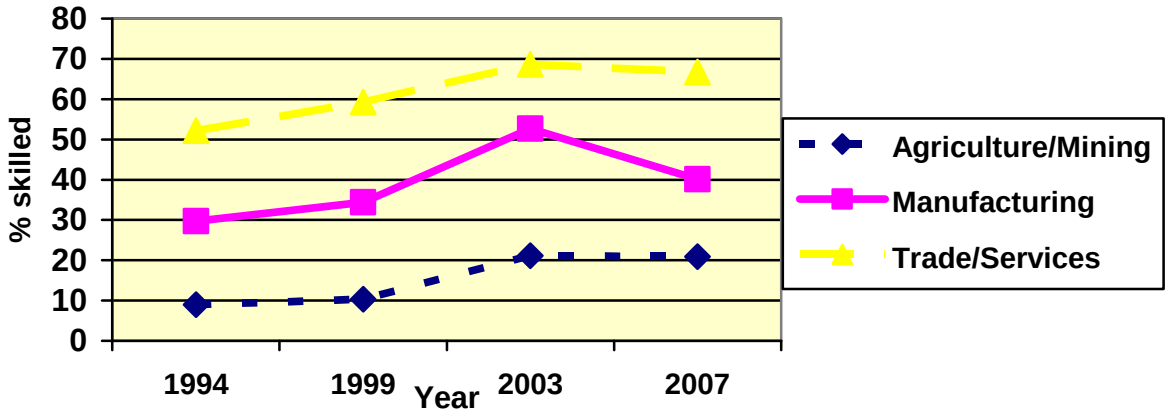


Figure 8(c): Indonesia: Return to skill by sector over time (Tertiary and above)

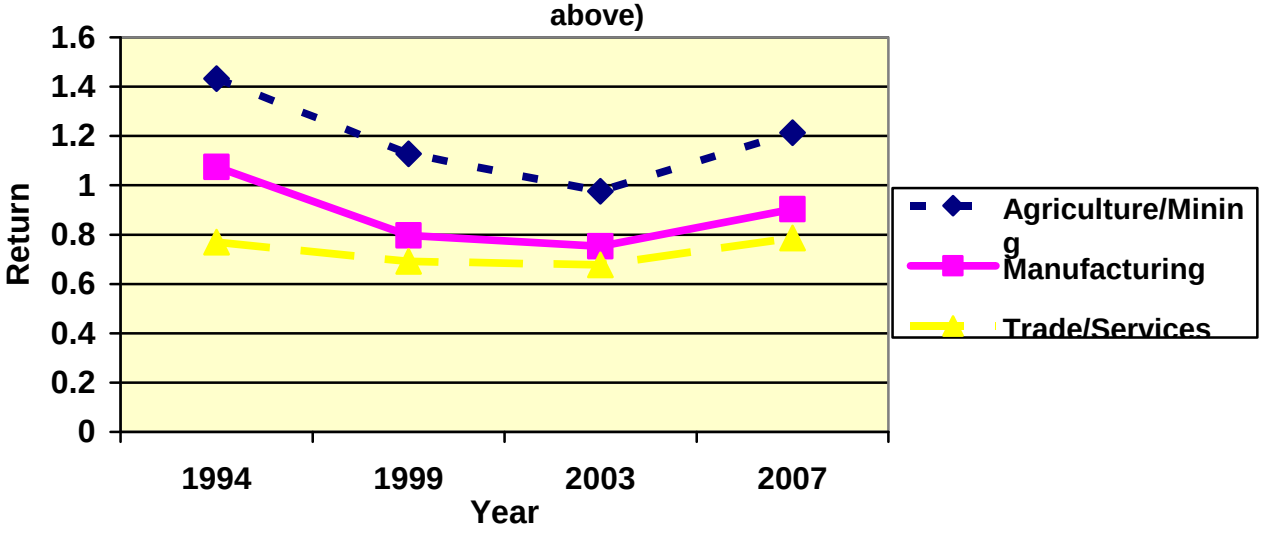


Figure 8(d): Indonesia: Proportion of skilled workers by sector over time (Tertiary and above)

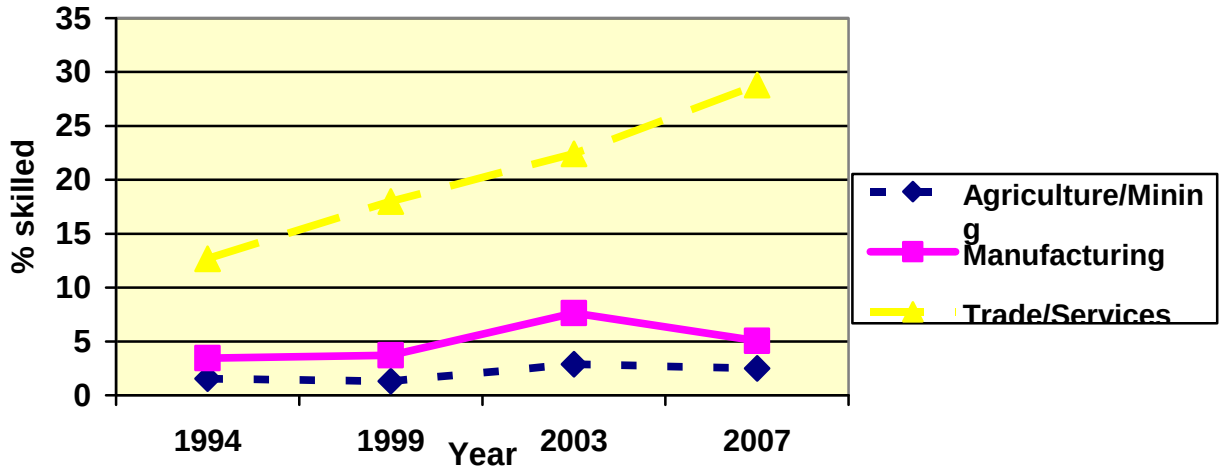


Figure 9(a): Philippines: Return to skill by sector over time (Secondary and above)

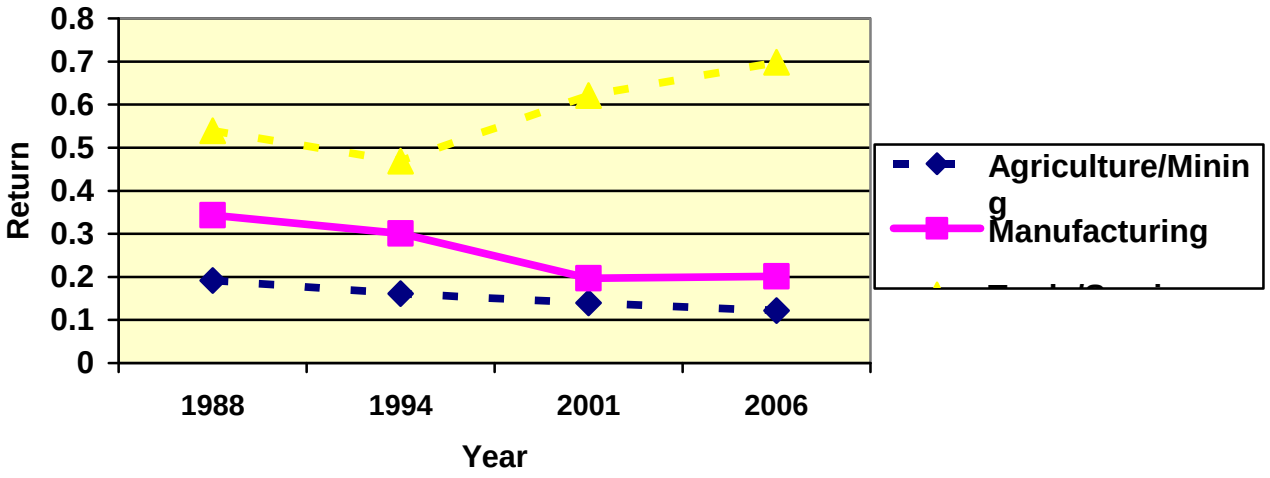


Figure 9(b): Philippines: Proportion of skilled workers by sector over time (Secondary and above)

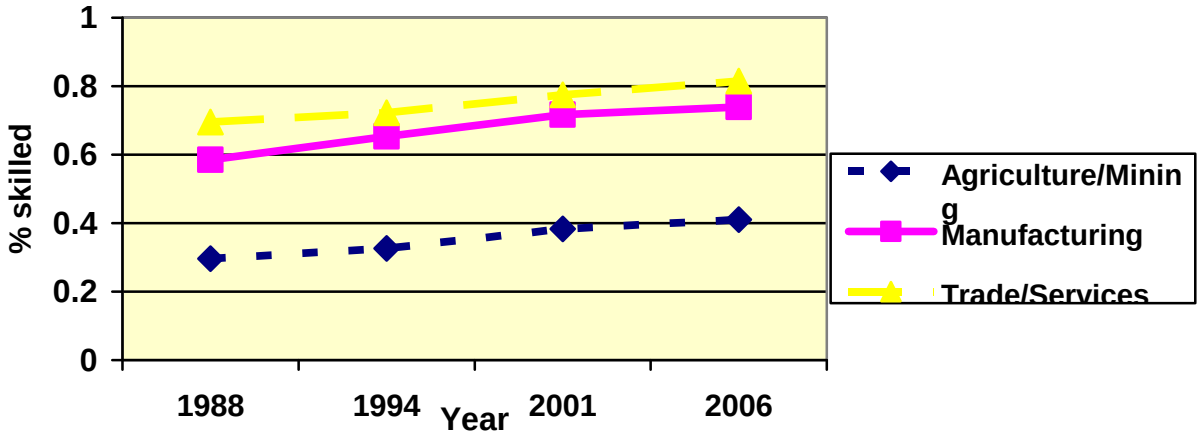


Figure 9(c): Philippines: Return to skill by sector over time (Tertiary and above)

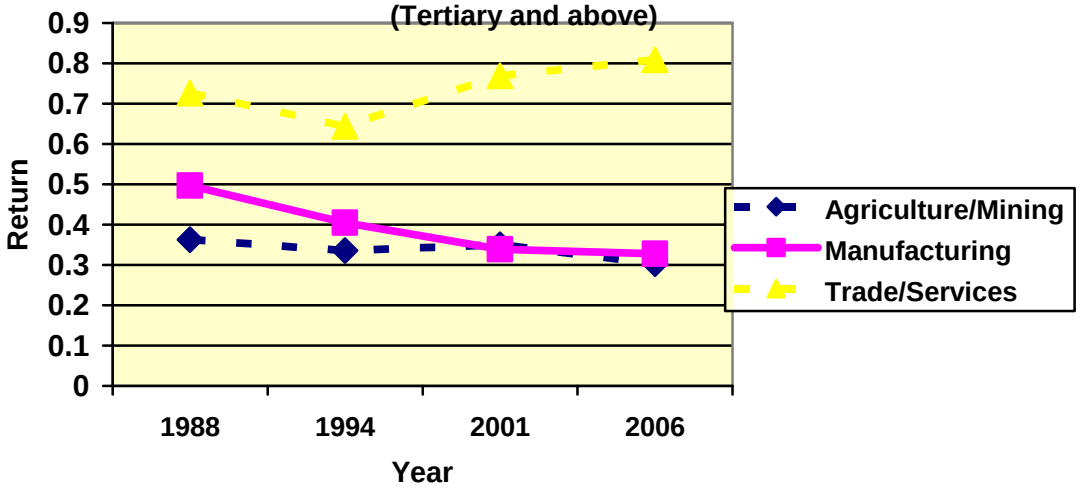


Figure 9(d): Philippines: Proportion of skilled workers by sector over time (Tertiary and above)

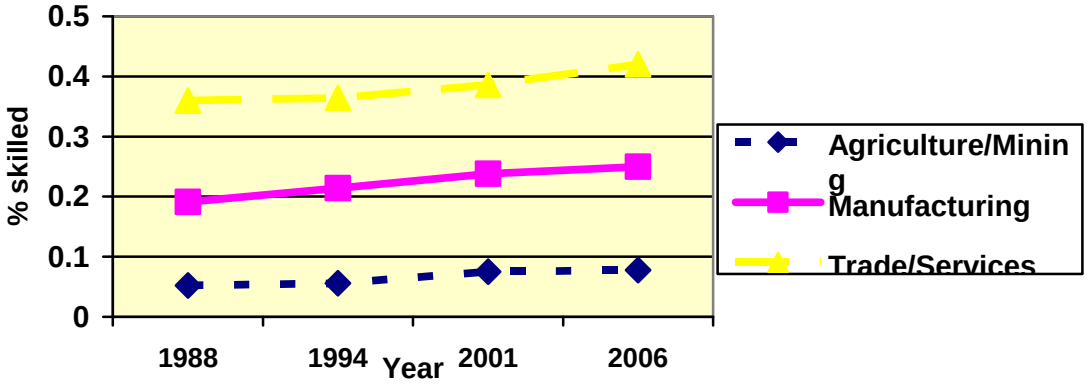


Figure 10(a): Thailand: Return to skill by sector over time (Senior Secondary and above)

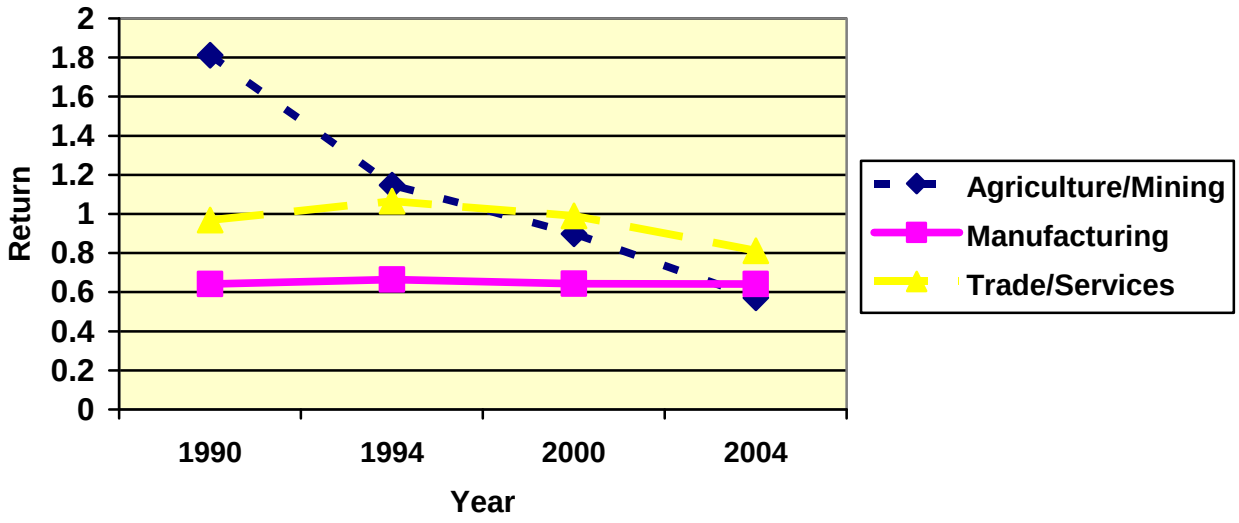


Figure 10(b): Thailand: Proportion of skilled workers by sector over time (Senior Secondary and above)

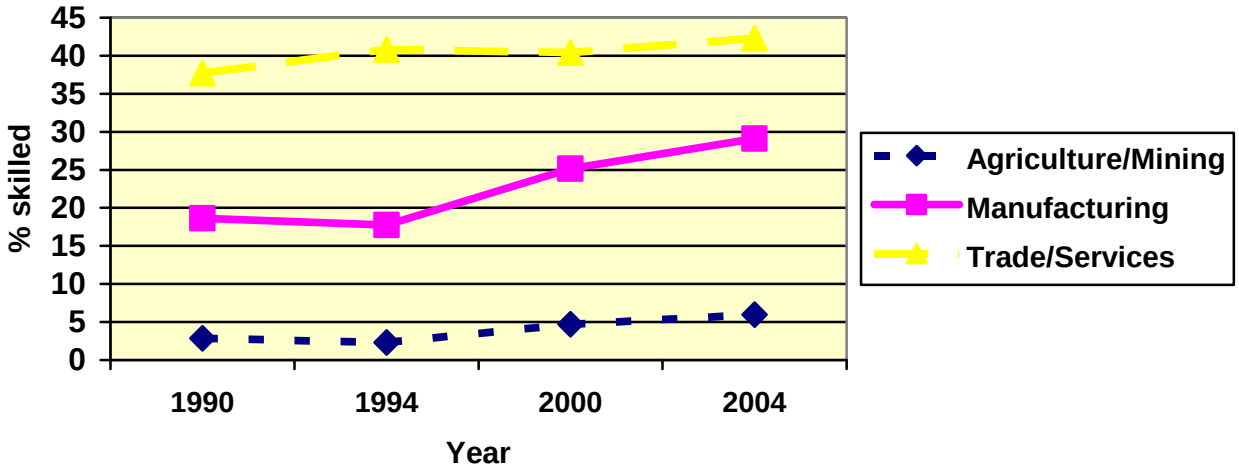


Figure 10(c):Thailand: Return to skill by sector over time (Tertiary and above)

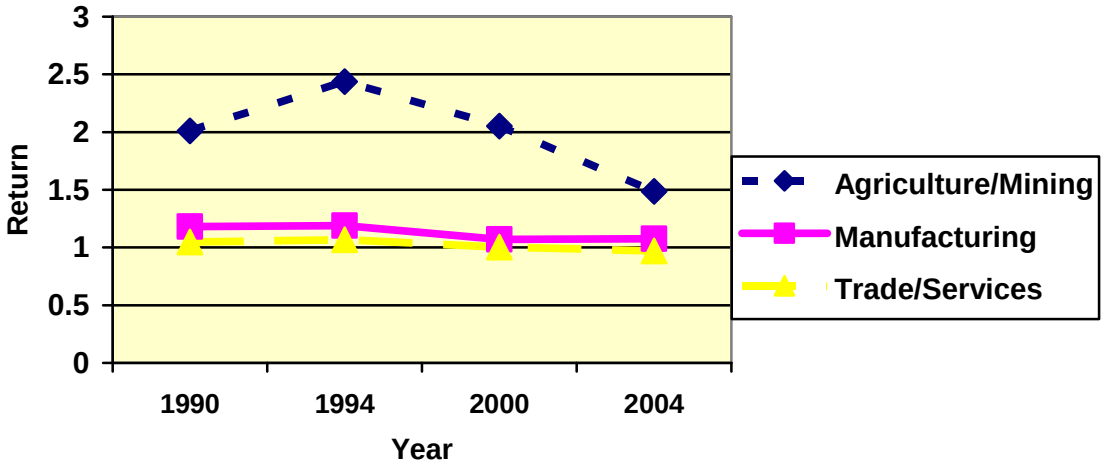


Figure 10(d): Thailand: Proportion of skilled workers by sector over time (Tertiary and above)

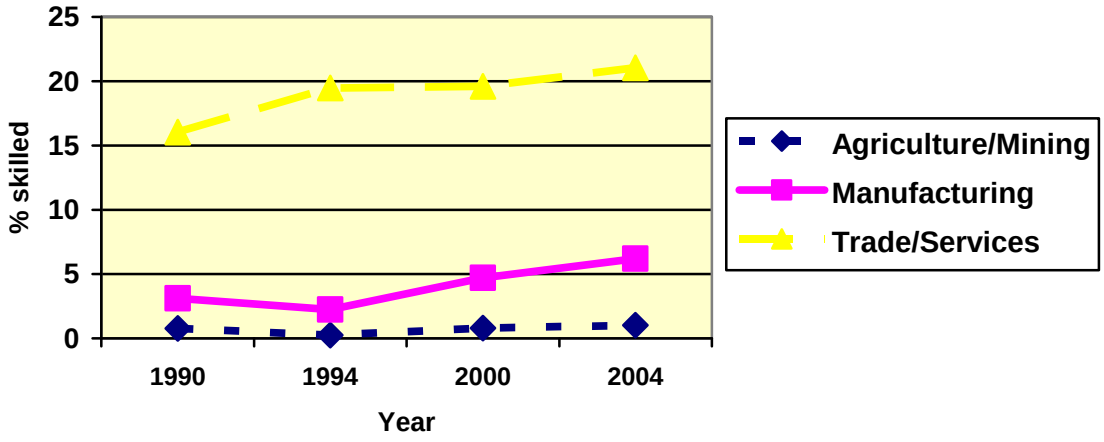


Figure 11(a): Vietnam: Return to skill by sector over time (Senior Secondary and above)

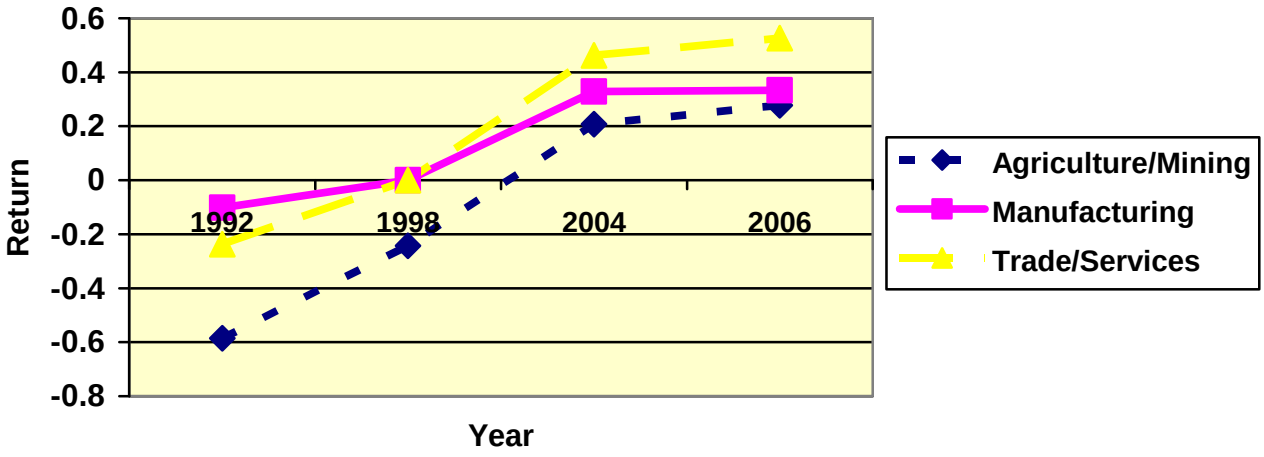


Figure 11(b): Vietnam: Proportion of skilled workers by sector over time (Senior Secondary and above)

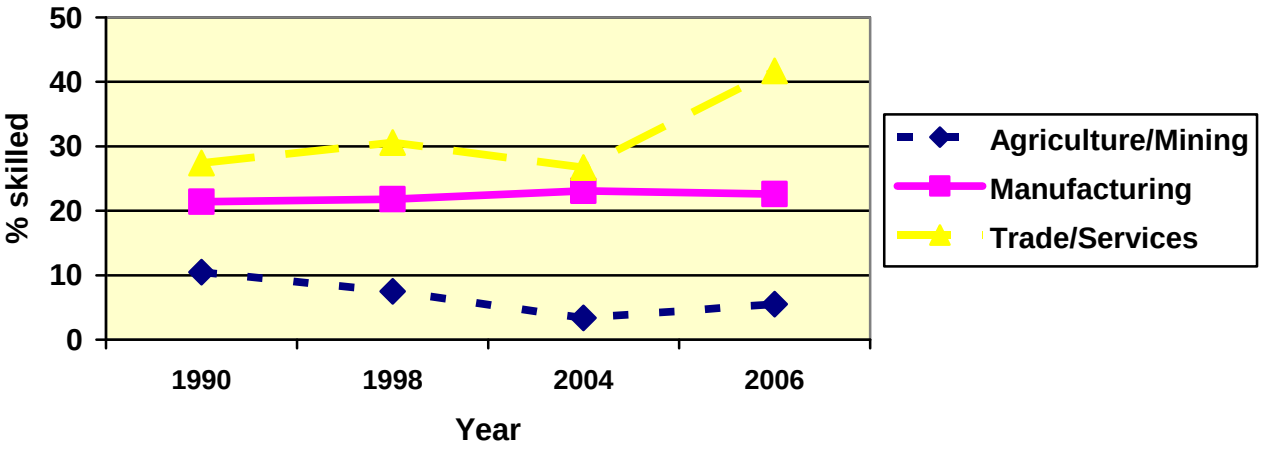


Figure 11(c): Vietnam: Return to skill by sector over time (Tertiary and above)

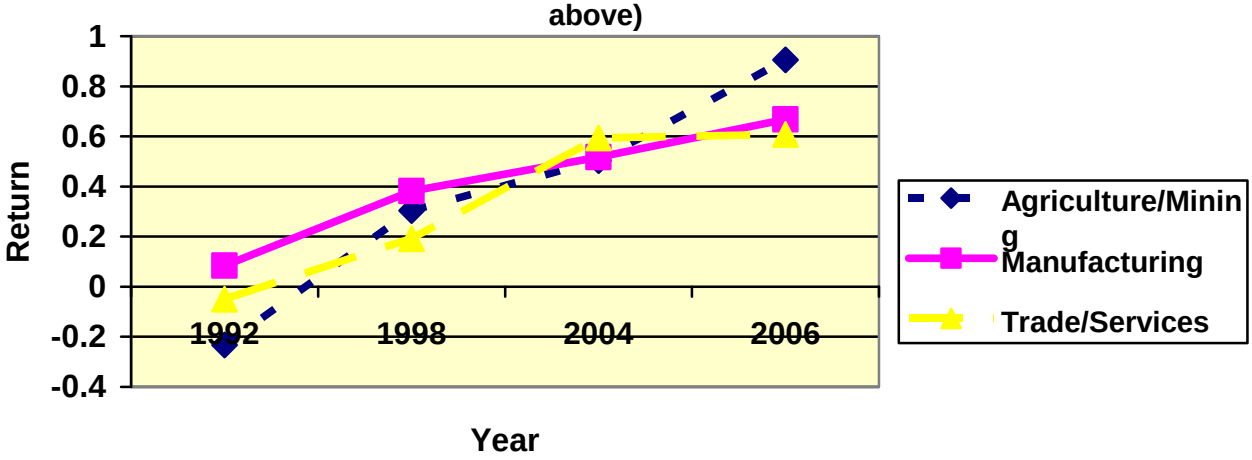


Figure 11(d): Vietnam: Proportion of skilled workers by sector over time (Tertiary and above)

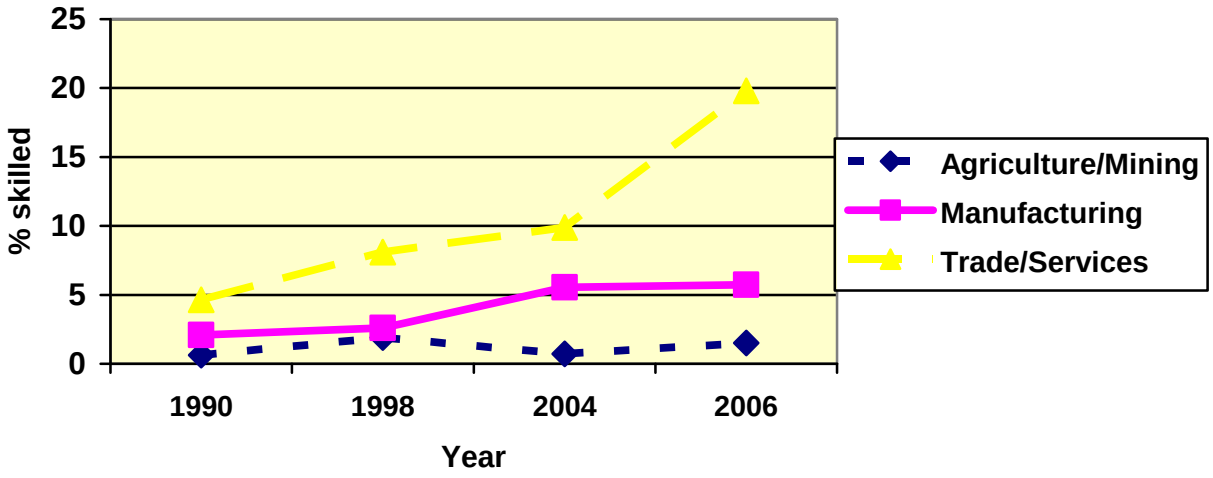


Figure 12(a): Cambodia: Return to skill by sector over time (Senior Secondary and above)

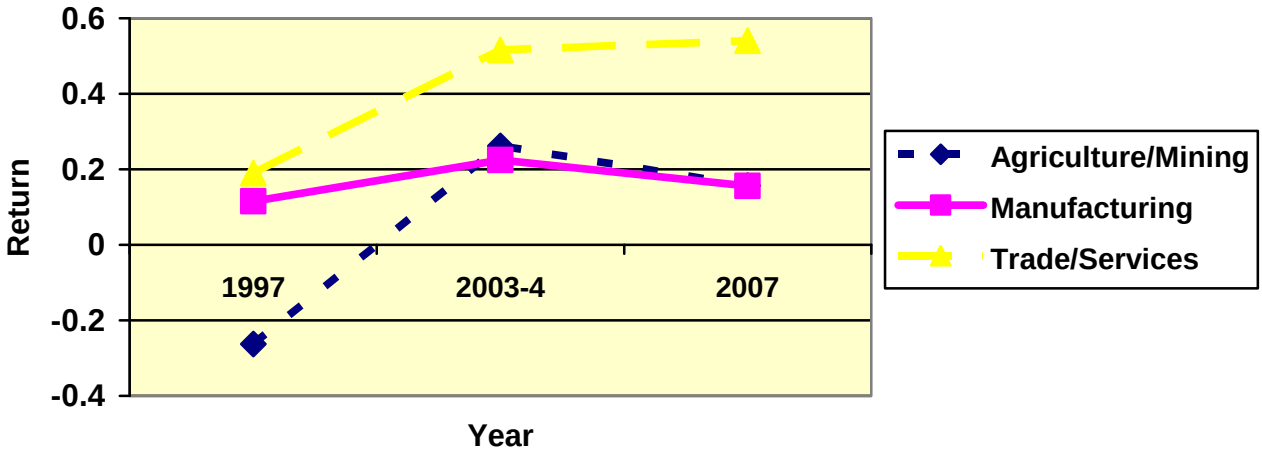


Figure 12(b): Cambodia: Proportion of skilled workers by sector over time (Senior Secondary and above)

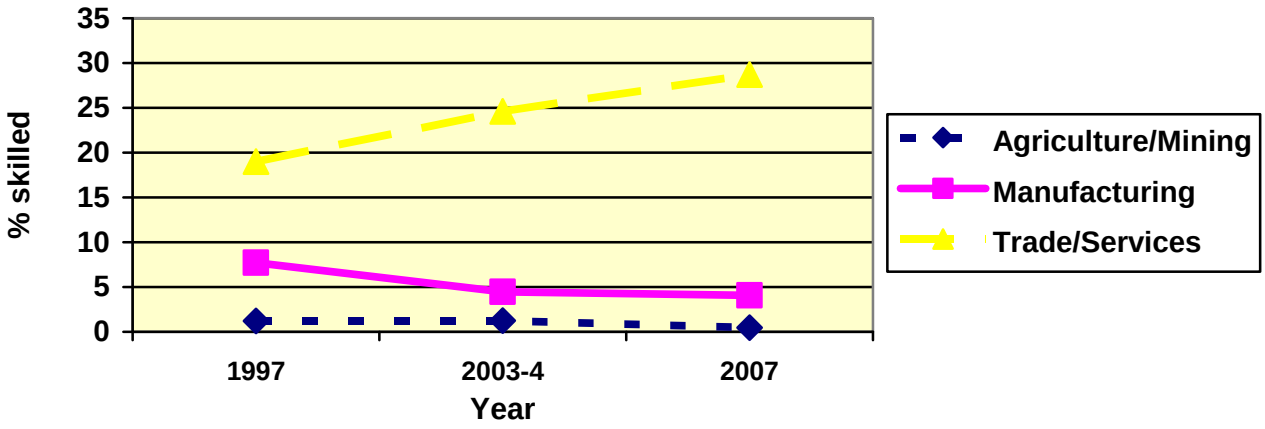
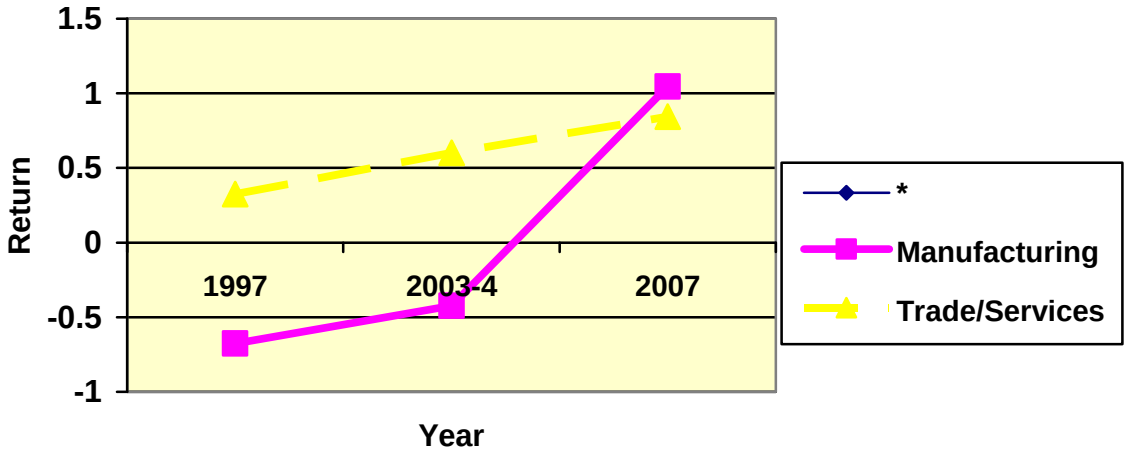
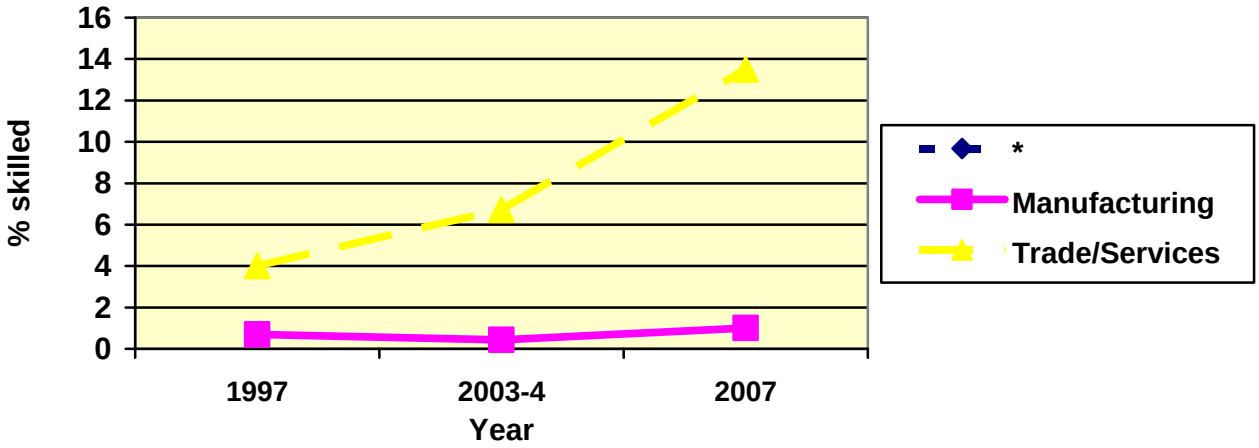


Figure 12(c): Cambodia: Return to skill by sector over time Tertiary and above)



* Not enough observations.

Figure 12(d): Cambodia: Proportion of skilled workers by sector over time (Tertiary and above)



* Not enough observations.

Figure 13(a): China: Return to skill by sector over time (Senior Secondary and above)

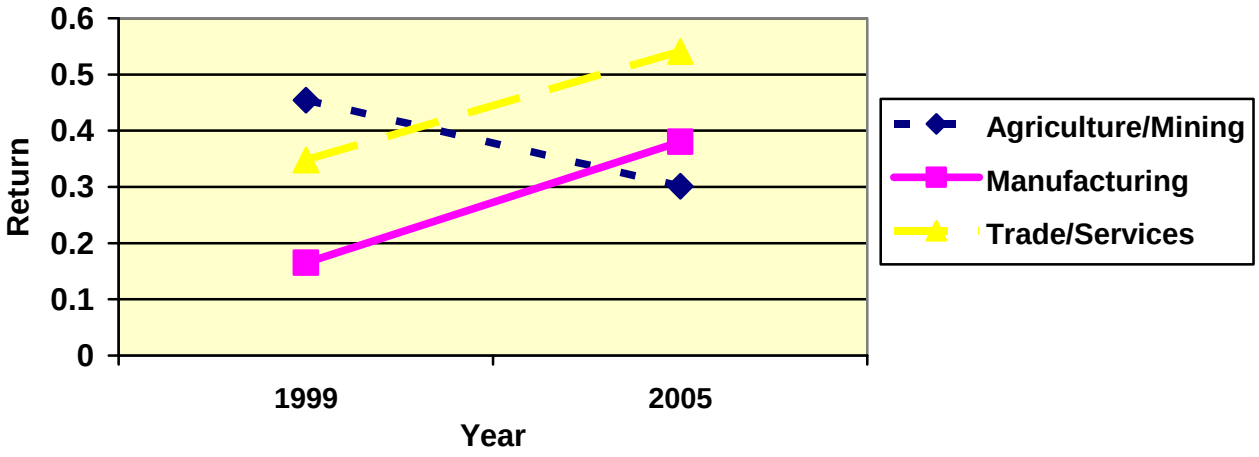


Figure 13(b): China: Proportion of skilled labor by sector over time (Senior Secondary and above)

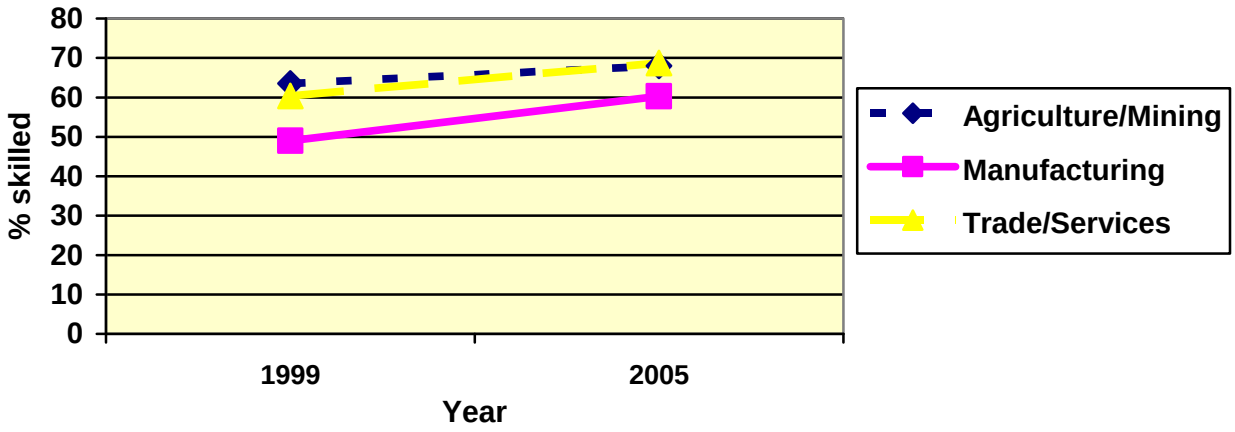


Figure 13(c): China: Return to skill by sector over time (Tertiary and above)

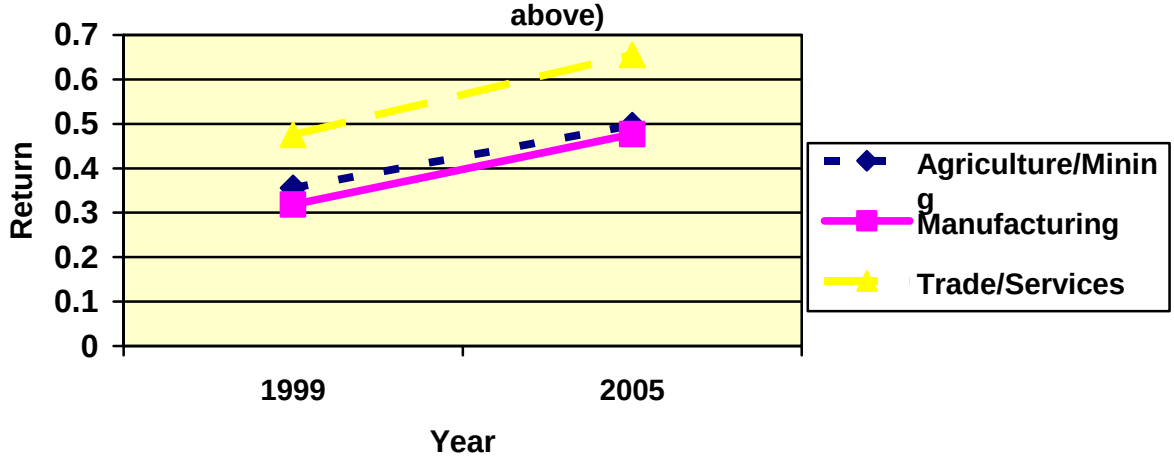


Figure 13(d): China: Proportion of skilled labor by sector over time (Tertiary and above)

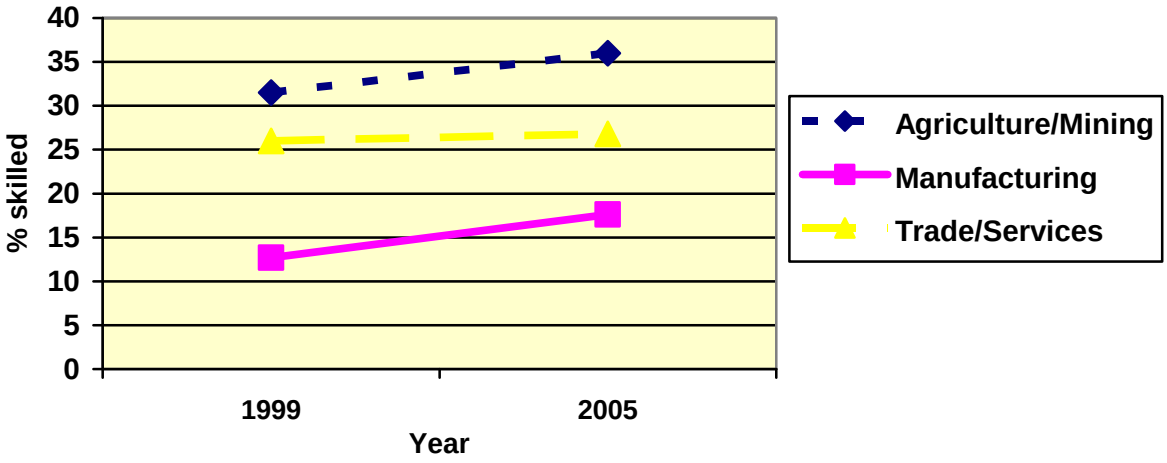


Figure 14(a): Mongolia: Return to skill by sector over time (Senior Secondary and above)

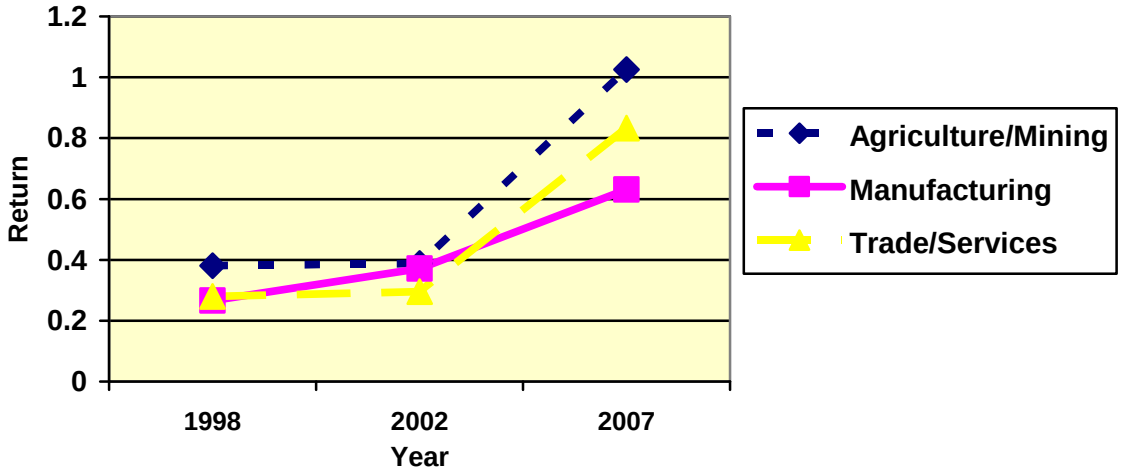


Figure 14(b): Mongolia: Proportion of skilled labor by sector over time (Senior Secondary and above)

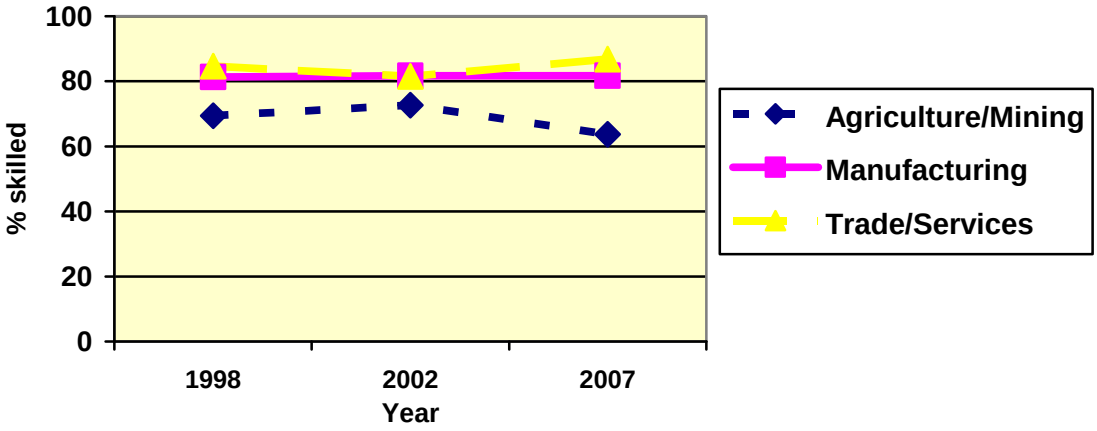


Figure 14(c): Mongolia: Return to skill by sector over time (Tertiary and above)

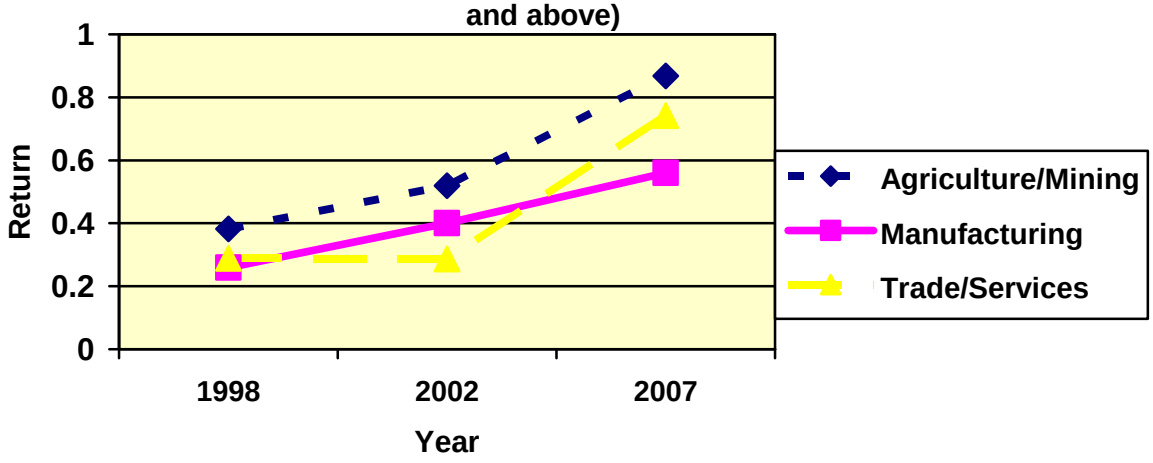
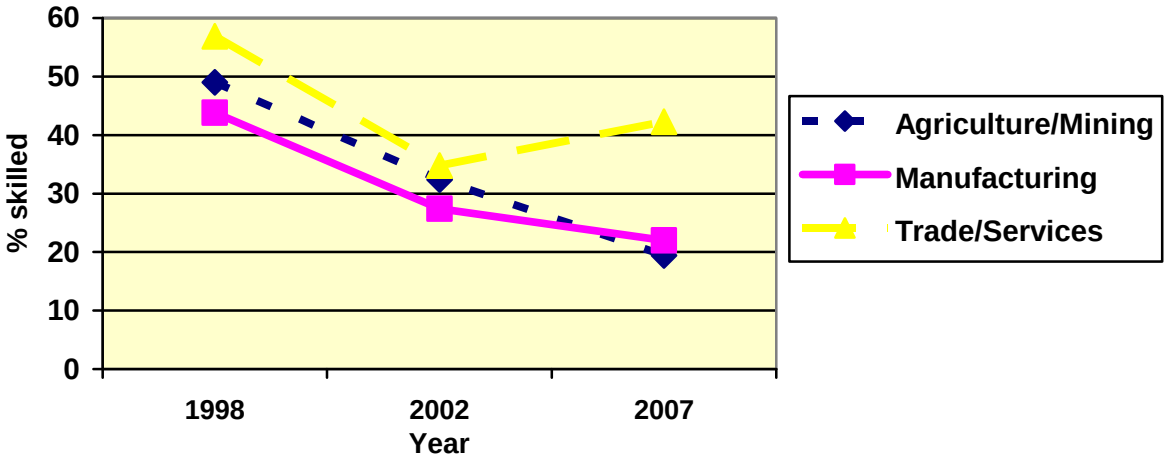


Figure 14(d): Mongolia: Proportion of skilled labor by sector over time (Tertiary and above)



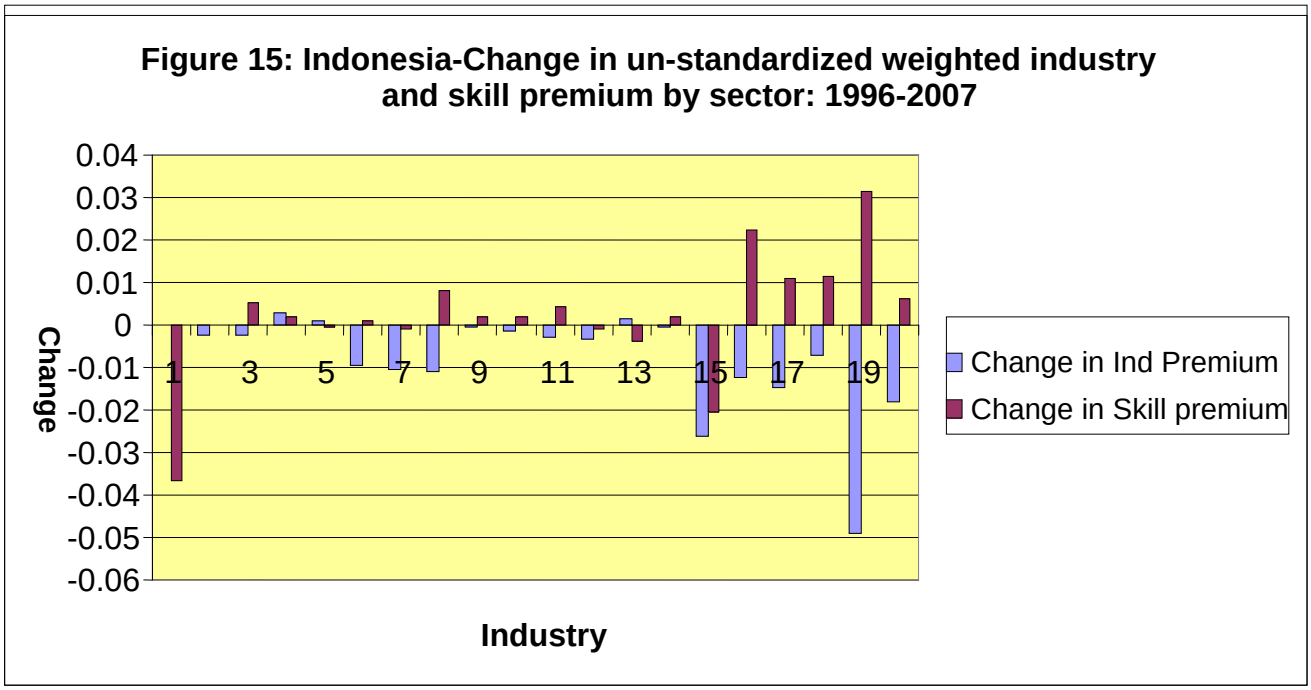
The Charts (Figures 15 to 21) which follow show the changes in the un-standardized weighted industry and skill (senior secondary and above) premiums by industry affiliation. The above findings are generally confirmed with clear evidence of increases in industry premiums compared to Agriculture in the Philippines, Thailand and Cambodia – suggesting possibility of labor market segmentation; significant increases in skill premiums in most service sub-sectors in all countries (with the exception of Thailand); and increases in skill premiums across most sub-sectors in Vietnam, Cambodia, China and Mongolia.

Changes in industry premiums are interpreted in relation to the excluded industry, which is agriculture. In Indonesia, generally, industry premiums moved in favor of agriculture, while premiums for other groups generally declined. Un-standardized skill premiums on the other hand indicate a mixed pattern, with the skill premium for agriculture and construction declining over time (in relation to unskilled), while it increased for other industries, especially Trade and Services. In the Philippines, industry premiums generally increased compared to agriculture (with the exception of household employment). Skill premiums show a mixed pattern over time, generally declining in agriculture and manufacturing, but raising for most services (with the notable exception of financial services, health and social work and private household employment[8]). In Thailand, industry premiums generally increased over time compared to agriculture especially for trade and services. On the other hand, standardized skill premiums decreased in agriculture and services and increased in manufacturing and trade. In Vietnam, increasing industry premiums are found for services and construction and decreasing for food-beverages-tobacco, textiles, wood-furniture and trade. Skill premiums generally increased across the board, especially in agriculture and services. In Cambodia, industry premiums increased compared to agriculture for all industries except trade. Similarly, skill premiums increased for all industries except in trade. In Mongolia, industry premiums decreased compared to agriculture, and skill premiums increased across the board (except for public administration). Finally in China, industry premiums generally decreased

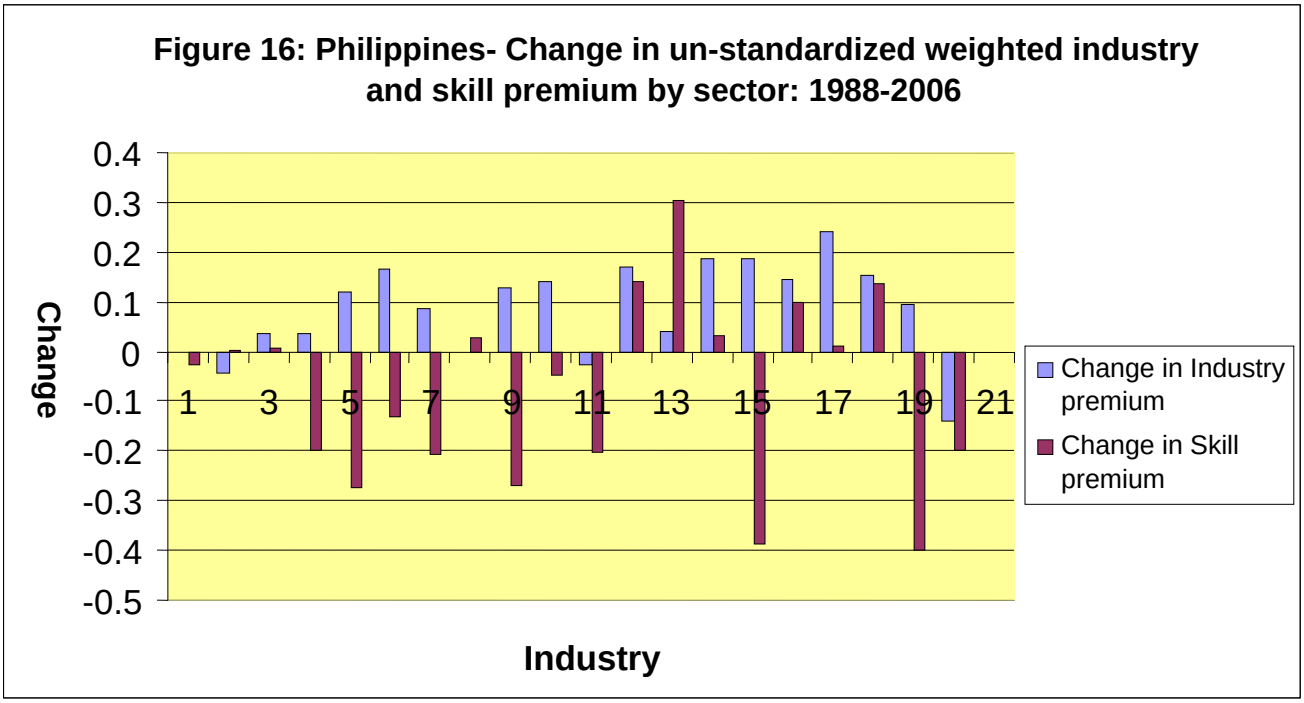
[8] When considering a definition of tertiary and more, however, skill premiums are on the rise for insurance and real estate, important parts of the financial services sub-sector.

compared to agriculture, while skill premiums increased in trade, services and, to a lower extent, manufacturing, and slightly decreased in agriculture and utilities.

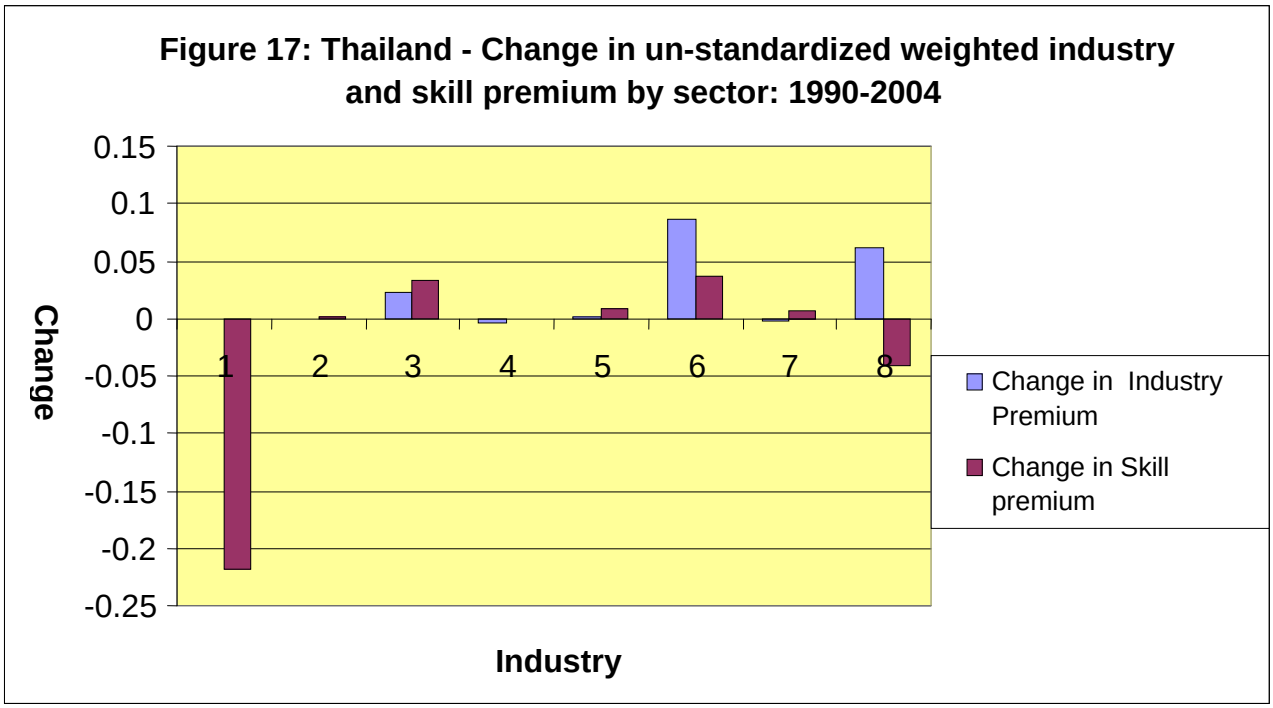
1. Agriculture 2. Forestry 3. Fishery 4. Mining-Minerals 5. Metal ore-Other Mining 6. Food-Drinks- Tobacco 7. Textile 8. Timber and Furniture 9. Paper and Printing 10. Chemicals 11. Non-Metallic production 12. Metal industry 13. Other industry 14. Utilities 15. Construction 16. Wholesale trade 17. Retail trade 18. Transportation/Communication 19. Finance-Real Estate 20. Public Admin-Health-Other Services.



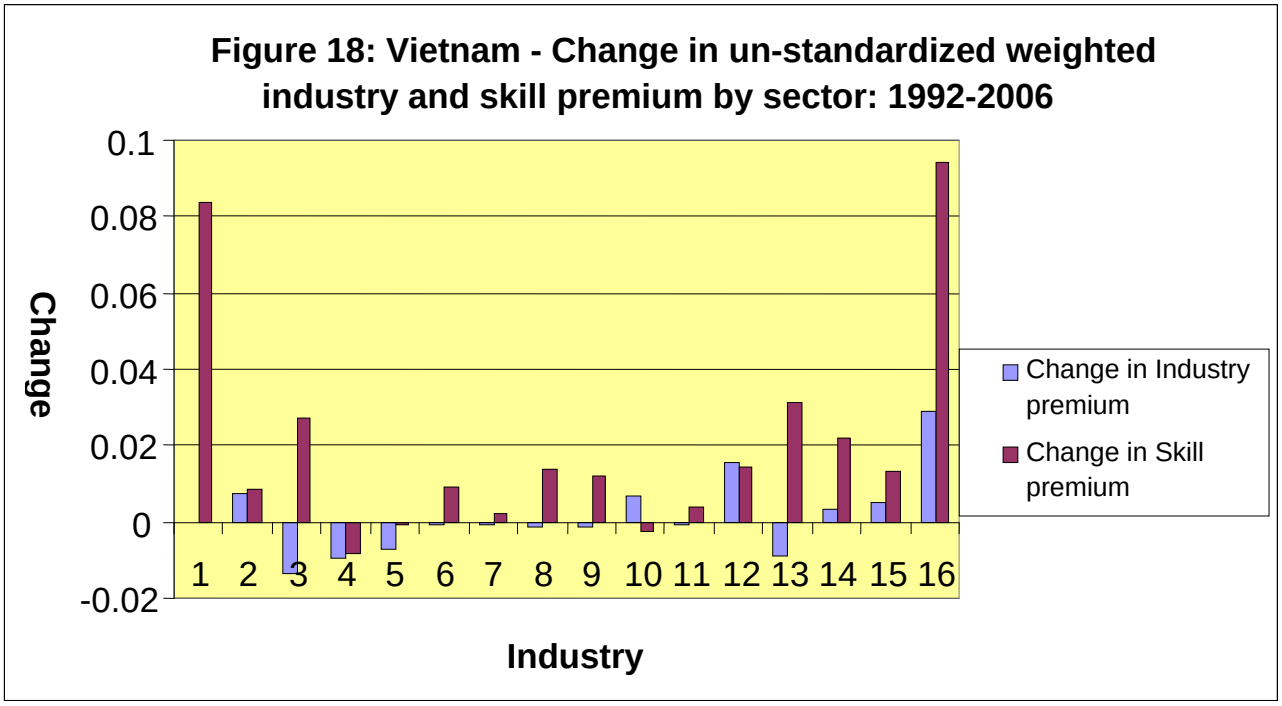
1. Growing crops 2. Fishing 3. Non-metal mining 4. Food-Beverages-Tobacco 5. Textiles 6. Wood-Furniture 7. Paper products 8. Chemicals 9. Utilities 10. Construction 11. Wholesale trade 12. Retail trade 13. Hotels-Restaurants 14. Transportation 15. Financial services 16. Business services 17. Public Admin. 18. Education 19. Health and Social Work 20. Private household employment.



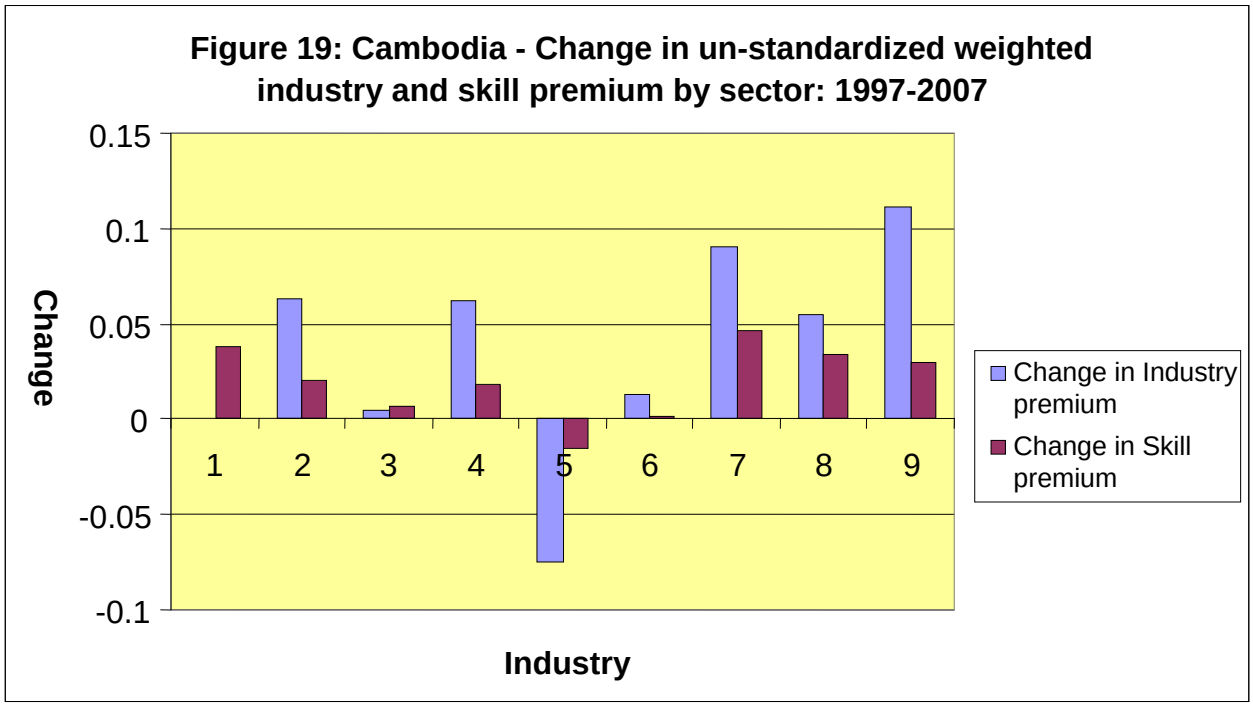
1. Agriculture 2. Mining 3. Manufacturing 4. Utilities 5. Construction 6. Trade 7. Transportation 8. Other services.



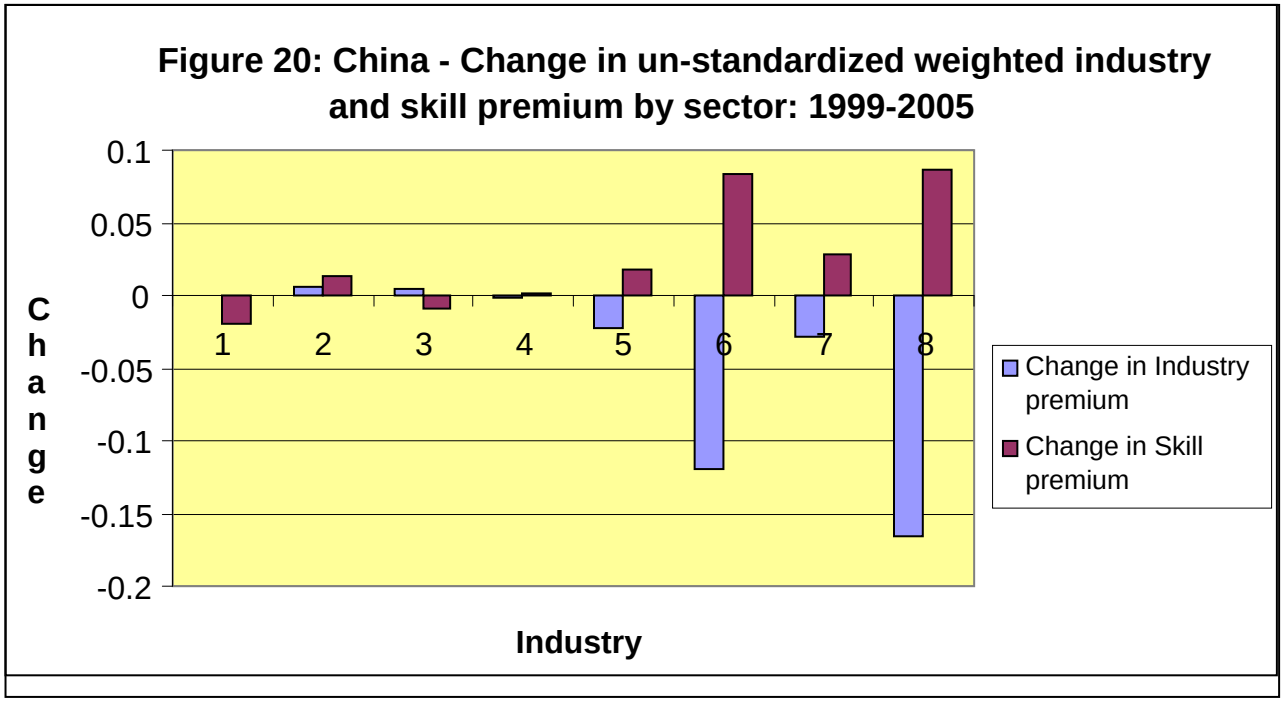
1. Agriculture 2. Mining 3. Food-Bev. Tobb. 4. Textile 5. Wood-Furniture 6. Paper 7. Chemicals 8. Non-metal mining products 9. Metal 10. Other manuf, 11. Utilities 12. Construction 13. Trade 14. Transport-Commun.15. Finance-Business 16. Other services.



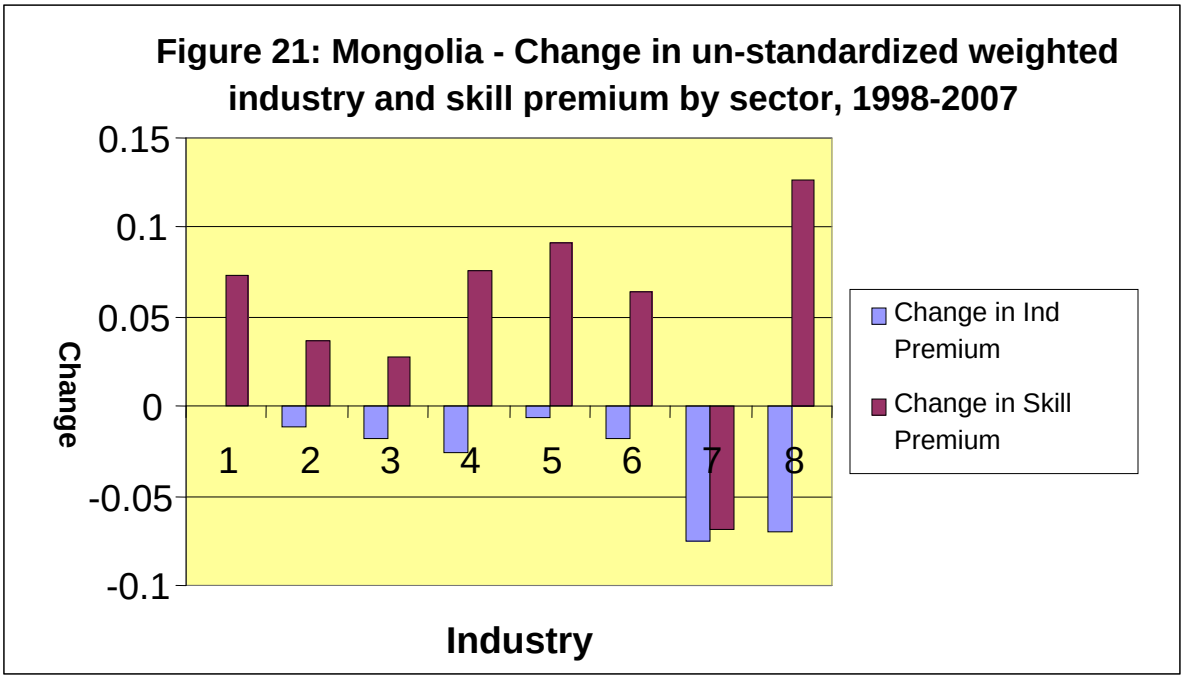
1. Agriculture-Mining 2. Manufacturing 3. Utilities 4. Construction 5. Trade 6. Transportation-Communication 7. Finance Business 8. Public Admin. 9. Other Services.



1. Agriculture-Mining 2. Manufacturing 3. Utilities 4. Construction 5. Transportation-Communication. 6. Trade 7. Public Admin. 8. Other Services (including Finance and Business and others).



1. Agriculture-Mining 2. Manufacturing 3. Utilities 4. Construction 5. Transportation-Communication. 6. Trade 7. Public Admin. 8. Other Services (including Finance and Business and others).



5. Conclusion

This paper has reviewed levels and trends in education and skill premiums, and skilled labor force, across eight East Asian countries, and over time, sector and sub-sector, representing the most comprehensive comparative exercise so far on this topic. Several main trends have emerged. Main trends include:

-there is evidence of increasing proportions of skilled/educated workers over the long run across the region

-this evidence combined with stable or increasing education/skill wage premiums (in regressions with only basic controls) indicates generally increasing demand for skills in the region (and that education is also leading to increasing inequalities in several countries)

-sector and sub-sector analysis of skill wage premiums and proportion of skilled labor, combined with changes in labor force composition in favor of the service sector, confirm that the service sector has become the most important driver of demand for skills for all countries (except Thailand)

-beyond these general trends, there is evidence that countries can be broadly categorized into three groups in relation to trends and patterns of demand for skills:

> -Indonesia, Philippines and Thailand – where demand for skills is on the rise but only moderately so; and increasingly industry-specific (in particular for the Philippines and Thailand)
>
> -Vietnam and China – where demand for skills is sharply on the rise and involving most sectors/sub-sectors
>
> -Cambodia and Mongolia – where skill premiums are sharply on the rise across most sectors/sub-sectors, but accompanied with slow increases or even some declines in the proportion of skilled labor which point to less clear cut trends in demand and the importance of shortage of skills

-there is also evidence of rising industry premiums – and related possible labor market segmentation – in three countries of the region (Philippines, Thailand and Cambodia).

These results point to several **policy implications**. The main ones are:

-Governments should focus on policies promoting access to education (formal education but also skill development opportunities for the unskilled) to address the increasing demand for skills and/or the persistent skill shortages.

-The ground is generally stronger for supporting general rather than specific curricula given broad-based increases in skill premiums, but countries such as the Philippines and Thailand also require particular attention to specific curricula because of their more differentiated skill premiums (in favor of services in the Philippines and manufacturing in Thailand).

-Overall, across practically all countries, there is strong ground for better tailoring curriculum design and content and pedagogical approaches to the needs of the service sector given its role in driving the demand for skills.

-At the same time, while these measures take their time to act, governments could also target some of their social protection programs to unskilled workers to protect them from the “un-equalizing” impact of education.

-Finally, in the Philippines, Thailand and Cambodia, education and social protection policies should also be accompanied by policies that make labor markets less segmented

References

Abu-Ghaida, D and Connolly, M (2003): "Trends in Relative Demand for Workers with Secondary Education: A Look at Nine Countries in East Asia, Africa and MENA", background paper for "*Expanding Opportunities and Building Competencies for Young People: A New Agenda for Secondary Education*", The World Bank, Washington DC.

Alatas, V and Bourguignon, F (2005): "Estimation of Rates of Return in Indonesia over 1980-2003", The World Bank, *mimeo*

Berman, E., J. Bound, and S. Machin (1998): "Implications of Skill-Biased Technological Change: International Evidence" in *The Quarterly Journal of Economics*, 113(4), 1245-79.

Fajnzylber, P and Fernandes, A (2004)" International Economic Activities and the Demand for Skilled Labor: Evidence from Brazil and China" – The World Bank (mimeo)

Feenstra, R. C., and G.H. Hanson (1997): "Foreign Direct Investment and Relative Wages: Evidence from Mexico's Maquiladoras" in *Journal of International Economics*, 42, 371-93.

Harrison, A., and G. Hanson (1999): "Who Gains from Trade Reform? Some Remaining Puzzles", in *Journal of Development Economics*, 51, 315-24.

Heckman, J J and Li, X (2003): "Selection Bias, Comparative Advantage and Heterogeneous Returns to Education: Evidence from China in 2000". IZA (Institute for Labor Studies) Discussion Paper N.829, Bonn, Germany.

Hiebert, M. (1993): "Wage Revolution: Vietnam Makes Salaries Reflect Responsibilities." *The Far Eastern Economic Review* (September).

Keller, W. (2004): "International Technology Diffusion" in *Journal of Economic Literature*, 42(3), 752-82.

Nguyen, T. L., T. B. Nguyen, Vu Binh Cu, V. T. Nguyen and M. Godfrey (1991): "Human Resources Development." In: Per Ronnas and Orjan Sjoberj (Eds), *Socio-Economic Development in Vietnam.*

Norlund, I. (1993): "The Creation of a Labor Market in Vietnam: Legal Framework and Practices." In: C. A. Thayer and D. G. Marr (Eds): *Vietnam and the Rule of Law*. Political and Social Change Monograph No. 19, Australian National University, Cambera.

O'Connor, D., and M.R. Lunati (1999): "Economic Opening and the Demand for Skills in Developing Countries: A Review of Theory and Evidence", in OECD Development Centre Working Paper, No. 149.

Pavcnik, N. (2003): "What Explains Skill Upgrading in Less Developed Countries?" in *Journal of Development Economics*, 71, 311-28.

Ridao-Cano, C. (2003). "Skills and Growth in Cambodia." ESAHD, World Bank, m*imeo.*

Sakellariou, C. and H. Patrinos (2000): "Labor Market Performance of Tertiary Education Graduates in Vietnam." *Asian Economic Journal*, vol. 14 (2).

Zeufack and Udomsaph (2006): "Skills Shortages and Mismatch in Malaysia and Thailand: *Evidence from Linked Employer-Employee data"*, The World Bank*, mimeo*

World Bank (1996): "Vietnam Education Financing Sector Study. Report No. 15925-VN. World Bank, Washington, DC.

_____ (2009): "Higher Education and Skills for Growth in Vietnam", Washington, DC.

Appendix

Indonesia

Table A1: Sakernas Survey – Weighted Summary Statistics – (Employed for wages)

	1994[1]	1997	1999	2001	2003	2005 (Nov)	2007 (Aug)
Hourly wage (rupia-2006 prices)	4,187	5,027	3,970	5,557	6,079	5,557	6,485
log hourly wage (2006 prices)	8.01	8.21	7.98	8.31	8.44	8.35	8.42
Male	0.694	0.691	0.677	0.686	0.690	0.680	0.685
Age	33.32	33.82	34.48	33.60	33.97	34.13	34.90
Married	N/A	0.663	0.666	0.666	0.674	0.666	0.689
Schooling							
Years of schooling	7.99	8.52	8.75	9.64	10.17	10.33	10.33
Primary incomplete	0.199	0.168	0.149	0.083	0.053	0.046	0.060
Primary complete	0.315	0.285	0.280	0.245	0.201	0.202	0.212
Junior high school	0.138	0.151	0.155	0.177	0.200	0.194	0.172
High school-general	0.140	0.168	0.178	0.199	0.259	0.247	0.223
High school- voc.	0.136	0.134	0.128	0.158	0.140	0.142	0.123
Diploma	0.040	0.043	0.052	0.064	0.062	0.073	0.088
University	0.032	0.050	0.058	0.073	0.084	0.096	0.121
Occupation							
Professional	0.113	0.111	0.119	0.127	0.124	0.141	0.144
Manager	0.006	0.004	0.007	0.007	0.006	0.008	0.011
Official/admin	0.134	0.144	0.144	0.155	0.175	0.153	0.144
Sales	0.059	0.074	0.069	0.076	0.088	0.090	0.096
Labor (Services)	0.101	0.097	0.103	0.112	0.108	0.116	0.141
Agriculture	0.182	0.155	0.178	0.102	0.083	0.075	0.075
Production	0.135	0.141	0.135	0.165	0.175	0.161	0.146
Transportation	0.075	0.078	0.079	0.082	0.088	0.095	0.085
Laborers	0.194	0.196	0.165	0.173	0.154	0.161	0.158
Skill classification							
Skilled (Secondary and above)	0.348	0.396	0.416	0.494	0.545	0.557	0.534
Skilled (Tertiary and above)	0.072	0.093	0.110	0.137	0.146	0.169	0.209
Sample size	43,450	40,965	27,267	21,037	37,756	27,441	125,654

[1] Industry controls included at the 1-digit level, as opposed to 2-digit for the rest of the years.

Philippines

Table A2: LFS – Weighted Summary Statistics (Employed Individuals 15-65 years)

Variables	1988	1991	1994	1997	2001	2004	2006
Hourly pay (2000 pesos)	20.357	21.375	21.502	25.486	25.716	24.029	22.929
Log(Hourly pay)	2.707	2.750	2.771	2.915	3.024	2.964	2.908
Male	0.633	0.636	0.635	0.623	0.610	0.625	0.616
Age in years	35.28	35.94	36.41	36.16	36.98	36.37	36.51
Married indicator	0.645	0.652	0.640	0.649	0.633	0.660	0.653
Schooling							
Years of Schooling							
Less than primary complete	0.261	0.245	0.225	0.205	0.185	0.182	0.173
Primary	0.243	0.242	0.237	0.218	0.192	0.174	0.168
Some secondary	0.131	0.133	0.134	0.135	0.142	0.138	0.138
High school graduate	0.260	0.271	0.297	0.326	0.349	0.368	0.377
Tertiary and above	0.105	0.109	0.107	0.116	0.132	0.138	0.144
Occupation							
Prof. and technical	0.056	0.058	0.055	0.059	0.074	0.073	0.073
Admin. and managers	0.103	0.105	0.108	0.111	0.100	0.110	0.114
Clerical	0.041	0.041	0.041	0.045	0.045	0.044	0.049
Sales and services	0.132	0.137	0.142	0.166	0.201	0.198	0.205
Agricultural workers	0.450	0.441	0.433	0.379	0.359	0.358	0.352
Prod. operators laborers	0.218	0.219	0.221	0.241	0.221	0.216	0.207
Skill classification							
Skilled (Secondary and above)	0.496	0.513	0.537	0.576	0.623	0.644	0.659
Skilled (Tertiary and above)	0.192	0.199	0.205	0.230	0.249	0.263	0.273
Sample size	37,335	46,511	47,304	74,768	73,815	76,185	74,090

Thailand

Table A3: Socioeconomic Survey – Summary Statistics (Employed individuals)

	1990	1994	2000	2004
Monthly earnings (Baht)	3,498	4,941	7,905	8,189
log monthly earnings	7.40	7.76	8.42	8.33
Male	0.581	0.569	0.576	0.512
Age	37.21	38.97	39.64	41.45
Married	0.685	0.717	0.728	0.710
Schooling				
Years of schooling	6.75	6.93	8.27	8.36
Less than primary	0.598	0.569	0.437	0.401
Primary complete	0.140	0.151	0.167	0.184
Lower Secondary	0.084	0.091	0.115	0.122
Upper Secondary	0.041	0.047	0.073	0.082
Higher Vocational	0.075	0.070	0.089	0.086
University	0.061	0.071	0.120	0.121
Skill classification				
Skilled (Secondary and above)	0.177	0.188	0.282	0.289
Skilled (Tertiary and above)	0.061	0.071	0.120	0.121
Sample size	22,583	41,404	34,981	60,176

* 3-digit occupational classification changed in 2000.

Vietnam

Table A4: VLSS Survey – Summary Statistics (excluding Self-Employed)

	1992	1998	2004	2006
Monthly earnings (Dong)	1,525	3,451	4,786	6,144
log monthly earnings	6.92	7.88	8.27	8.52
Male	0.603	0.606	0.620	0.563
Age	31.20	32.71	33.58	35.99
Married	0.577	0.565	0.625	0.642
Schooling				
Years of schooling	7.84	8.04	8.73	9.06
Primary incomplete	0.220	0.218	0.156	0.147
Primary	0.256	0.254	0.218	0.225
Lower Secondary	0.232	0.219	0.205	0.259
Upper Secondary	0.089	0.136	0.105	0.107
Higher Vocational	0.135	0.082	0.190	0.192
Tertiary	0.067	0.090	0.129	0.130
*Occupation**				
Manager/Official		0.052	0.047	0.059
Professional		0.119	0.071	0.078
Associate Professional		0.089	0.106	0.103
Clerical		0.025	0.045	0.038
Service/Sales		0.078	0.037	0.038
Skilled Agric. Workers		0.048	0.012	0.014
Skilled Manual Workers		0.283	0.201	0.217
Machine Operators		0.038	0.053	0.052
Laborers		0.268	0.428	0.401
Skill classification				
Skilled (Secondary and above)	0.291	0.308	0.421	0.425
Skilled (Tertiary and above)	0.067	0.090	0.129	0.130
Sample size	2,241	3,173	6,707	6,294

* For 1992, Occupational classifications are different from those in the 1998-2006 period.

Cambodia

Table A5: Socio-economic survey: Weighted Summary Statistics (workers with positive earnings)

	1997	2003-4	2007
Monthly earnings (Riels)	660	1,112	1,495
log monthly earnings	6.00	6.57	6.86
Male	0.687	0.596	0.597
Age	34.48	30.80	31.10
Married	0.683	0.518	0.544
Schooling			
Years of schooling	5.83	6.00	6.13
Primary incomplete	0.472	0.468	0.491
Primary	0.259	0.260	0.265
Lower Secondary	0.164	0.141	0.142
Upper Secondary	0.086	0.100	0.066
Tertiary	0.020	0.030	0.034
Skill classification			
Skilled (Lower secondary and above)	0.269	0.272	0.244
Skilled (Upper secondary and above)	0.105	0.131	0.102
Skilled (Tertiary)	0.020	0.030	0.034
Sample size	2,560	6,511	2,763

Note: Changes in occupational classification did not permit a consistent comparison of various occupation groups.
Between 2003-4 and 2007 the composition of the samples with respect to type of employer are substantially different; as a result changes in educational attainment reported may be misleading (for example the reported decease in the proportion of workers with upper secondary education/skilled workers).

China

Table A6: China Urban Labor Survey: Summary Statistics (workers with positive earnings)

	1999	2005
Hourly wage (Yuan)	4.49	7.36
log hourly wage	1.26	1.69
Male	0.532	0.566
Age	38.8	40.4
Married	0.870	0.825
Schooling		
Years of schooling	11.42	11.94
Primary incomplete	0.027	0.011
Primary	0.060	0.033
Lower Secondary	0.349	0.291
Upper Secondary	0.353	0.421
Tertiary	0.211	0.243
Skill classification		
Skilled (Upper secondary and above)	0.564	0.665
Skilled (Tertiary)	0.211	0.243
Sample size	4,612	3,266

Mongolia

Table A7: Summary Statistics (workers with positive earnings)

	1998	2002	2007
Hourly wage (Togrog)	420.0	493.6	786.0
log hourly wage	5.52	5.91	6.17
Male	0.495	0.474	0.485
Age	37.31	37.70	36.80
Married	0.746	0.746	0.658
Schooling			
Years of schooling	13.14	12.69	12.30
No education	0.004	0.002	0.011
Primary	0.020	0.020	0.026
Lower Secondary	0.128	0.151	0.140
Upper Secondary	0.267	0.350	0.487
Diploma	0.254	0.250	0.150
University	0.327	0.228	0.178
Skill classification			
Skilled (Upper secondary and	0.849	0.828	0.822
above)	0.582	0.478	0.328
Skilled (Diploma or higher)			
Sample size	1,309	2,384	8,780

Table A8: Indonesia - Industry share in employment and share of skilled workers by industry

	Industry share in employment		Share of skilled workers by industry	
	1996	2007	1996	2007
Agriculture	0.130	0.090	0.055	0.160
Forestry	0.010	0.008	0.117	0.218
Fishery	0.002	0.017	0.286	0.142
Mining-minerals	0.005	0.010	0.681	0.693
Metal ore and other mining	0.008	0.019	0.129	0.243
Food, Drinks, Tobacco	0.038	0.041	0.234	0.335
Textile	0.057	0.039	0.329	0.341
Timber and furniture	0.040	0.038	0.262	0.342
Paper and Printing	0.007	0.009	0.533	0.616
Chemicals	0.014	0.014	0.465	0.538
Non-Metallic production	0.010	0.010	0.237	0.250
Metal industry	0.014	0.007	0.545	0.471
Other industry	0.016	0.014	0.456	0.709
Electricity-Water	0.005	0.006	0.733	0.799
Construction	0.106	0.089	0.203	0.299
Wholesale	0.028	0.052	0.672	0.587
Retail	0.067	0.070	0.490	0.546
Transportation/Communication	0.059	0.063	0.362	0.457
Finance-Real Estate	0.026	0.035	0.864	0.841
Public Admin-Health-Other Services	0.358	0.367	0.679	0.808
Mean Skilled (Secondary and above)			*0.442*	*0.555*
Obs	44,603	125,597	44,603	125,597

Table A9: Philippines - Industry share in employment and share of skilled workers by industry

	Industry share in employment		Share of skilled workers by industry			
	1988	2006	1988		2006	
			(1)	(2)	(1)	(2)
Agriculture	0.455	0.356	0.296	0.052	0.410	0.078
Mining	0.006	0.002	0.546	0.153	0.477	0.109
Manufacture	0.107	0.094	0.595	0.199	0.778	0.284
Electricity/Water	0.004	0.004	0.899	0.578	0.980	0.651
Construction	0.041	0.050	0.529	0.132	0.660	0.163
Wholesale retail trade	0.137	0.188	0.604	0.238	0.779	0.335
Hotels restaurants	0.015	0.028	0.705	0.307	0.870	0.423
Transportation	0.050	0.077	0.674	0.212	0.775	0.284
Finance bus. services	0.017	0.037	0.949	0.701	0.965	0.738
Public administration	0.041	0.047	0.921	0.694	0.912	0.661
Community services	0.054	0.066	0.923	0.793	0.918	0.726
Private HH workers	0.071	0.050	0.518	0.102	0.647	0.089
Mean Skilled (Secondary and above)			*0.496*	*0.192*	*0.659*	*0.273*
Obs	37,335	74,090	37,335		74,090	

Note: (1) Skilled refers to those with some secondary and above (2) Skilled refers to those with some tertiary and above

Table A10: Thailand - Industry share in employment and share of skilled workers by industry

	Industry share in employment		Share of skilled workers by industry			
			1990		2004	
	1990	2004	(1)	(2)	(1)	(2)
Agriculture/Fishery	0.385	0.300	0.024	0.005	0.056	0.009
Mining	0.001	0.001	0.250	0.100	0.333	0.151
Manufacturing	0.132	0.146	0.164	0.027	0.289	0.062
Utilities	0.008	0.005	0.528	0.118	0.576	0.236
Construction	0.050	0.058	0.099	0.017	0.138	0.027
Trade	0.153	0.246	0.175	0.038	0.285	0.074
Transportation/Commun.	0.040	0.035	0.210	0.036	0.304	0.101
Services	0.231	0.209	0.428	0.209	0.670	0.433
Mean			*0.177*	*0.061*	*0.288*	*0.121*
Obs	21,524	54,383	21,524	21,524	54,383	54,383

Note: (1) Skilled refers to those with some secondary and above (2) Skilled refers to those with some tertiary and above

Table A11: Vietnam - Industry share in employment and share of skilled workers by industry

	Industry share in employment		Share of skilled workers by industry	
	1992	2006	1992	2006
Agriculture	0.271	0.162	0.086	0.077
Mining	0.014	0.018	0.469	0.470
Food-Bev-Tobb	0.042	0.048	0.149	0.221
Textiles	0.075	0.076	0.292	0.389
Wood-Furniture	0.057	0.046	0.148	0.188
Paper	0.008	0008	0.176	0.542
Chemicals	0.013	0.012	0.267	0.553
Non-metal	0.037	0.024	0.169	0.253
Metal	0.036	0.021	0.225	0.458
Other manuf.	0.012	0.017	0.333	0.752
Utilities	0.009	0.011	0.650	0.881
Construction	0.101	0.155	0.177	0.200
Trade	0.047	0.093	0.295	0.433
Transport/Commun.	0.046	0.047	0.311	0.615
Finance/Business	0.009	0.020	0.700	0.816
Services	0.224	0.242	0.643	0.786
Mean			*0.291*	*0.425*
Obs	2,241	6,294	2,241	6,294

Table A12: Cambodia - Industry share in employment and share of skilled workers by industry

	Industry share in employment		Share of skilled workers by industry	
	1997	2007	1997	2007
Agriculture/Mining	0.273	0.221	0.062	0.023
Manufacturing	0.122	0.240	0.172	0.164
Electricity/Water	0.004	0.004	0.644	0.172
Construction	0.085	0.165	0.104	0.141
Trade	0.072	0.039	0.132	0.239
Transport/Communication	0.061	0.077	0.164	0.169
Finance/Business	0.021	0.057	0.545	0.524
Public Admin	0.198	0.085	0.494	0.534
Other Services	0.164	0.111	0.514	0.677
Mean Skilled (Lower secondary and above)			*0.269*	*0.245*
Mean Skilled12 (Upper secondary and above)			*0.105*	*0.100*
Obs	2,516	2,647	2,516	2,647

Table A13: China - Industry share in employment and share of skilled workers by industry

	Industry share in employment		Share of skilled workers by industry	
	1999	2005	1999	2005
Agriculture/Mining	0.044	0.008	0.635	0.680
Manufacturing	0.306	0.188	0.490	0.603
Utilities	0.051	0.020	0.575	0.576
Construction	0.068	0.034	0.484	0.741
Transport/Communication	0.089	0.104	0.554	0.624
Trade	0.112	0.195	0.462	0.610
Public Admin	0.056	0.079	0.743	0.862
Services	0.274	0.374	0.668	0.693
Mean Skilled (Upper secondary and above)			*0.564*	*0.665*
Mean Skilled (Tertiary)			*0.210*	*0.243*
Obs	4,620	3,266	4,620	3,266

Table A14: Mongolia - Industry share in employment and share of skilled workers by industry

	Industry share in employment		Share of skilled workers by industry	
	1998	2007	1998	2007
Agriculture/Mining	0.075	0.083	0.694	0.637
Manufacturing	0.049	0.100	0.812	0.817
Utilities	0.034	0.046	0.822	0.771
Construction	0.035	0.094	0.804	0.700
Transport/Communication	0.066	0.129	0.896	0.830
Trade	0.075	0.093	0.806	0.811
Public Admin	0.225	0.101	0.908	0.913
Services	0.440	0.355	0.854	0.883
Mean Skilled (Upper secondary and above)			*0.849*	*0.822*
Mean Skilled (Tertiary)			*0.582*	*0.328*
Obs	1,309	8,861	1,309	8,861

Table A15a: Indonesia - Returns to levels of education over time - Employed for wages

	1994	1996	1999	2001	2003	2005	2007	Change 2007-1994
Industry dummies included								
Upper Sec. and above/ Low sec. and below	0.677	0.663	0.542	0.575	0.549	0.567	0.622	-0.055
At least some tertiary/ Secondary and below	0.819	0.788	0.691	0.752	0.658	0.667	0.771	-0.048

Table A15b: Indonesia - Returns to levels of education (relative to primary education) - Employed for wages

	1994	2001	2007	Change 2007-94
Basic controls only				
Primary	0.213	0.242	0.242	*0.029*
Junior Sec./primary	0.234	0.238	0.128	*-0.106*
Senior Sec./ primary	0.596	0.578	0.508	*-0.088*
Tertiary/primary	1.125	1.123	1.084	*-0.041*
Basic controls + Industry dummies				
Primary	0.195	0.226	0.243	*0.049*
Junior Sec./primary	0.235	0.227	0.126	*-0.109*
Senior Sec./ primary	0.610	0.564	0.498	*-0.112*
Tertiary/primary	1.137	1.096	1.070	*-0.067*

Table A15c: Indonesia - Returns to levels of education (relative to primary education) - Employed for wages

	1994	2001	2007	Change 2007-94
Basic controls only				
Primary	0.218	0.245	0.242	*0.024*
Secondary/ primary	0.468	0.458	0.369	*-0.099*
Tertiary/primary	1.109	1.105	1.069	*-0.040*
Basic controls + Industry dummies				
Primary	0.197	0.226	0.237	*0.040*
Secondary/ primary	0.466	0.431	0.351	*-0.115*
Tertiary/primary	1.099	1.052	1.016	*-0.083*

Table A15d: Indonesia- Returns to levels of education (relative to primary education) - Employed for wages

	1994	1997	1999	2001	2003	2005	2007	Change 2007-94
Basic controls only								
High school general/ primary	0.527	0.498	0.509	0.539	0.548	0.527	0.486	*-0.041*
High school vocational/ primary	0.663	0.645	0.634	0.613	0.629	0.614	0.547	*-0.116*
Tertiary/primary	1.123	1.046	1.044	1.117	1.064	1.034	1.084	*-0.039*
Basic controls + Industry dummies								
High school general/ primary	0.545	0.504	0.504	0.534	0.530	0.529	0.479	*-0.066*
High school vocational/ primary	0.678	0.638	0.615	0.603	0.599	0.612	0.526	*-0.152*
Tertiary/primary	1.139	1.104	1.016	1.097	1.027	1.030	1.056	*-0.083*

Table A16a: Philippines - Returns to levels of education over time – Employed individuals

	1988	1991	1994	1997	2001	2004	2006	Change 2006-1988
With Industry dummies								
Some Secondary and above/ primary and below	0.254	0.264	0.230	0.239	0.202	0.197	0.201	-0.063
At least some tertiary/ Secondary and below	0.437	0.425	0.395	0.413	0.402	0.384	0.392	-0.045

Table A16b: Philippines - Returns to levels of education - Employed for wages

	1988	2006	Change (%) 2006-1988
Basic controls only			
- Secondary/primary	0.415	0.492	*18.5*
- Tertiary/primary	1.075	1.184	*10.1*
Basic controls + Industry dummies			
- Secondary/primary	0.254	0.201	*-20.9*
- Tertiary/primary	0.691	0.593	*-14.1*

Table A17a: Thailand - Returns to levels of education over time – Employed individuals

	1990	1994	2000	2004	2004-1990
Industry dummies included					
Senior sec. and above/ low sec. and below	0.846	0.883	0.740	0.696	*-0.150*
Tertiary/ Upper sec. and below	1.056	1.045	0.916	0.955	*-0.101*

Table A17b: Thailand - Returns to levels of education over time – Employed individuals

	1990	2000	2004	2004-1990
Basic controls only				
Primary	0.301	0.481	0.394	*0.093*
Junior Sec./primary	0.374	0.314	0.316	*-0.058*
Senior Sec./ primary	0.636	0.608	0.603	*-0.033*
Tertiary/primary	1.093	1.229	1.289	*0.196*
Basic controls + Industry dummies				
Primary	0.221	0.285	0.253	*0.032*
Junior Sec./primary	0.306	0.220	0.214	*-0.092*
Senior Sec./ primary	0.571	0.492	0.430	*-0.141*
Tertiary/primary	1.089	1.039	1.072	*-0.017*

Table A17c: Thailand - Returns to levels of education over time – Employed individuals

	1990	2000	2004	2004-1990
Basic controls only				
Primary	0.298	0.478	0.393	*0.095*
Secondary/ primary	0.525	0.483	0.482	*-0.043*
Tertiary/primary	1.092	1.222	1.285	*0.193*
Basic controls + Industry dummies				
Primary	0.219	0.283	0.251	*0.032*
Secondary/ primary	0.455	0.371	0.336	*-0.119*
Tertiary/primary	1.081	1.021	1.060	*-0.021*

Table A17d: Thailand - Returns to levels of education over time – Employed individuals

	1990	2000	2004	2004-1990
Basic controls only				
High school general/ primary	0.471	0.538	0.482	*0.011*
High school vocational/ primary	0.730	0.668	0.719	*-0.011*
Tertiary/primary	1.097	1.231	1.289	*0.192*
Basic controls + Industry dummies				
High school general/ primary	0.389	0.396	0.327	*-0.062*
High school vocational/ primary	0.666	0.578	0.533	*-0.133*
Tertiary/primary	1.094	1.045	1.078	*-0.016*

Table A18a: Vietnam - Returns to levels of education over time- Employed for wages

	1992	1998	2004	2006	Change 1992-2006
Industry dummies included					
Lower Secondary and above/ primary and below	-0.082	-0.013	0.135	0.170	*0.252*
Upper secondary and above/ Lower Secondary and below	0.030	0.193	0.294	0.276	*0.246*
At least some tertiary/ Secondary and below	0.239	0.419	0.463	0.516	*0.277*

Table A18b: Vietnam - Returns to levels of education over time- Employed for wages

	1992	1998	2004	2006	Change 1992-2006
Basic controls only					
Primary	-0.019	-0.139	0.076	0.094	*0.113*
Junior Sec./primary	-0.172	-0.088	-0.034	0.055	*0.227*
Senior Sec./ primary	-0.175	0.046	0.193	0.210	*0.385*
Tertiary/primary	0.00	0.390	0.584	0.648	*0.648*
Basic controls + Industry dummies					
Primary	-0.018	-0.107	0.077	0.080	*0.098*
Junior Sec./primary	-0.167	-0.077	-0.040	0.039	*0.206*
Senior Sec./ primary	-0.123	0.090	0.181	0.195	*0.318*
Tertiary/primary	0.151	0.450	0.584	0.638	*0.487*

Table A18c: Vietnam - Returns to levels of education over time- Employed for wages

	1992	1998	2004	2006	Change 1992-2006
Basic controls only					
Primary	-0.019	-0.143	0.072	0.089	*0.108*
Secondary/ primary	-0.174	-0.032	0.077	0.114	*0.288*
Tertiary/primary	0.00	0.366	0.533	0.612	*0.612*
Basic controls + Industry dummies					
Primary	-0.018	-0.112	0.070	0.074	*0.092*
Secondary/ primary	-0.151	-0.008	0.063	0.097	*0.248*
Tertiary/primary	0.141	0.418	0.526	0.596	*0.455*

Table A18d: Vietnam - Returns to levels of education over time- Employed for wages

	1992	1998	2004	2006	Change 1992-2006
Basic controls only					
High school general/ primary	-0.040	0.058	0.164	0.147	*0.187*
High school vocational/ primary	-0.222	0.014	0.206	0.211	*0.433*
Tertiary/primary	0.023	0.385	0.576	0.648	*0.625*
Basic controls + Industry dummies					
High school general/ primary	0.001	0.098	0.161	0.142	*0.141*
High school vocational/ primary	-0.167	0.062	0.187	0.187	*0.354*
Tertiary/primary	0.135	0.447	0.575	0.634	*0.499*

Table A19a: Cambodia - Returns to levels of education over time –Employed individuals

	1997	2003-4	2007	Change 1997-2007
Industry dummies included				
Lower Secondary and above/ primary and below	0.146	0.363	0.256	*0.110*
At least Upper secondary/ Lower Secondary and below	0.155	0.448	0.301	*0.146*
Tertiary/Upper secondary and below	0.302	0.699	0.630	*0.328*

Table A19b: Cambodia - Returns to levels of education over time –Employed individuals

	1997	2003-4	2007	Change 1997-2007
Basic controls only				
Primary	0.122	0.347	0.276	*0.154*
Junior Sec./primary	0.092	0.171	0.227	*0.135*
Senior Sec./ primary	0.111	0.395	0.388	*0.277*
Tertiary/primary	0.313	0.711	1.035	*0.722*
Basic controls + Industry dummies				
Primary	0.114	0.210	0.152	*0.038*
Junior Sec./primary	0.061	0.132	0.117	*0.056*
Senior Sec./ primary	0.104	0.351	0.165	*0.061*
Tertiary/primary	0.320	0.699	0.731	*0.411*

Table A19c: Cambodia - Returns to levels of education over time –Employed individuals

	1997	2003-4	2007	Change 1997-2007
Basic controls only				
Primary	0.088	0.267	0.224	*0.136*
Secondary/ primary	0.123	0.279	0.279	*0.156*
Tertiary/primary	0.334	0.743	1.029	*0.695*
Basic controls + Industry dummies				
Primary	0.072	0.171	0.119	*0.047*
Secondary/ primary	0.080	0.217	0.127	*0.047*
Tertiary/primary	0.337	0.694	0.721	*0.384*

Table A20a: China - Returns to levels of education over time –Employed individuals

	1999	2005	Change 1999-2005
Industry dummies included			
At least Upper secondary/ Lower Secondary and below	0.239	0.456	*0.217*
Tertiary/Upper secondary and below	0.397	0.578	*0.181*

Table A20b: China - Returns to levels of education over time –Employed individuals

	1999	2005	Change 1999-2005
Basic controls only			
Primary	0.095	0.131	*0.036*
Junior Sec./primary	0.054	0.159	*0.105*
Senior Sec./ primary	0.192	0.466	*0.274*
Tertiary/primary	0.607	0.958	*0.351*
Basic controls + Industry dummies			
Primary	0.108	0.089	*-0.019*
Junior Sec./primary	0.052	0.163	*0.111*
Senior Sec./ primary	0.178	0.468	*0.29*
Tertiary/primary	0.538	0.930	*0.392*

Table A20c: China - Returns to levels of education over time –Employed individuals

	1999	2005	Change 1999-2005
Basic controls only			
Primary	0.095	0.129	*0.034*
Secondary/ primary	0.119	0.334	*0.215*
Tertiary/primary	0.602	0.943	*0.341*
Basic controls + Industry dummies			
Primary	0.107	0.087	*-0.020*
Secondary/ primary	0.111	0.336	*0.225*
Tertiary/primary	0.532	0.909	*0.377*

Table A21a: Mongolia - Returns to levels of education over time- Employed for wages

	1998	2002	2007-8	Change 1998-2007
Basic controls only				
Upper secondary and above/ Lower Secondary and below	0.315	0.264	0.769	*0.454*
At least some tertiary/ Secondary and below	0.299	0.376	0.701	*0.411*
Industry dummies included				
Upper secondary and above/ Lower Secondary and below	0.280	0.282	0.743	*0.463*
At least some tertiary/ Secondary and below	0.286	0.392	0.684	*0.398*

Table A21b: Mongolia - Returns to levels of education over time- Employed for wages

	1998*	2002**	2007-8***	Change 1998-2007
Basic controls only				
Primary	-0.250	0.059	0.116	*0.366*
Junior Sec./primary	0.521	0.203	0.290	*-0.231*
Senior Sec./ primary	0.603	0.249	0.786	*0.183*
Higher Diploma/primary	0.667	0.500	1.306	*0.639*
University/primary	0.979	0.705	1.387	*0.408*
Basic controls + Industry dummies				
Primary	-0.243	0.074	0.108	*0.351*
Junior Sec./primary	0.463	0.195	0.292	*-0.171*
Senior Sec./ primary	0.520	0.259	0.776	*0.252*
Higher Diploma/primary	0.592	0.524	1.294	*0.702*
University/primary	0.896	0.725	1.365	*0.469*

* Estimates not statistically significant except for university.

** Estimates not statistically significant except for higher diploma and university.

*** Estimates are all statistically significant except for primary.

Table A21c: Mongolia - Returns to levels of education over time- Employed for wages

	1998	2002	2007-8	Change 1998-2007
Basic controls only				
Primary	-0.259	0.066	0.116	*0.375*
Secondary/ primary	0.588	0.236	0.782	*0.194*
Tertiary/primary	0.852	0.602	1.448	*0.596*
Basic controls + Industry dummies				
Primary	-0.253	0.081	0.104	*0.357*
Secondary/ primary	0.516	0.240	0.652	*0.136*
Tertiary/primary	0.770	0.621	1.304	*0.534*

Table A21d: Mongolia - Returns to levels of education over time- Employed for wages

	1998	2002	2007-8	Change 1998-2007
Basic controls only				
High school general/ primary	0.650	0.215	0.743	*0.093*
High school vocational/ primary	0.525	0.325	0.874	*0.349*
Tertiary/primary	0.854	0.603	1.349	*0.495*
Basic controls + Industry dummies				
High school general/ primary	0.567	0.223	0.736	*0.169*
High school vocational/ primary	0.438	0.335	0.865	*0.427*
Tertiary/primary	0.773	0.624	1.332	*0.559*