

Son, Hyun Hwa

Working Paper

On Measuring Human Capital: A Case Study of Viet Nam

ADB Economics Working Paper Series, No. 311

Provided in Cooperation with:

Asian Development Bank (ADB), Manila

Suggested Citation: Son, Hyun Hwa (2012) : On Measuring Human Capital: A Case Study of Viet Nam, ADB Economics Working Paper Series, No. 311, Asian Development Bank (ADB), Manila, <https://hdl.handle.net/11540/1277>

This Version is available at:

<https://hdl.handle.net/10419/109430>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



<http://creativecommons.org/licenses/by/3.0/igo>

ADB Economics Working Paper Series



On Measuring Human Capital: A Case Study of Viet Nam

Hyun Hwa Son

No. 311 | September 2012

Asian Development Bank



ADB Economics Working Paper Series

On Measuring Human Capital: A Case Study of Viet Nam

Hyun Hwa Son
No. 311 September 2012

Hyun Hwa Son is Principal Evaluation Specialist,
Independent Evaluation Department,
Asian Development Bank.

This paper was presented in the conference on
Human Capital and Economic Development at Harvard
University on 9–10 September 2011. The author would
like to acknowledge insightful comments and
suggestions by the conference participants.
In particular, she thanks Noam Yuchtman,
Mark Rosenzweig, and Jong-Wha Lee for their
constructive comments and suggestions,
which helped improve an earlier version of the paper.

Asian Development Bank

Asian Development Bank
6 ADB Avenue, Mandaluyong City
1550 Metro Manila, Philippines
www.adb.org

© 2012 by Asian Development Bank
September 2012
ISSN 1655-5252
Publication Stock No. WPS125006

The views expressed in this paper are those of the author and do not necessarily reflect the views and policies of the Asian Development Bank (ADB) or its Board of Governors or the governments they represent.

ADB does not guarantee the accuracy of the data included in this publication and accepts no responsibility for any consequence of their use.

By making any designation of or reference to a particular territory or geographic area, or by using the term “country” in this document, ADB does not intend to make any judgments as to the legal or other status of any territory or area.

Note: In this publication, “\$” refers to US dollars.

The ADB Economics Working Paper Series is a forum for stimulating discussion and eliciting feedback on ongoing and recently completed research and policy studies undertaken by the Asian Development Bank (ADB) staff, consultants, or resource persons. The series deals with key economic and development problems, particularly those facing the Asia and Pacific region; as well as conceptual, analytical, or methodological issues relating to project/program economic analysis, and statistical data and measurement. The series aims to enhance the knowledge on Asia’s development and policy challenges; strengthen analytical rigor and quality of ADB’s country partnership strategies, and its subregional and country operations; and improve the quality and availability of statistical data and development indicators for monitoring development effectiveness.

The ADB Economics Working Paper Series is a quick-disseminating, informal publication whose titles could subsequently be revised for publication as articles in professional journals or chapters in books. The series is maintained by the Economics and Research Department.

CONTENTS

ABSTRACT	v
I. INTRODUCTION	1
II. METHODOLOGY	2
III. EMPIRICAL APPLICATION TO VIET NAM	6
A. Structure of Employment by Education Level	6
B. Estimation of Productivity Weights	9
C. Empirical Estimates of Human Capital in Viet Nam	10
D. Utilization of Human Capital	11
IV. EQUITY IN HUMAN CAPITAL	12
V. HUMAN CAPITAL ACROSS SOCIOECONOMIC AND DEMOGRAPHIC GROUPS	17
A. Gender	18
B. Geographical Location	18
C. Ethnicity	20
D. Age	20
E. Marital Status	21
VI. INEQUALITY IN HUMAN CAPITAL ACROSS SOCIOECONOMIC GROUPS	22
VII. SKILLS AND PRODUCTIVITY	23
VIII. CONCLUSIONS AND POLICY IMPLICATIONS	25
REFERENCES	29

ABSTRACT

Human capital refers to the ability and efficiency of people to transform raw materials and capital into goods and services, the consensus being that these skills can be learned through the educational system. The concept of human capital, necessarily, is related to the productivity of workers. Thus, this paper develops a productivity-based single measure of human capital, taking account of different levels of education and productivity differentials across workers. Using this new measure, the paper presents empirical estimates of human capital in Viet Nam and compares the stock of human capital contributed by vocational education and general education. The paper extends its analysis by investigating the extent to which human capital is utilized at different levels of education in the labor market. It also deals with equity in human capital, particularly as contributed by vocational education, and measures this equity across income quintiles and various socioeconomic and demographic groups in Viet Nam.

I. INTRODUCTION

Human capital refers to the ability and efficiency of people to transform raw materials and capital into goods and services, the consensus being that these skills can be learned through the educational system. The concept of human capital, obviously, is related to the productivity of workers. Thus, there is a broad consensus that countries should enhance their human capital in order to promote sustainable macroeconomic growth (Barro 1991, Barro and Lee 2010, Bartel and Lichtenberg 1987, Gintis 1971).

Although the general conceptual definition of human capital is clear, its measurement is difficult because it is a multidimensional concept encompassing several kinds of skills and educational levels. Various proxy measures of human capital have been proposed in the empirical literature, such as literacy rate (Azariadis and Drazen 1990); school enrollment rates (Barro 1991; Mankiw, Romer, and Weil 1992); years of schooling (Barro and Lee 2010; Cohen and Soto 2007); and test scores (Hanushek and Kimko 2000; Hanushek and Woessmann 2009). While the literacy rate—the proportion of the population able to read and write—is an important measure of well-being, it does not measure the educational attainment or skill level of the workforce. The school enrollment rate, meanwhile, is relevant only for school-age children and not the workforce. Although years of schooling is widely used to measure human capital, it does not capture the multidimensional aspect of different kinds of skills required by the workforce to produce output. This brings us to test scores, an indicator suggested by Hanushek and Kimko (2000) that reflects the quality of education and is closely related to individual skill, but for which it is very difficult to get a measurement that can be reliably extrapolated for the entire workforce. In fact, the country-level measures of average cognitive skills in Hanushek and Kimko (2000), and later Hanushek and Woessmann (2009), are not based on a random selection of schools or students, and may therefore not be nationally representative of the skill level of students, much less of the workforce.

The main objective of this paper is to develop a productivity-based single measure of human capital. Suppose there are k different types of educational levels that people can acquire, then, each person's human capital is measured by the educational level acquired by that person. Thus, an aggregate measure of human capital should be a function of those k educational levels. In order to obtain an aggregate measure of human capital, we have to devise a weighting scheme that reflects the average differences in productivity across educational levels. In this study, it is assumed that the average earnings differentials by different types of skills measure the productivity differences for different levels of education. For instance, suppose person A with no education earns \$1 per hour, and person B with secondary education earns \$3 per hour, then person B is potentially three times more productive than person A. In this way, we can calculate the human capital for each person in society, once we know what level of education a person has attained and what a person's productivity (or earnings) weight is relative to a person with no education. An aggregate measure of human capital is then derived by adding up the human capital possessed by each individual.

The main drawback of the proposed measure of human capital is that many individual characteristics that can affect earnings of individuals with the same level of education. It is therefore essential that we control for individual characteristics in determining the productivity weights to be given to different educational levels. In this study, we determine the productivity weights of different educational levels using the Mincer (1958) and Becker (1964) earnings functions. This is the general methodology used in the paper. It takes into account different levels of education that different people acquire and productivity weight for each level of education. In this sense, it takes a multidimensional approach to measuring human capital.

We apply the methodologies developed in the study to data on the labor market in Viet Nam, with particular focus on the stock of human capital contributed by vocational education and general education. The study extends its analysis by investigating the extent to which human capital is utilized at different levels of education in the labor market. It also deals with equity in human capital, particularly as contributed by vocational education. Equity in human capital is assessed by analyzing the distribution of human capital across income quintiles (constructed using per capita household income) and various socioeconomic and demographic groups in Viet Nam. In addition, the study touches on the varying intensity of skill requirements across different occupational groups. To this end, we have used the 2008 Viet Nam Household Living Standard Survey (VHLSS) conducted by the General Statistics Office of Viet Nam and containing data representative down to the regional level and urban and rural areas.

The study is organized as follows. Section II is devoted to methodology, and Section III discusses the empirical results emerging from the analysis of the micro-level household survey in Viet Nam. Sections IV–VI are devoted to inequities in human capital across various socio-demographic groups. Section VII explores a measure of skills accounting for workers' productivity. Section VIII summarizes major findings and presents key policy implications.

II. METHODOLOGY

As pointed out earlier, we aim to develop a new measure of human capital that takes into account different levels of education that different people acquire while accounting for their productivity. In this sense, it adopts a multidimensional approach to measuring human capital. This section outlines the methodology for this new measure.

Viet Nam's household survey, described in detail in Section III, provides information on the educational attainment of every individual in the sample households. We use this information to calculate the human capital of every individual, allowing us to construct the profiles of human capital for individuals and households across different socioeconomic characteristics. Using the survey, we identified nine mutually exclusive levels of educational attainment: (i) no degree (less than primary or incomplete primary education); (ii) completed primary; (iii) completed lower secondary; (iv) completed upper secondary; (v) completed short-term technical; (vi) completed long-term technical; (vii) completed professional secondary; (viii) vocational college; and (ix) tertiary general.

With the levels of educational attainment sorted out, we then calculate the average potential earnings for the nine categories (while controlling for other individual characteristics) using the Mincer (1958) and Becker (1964) earnings functions. Accordingly, we fit the following regression model:

$$\ln(x) = \alpha + \beta (\text{age}) + \beta_1 (\text{age}^2) + \gamma D_{\text{sex}} + \varepsilon D_{\text{urban}} + \rho (W_{\text{hours}}) + \tau D_{\text{ethnicity}} + \sum_{i=2}^9 \delta_i D_i + u$$

In this equation, age is introduced as an explanatory variable to capture experience. Individuals' earnings with the same level of education tend to increase with age. However, since earnings do not increase in a linear fashion, we have introduced the square of age (age^2) to capture its non-linearity. D_{sex} is a dummy variable for gender, which takes the value of 1 when the person is male and the value of 0 for female. This variable captures gender discrimination in

the labor market. It is also generally the case that earnings are higher in urban areas than in rural areas; as such, the urban dummy variable denoted as D_{urban} is included in the regression equation to capture urban–rural disparities. Hours of work, denoted by W_{hours} , is included as an explanatory variable as it is associated with earnings. It is also well known that ethnic minority groups are likely to suffer discrimination in the labor market as compared to the dominant ethnic group (i.e., the Kinh in the case of Viet Nam). Thus, a dummy variable for ethnicity denoted as $D_{ethnicity}$ is included in the earnings function. In this case, the non-Kinh ethnic minority is the reference group.

Finally, the regression equation includes eight dummy variables for each level of educational attainment. More specifically, the dummy variable D_i takes the value 1 when a person has attained the i th educational attainment level and 0 otherwise. The reference group in this case is the group with no degree. The regression coefficient δ_i is interpreted as the productivity of the i th educational attainment level relative to that of having “no degree”. Earning is used as a proxy for productivity. The regression model given above tells us that a person who has attained the i th educational level is expected to earn $\delta_i\%$ more than one with no degree, all things being equal. Without loss of generality, we can give a weight of 1 to a person who has attained no degree or formal qualifications. These normalized weights may be called the productivity weights, which convert educational attainment to a productivity-based measure of human capital. The human capital for the j th person can then be given by

$$H_j = 1 + \sum_{i=2}^9 \delta_i D_{ij} \quad (1)$$

This is our proposed measure of human capital for j th person, which takes account of the differences in productivity rates of different levels of educational attainment. For instance, if the j th person has completed upper secondary, say, which is equivalent to level (iv) in our classification indicated earlier, then his human capital will be defined as $H_j = (1 + \delta_4)$. Using this proposed measure, we can calculate human capital for any individual in the society. We can also aggregate the human capital for the entire population that is given by

$$H = \sum_{j=1}^N H_j = N + \sum_{j=1}^N \sum_{i=2}^9 \delta_i D_{ij} \quad (2)$$

where N is the total population in the country. Note that $H = N$, if no person in the society has obtained any educational degree. The difference $(H - N)$ is the net contribution of education to human capital and may be called the real aggregate measure of human capital because it has been adjusted for the population.

We can also use equation (2) to calculate human capital for any socioeconomic and demographic group in society. Thus, we can make comparisons of human capital possessed by various socioeconomic and demographic groups. For instance, we can calculate human capital by various income classes, which allows us to assess how equitable human capital is. Similarly, a comparison of human capital across different regions could be useful in making regional educational policies.

Our measure also helps us to understand whether human capital in a country has increased or decreased over time. It is reasonable to assume that productivity weights can significantly change only in the long run. However, if productivity weights are assumed to remain constant in the short run, then the change in human capital derived from equation (2) can be measured by

$$\Delta H = \Delta N + \sum_{i=2}^9 \delta_i \Delta N_i \quad (3)$$

where N_i is the number of persons in the population who have attained the i th level of education. The first term in the right-hand side is the change in population. Any increase in population will always increase human capital because additional workers can produce output even if they have not attained any educational degree. The second term is the contribution of education to output. If this term is positive, the population is getting more educated, which contributes to higher earnings. The performance of a country in enhancing its human capital can be measured by the second term in the right-hand side of equation (3).

In the long run, a country's performance can be measured by

$$\Delta H = \Delta N + \sum_{i=2}^9 \delta_i \Delta N_i + \sum_{i=2}^9 N_i \Delta \delta_i \quad (4)$$

The third term in equation (4) captures the impact of changes in productivity weights over time. In the initial stages of economic development, we may expect the rates of return to higher levels of education to increase. If the third term in the right-hand side of equation (4) is positive, then this suggests that rates of return to education are increasing, leading to the widening gap in earnings between skilled and unskilled labor.

Another interesting question is whether we can compare human capital across different countries: can we say that one country has more human capital than another? The main difficulty with this issue is that different countries will have different productivity weights and different educational attainments. As such, we need to know the separate effects of these two factors in explaining differences in human capital of countries. To this end, we propose the following decomposition:

$$H_2 - H_1 = (N_2 - N_1) + \sum_{i=2}^9 \left(\frac{\delta_{2i} + \delta_{1i}}{2} \right) (N_{2i} - N_{1i}) + \sum_{i=2}^9 \left(\frac{N_{2i} + N_{1i}}{2} \right) (\delta_{2i} - \delta_{1i}) \quad (5)$$

where

H_1 is human capital for country 1; H_2 is human capital for country 2; N_1 is population for country 1; N_2 is population for country 2; N_{1i} is the number of persons in country 1 who have attained i th level of education; N_{2i} is the number of persons in country 2 who have attained i th level of education; δ_{1i} is the productivity weights for country 1; and δ_{2i} is the productivity weights for country 2.

The second term in the right-hand side of equation (5) measures the differences in educational attainment in the two countries. If this term is positive (negative), this suggests that country 2 has higher (lower) educational attainments than country 1. Similarly, the third term in the right-hand side measures the earning differences of various educational levels in the two countries. If this term is positive (negative), this means that the earnings of skilled workers relative to those of unskilled workers in country 2 are higher (lower) than those in country 1.

It should be emphasized that just having human capital is not enough to achieve higher output. The utilization of human capital is equally or even more important for achieving higher output than the mere possession of it. If a country is unable to employ or utilize much of its highly educated labor force, then it will not be able to achieve a higher standard of living. It is therefore important to know the share of human capital that is utilized. To answer this question,

we need to calculate the total human capital of the workforce that is employed. Suppose E is total employment in the country, then the utilized human capital can be calculated as

$$H_E = \sum_{j=1}^E H_j \quad (6)$$

Accordingly, the share of human capital that is utilized can be measured by

$$\varphi = \frac{H_E}{H} \quad (7)$$

which is an important indicator of a country's potential productive capability.

Another important indicator that can be calculated is the average amount of human capital per capita, which is equal to the total human capital possessed by the country divided by its population:

$$\rho = \frac{H}{N} \quad (8)$$

which will be equal to 1 if no person in the country possesses any human capital: the larger the value of ρ , the greater the country's endowment of human capital. This indicator can be used to make cross-country comparisons of human capital where population varies across countries.

ρ can also be calculated for each household or group of households. This will allow us to construct human capital profiles of households by socioeconomic and demographic characteristics and to answer several questions. For example, are poor households poor because they possess low per capita human capital? Can regional disparities in standards of living be explained by differences in per capita human capital? What is the impact of a government's education policies in enhancing per capita human capital?

Finally, the study introduces an index of skills intensity. Suppose E is total employment and H_E is the total human capital of those employed, then we can define an index of skills intensity of employment as

$$\theta = \frac{H_E}{E} \quad (9)$$

If all employed persons have no education, this index will be equal to 1; the larger the value of the index, the greater the skills intensity. This index can be calculated for any occupation or industry and can tell us which occupation is skills-intensive and which is not. For instance, we may expect the agricultural sector to be less skills intensive than the industrial sector, but using this index we can measure by how much. Likewise, we can compare the skills intensity of various service sectors such as education, health, and finance.

III. EMPIRICAL APPLICATION TO VIET NAM

In this section, we apply the methodologies developed in the previous section to data on the labor market in Viet Nam, with particular focus on equity of human capital. To this end, we have used the 2008 The VHLSS conducted by the General Statistics Office of Viet Nam and which contains data representative down to the regional level and urban and rural areas.

The VHLSS is organized by household, but it also includes data on characteristics of individual household members such as age, gender, employment, wage and salary, health, and educational attainment. At the household level, the survey provides detailed information on income, expenditure, and housing conditions, among others. The 2008 VHLSS covers 38,253 individuals in 9,189 households.

The VHLSS also includes detailed information on education of household members, which allows us to distinguish between attainment of general and vocational education. General education in this context includes primary, lower secondary, upper secondary, and tertiary general education. On the other hand, vocational education covers short-term technical, long-term technical, professional secondary, and vocational college.

A. Structure of Employment by Education Level

Table 1 presents the number of persons aged 15 years and older by employment sector and education level. Viet Nam has a population older than 15 years of 66 million, making up about 77% of its 86 million people in 2008. Among the population aged 15 and older, 45% work in agriculture, forestry, or fisheries for their households; 33% are employed as wage and salary earners; and 18% are engaged in self-employed activities other than in the primary sector.

As regards educational attainment, 70% of the population 15 years and older have acquired at least one level in the 12-year universal general education cycle (i.e., primary, lower secondary, or upper secondary education). Table 1 shows that 21% have not completed primary school and that only 9%—or six million people—have finished some form of vocational education. The results further indicate that 55% of those with vocational education are working as wage and salary earners and another 30% are self-employed in the primary sector. By comparison, a significant 46% of those who received a general education are self-employed in the primary sector, whereas just 32% work for a wage and salary.

**Table 1: Employment by Sector and Education Level for Population
15 Years and Older, 2008 (million)**

Education Level	Number of People	Employed in Wage and Salary	Self-employed in Primary Industry	Self-employed in non-primary Industry
No degree	14.0	3.4	7.1	2.0
Primary	15.1	5.0	8.7	3.2
Lower secondary	18.6	5.1	9.8	3.6
Upper secondary	9.3	2.4	2.5	1.6
Short-term technical	2.2	1.1	0.8	0.7
Long-term technical	1.3	0.7	0.3	0.2
Professional secondary	2.3	1.3	0.7	0.4
Vocational college	0.2	0.2	0.0	0.0
Tertiary general	3.5	2.7	0.4	0.3
General education	46.47	15.07	21.31	8.73
Vocational education	6.00	3.32	1.79	1.32
Total*	66.49	21.79	30.24	12.02

* Total comprises No degree, General education, and Vocational education.

Source: Author's calculations based on the 2008 Viet Nam Household Living Standard Survey.

Table 2 can help us better understand the status of employment across education levels and sectors. The results suggest that while a small number of people aged 15 years and older have received vocational education, more than half of them are employed in wage and salary work, which could be expected to provide a more regular income, as compared to self-employment, particularly in the primary sector or in sales and services. While more than 76% of those with tertiary general education work for a wage or salary, more than 50% of those with vocational education at any level are employed in the wage and salary sector. Moreover, when we compare the employment rate of those with general education with those with vocational education, the latter group appears to fare better than the former. A comparison of the employment rate among those with upper secondary versus professional secondary education strengthens the case for vocational education since the graduates of lower secondary school can pursue either upper general secondary or vocational secondary education. As shown in Table 2, almost two-thirds of those who completed professional secondary are employed in jobs with regular wages and salaries, whereas less than one-third of those who finished upper secondary work in the same sector.

As would be expected, those with low levels of education or no education are largely concentrated in self-employment in agriculture, forestry, or fisheries. On the other hand, a relatively small proportion of individuals with vocational education are found in self-employment in the primary sectors. Yet, a significant 29.4% of those who received short-term technical training work for the self-employed sectors other than the primary sector. In all, in

Viet Nam, those with vocational education are more likely to find wage and salary employment than their counterparts with general education.

**Table 2: Employment Rate by Sector and Education Level
for Population 15 Years and Older, 2008 (%)**

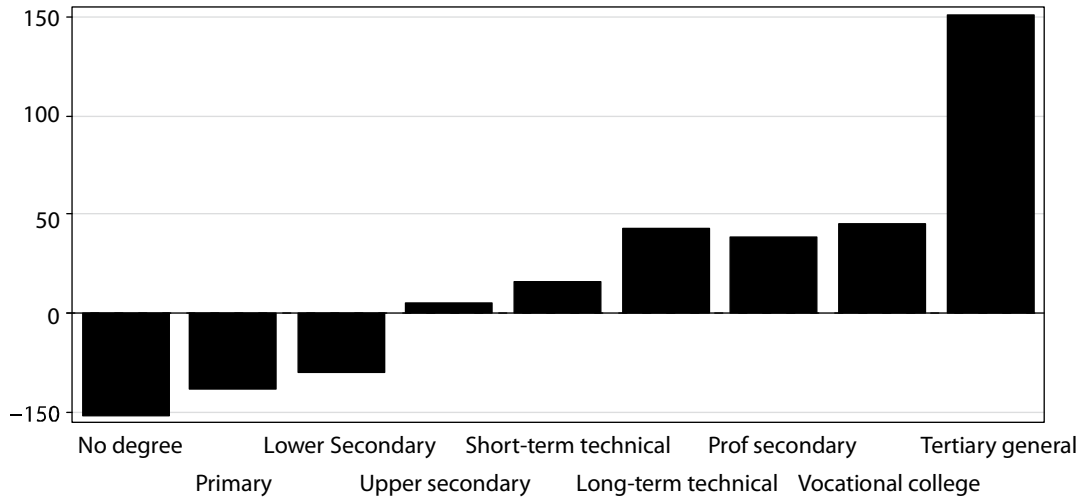
Education Level	Employed in Wage and Salary	Self-employed in Primary Industry	Self-employed in Non-primary Industry
No degree	24.3	51.0	14.0
Primary	32.9	57.4	21.5
Lower secondary	27.2	52.9	19.2
Upper secondary	25.6	26.3	17.1
Short-term technical	51.3	34.6	29.4
Long-term technical	56.4	23.4	19.5
Professional secondary	56.7	29.4	17.0
Vocational college	72.8	21.8	14.2
Tertiary general	76.3	10.7	9.4
General education	32.4	45.9	18.8
Vocational education	55.2	29.8	22.1
Total	32.8	45.5	18.1

Source: Author's calculations based on the 2008 Viet Nam Household Living Standard Survey.

We now look at earning differentials across different levels of education. Figure 1 depicts the earning differentials for the wage and salary earners: we can see that overall differentials in earnings are moderate across educational levels. The story, however, changes dramatically when it comes to earnings among workers with tertiary general education: the average earnings per worker for those with tertiary general education are 151% higher than the average per worker earnings among wage and salary workers. The results also suggest that average earnings for those who have attained general education up to lower secondary are below the average wage and salary levels in the labor market. On the other hand, earnings for workers with more than upper secondary are slightly higher than average earnings.

Figure 1 also shows that, on average, workers who acquired technical training or vocational education (whether at the secondary or tertiary level) earn 32% more than the average wage and salary earner in Viet Nam. In comparison, average earnings for a worker with general education are only 5% higher than average earnings. For instance, average earnings for workers who completed professional secondary are 38% higher than average earnings, whereas average earnings for workers who finished upper secondary general education are just 5% higher than the average. By contrast, when we compare the wage and salary earners who completed academic tertiary education versus vocational college, earnings for the two groups differ remarkably: average earnings for the academic tertiary education group are 173% higher than for the vocational college education.

Figure 1: Differentials in Wage-and-Salary Workers' Earnings
(Average earnings = 100)



Source: Author's calculations.

B. Estimation of Productivity Weights

In this section, we estimate the productivity weights from the Mincerian earning function using the methodology and set of controls as discussed in the previous section.

The results presented in Table 3 show that, on average, an additional year of experience will increase earnings by 4.83% in Viet Nam, while living in an urban area has a much higher payoff: the average earnings for an urban wage earner are 30.58% higher than those of a rural wage earner. A male worker, however, is rewarded more than his female counterpart: on average, his earnings are 29.34% higher than her earnings after controlling for educational attainment, experience, and other factors.

Table 3 also presents the relative earnings of each level of educational attainment relative to having no formal education or degree. These are the coefficients of the dummy variables for different levels of education, which we refer to as productivity weights. An average wage earner who completed primary school is expected to earn 2.23% more than a wage worker with no degree, controlling for all other factors. As would be expected, workers with four years or more of university education have the highest earnings in relation to the least educated group with no degree, followed by those with two years of vocational college. On average, a wage worker with a tertiary-level degree earns 113.73% more than one with no degree, *ceteris parabus*. The results also show that vocational education is a more profitable investment compared to general education at the primary, lower secondary, and upper secondary levels. More specifically, a worker with three years of upper secondary general education sees earnings 31.3% higher than one without formal education, whereas a worker with 2–3 years of vocational secondary education is likely, annually, to earn 67.67% more than the least educated worker.

Overall, the results indicate that an additional level of education gives rise to higher earnings than having no degree and that, on average, earnings for academic tertiary education are higher than vocational college. This finding indicates that opting for vocational college instead of university is a bad investment choice for individuals in Viet Nam who have access to either stream.

Table 3: Relative Earnings of Various Educational Levels for Wage and Salary Earners Aged 15 Years and Older
(Dependent variable: logarithm of earnings)

Explanatory Variables	Coefficient	t-value
Age	0.0483	13.21
Age squared	-0.0006	-13.18
Urban (Reference: rural)	0.3058	19.41
Male (Reference: female)	0.2934	16.26
Educational levels (Reference: no education)		
Primary	0.0223	0.88
Lower secondary	0.0858	3.36
Upper secondary	0.3130	10.10
Short-term technical	0.4116	10.48
Long-term technical	0.5782	12.28
Professional Secondary school	0.6766	18.04
Vocational college	0.6419	7.10
Tertiary general	1.1373	36.68
Kinh ethnicity (Reference: minority ethnicity)	0.5233	21.3
Working hours	0.0006	60.14
Constant	6.2443	89.25
Number of observations	9,286	
R-square	0.615	

Source: Author's calculations based on the 2008 Viet Nam Household Living Standard Survey.

C. Empirical Estimates of Human Capital in Viet Nam

Turning our attention to the labor market in general, Table 4 presents new estimates of human capital based on the methodology described in the previous section. The stock of human capital for Viet Nam is measured for the total number of people aged 15 years and older at different levels of education. The productivity weights are constructed based on the estimated earning differentials for the different levels of educational attainment presented in Table 3. The reference group—i.e., those with no degree—is given a weight equal to unity.

**Table 4: Productivity-based Human Capital in Viet Nam
for 15 Years and Older**

	Total Number of Persons (million)	Productivity Weight	Total Human Capital (million)
No degree	14.0	1.00	14.02
Primary	15.1	1.02	15.44
Lower secondary	18.6	1.09	20.16
Upper secondary	9.3	1.31	12.22
Short-term technical	2.2	1.41	3.15
Long-term technical	1.3	1.58	2.00
Professional secondary school	2.3	1.68	3.82
Vocational college	0.2	1.64	0.37
Tertiary general	3.5	2.14	7.46
General education	46.47	1.19	55.28
Vocational education	6.00	1.56	9.34
Total	66.49	1.18	78.64

Source: Author's calculations based on the 2008 Viet Nam Household Living Standard Survey.

As can be seen in Table 4, total human capital for the population 15 years and older is 78.64 million, while the working-age population is 66.49 million; thus, per capita human capital for Viet Nam is 1.18. Per capita human capital for working-age individuals with vocational education is 1.56, while it is 1.19 for those with general education. This suggests that the working-age population with vocational education has higher per capita human capital than those with general education.

D. Utilization of Human Capital

As pointed out previously, the utilization of human capital is even more important than its mere possession. A mismatch in the demand for and supply of skills occurs when the stock of human capital is not fully utilized in the labor market. Table 5 deals with the issue of utilization of human capital. Our results reveal that Viet Nam's labor market utilizes 75% of its human capital, or 85% of those with vocational education and 75% of those with general academic education. It utilizes workers with an upper secondary education the least (56%), followed by those with less than primary education (69%). By contrast, those with vocational college utilized their human capital the most (91%), followed by those with short-term technical vocation (89%).

**Table 5: Productivity-based Human Capital Utilization
for Population 15 Years and Older**

	Wage and Salary Earners	Self-employed Agriculture	Self-employed Non-farm	Total Utilization of Human Capital	% Utilization of Human Capital
No degree	3.40	7.15	1.97	9.72	69.34
Primary	5.08	8.86	3.32	13.08	84.69
Lower secondary	5.49	10.66	3.87	15.04	74.62
Upper secondary	3.13	3.22	2.09	6.81	55.71
Short-term technical	1.62	1.09	0.93	2.80	88.85
Long-term technical	1.13	0.47	0.39	1.68	84.09
Professional secondary school	2.17	1.12	0.65	3.15	82.39
Vocational college	0.27	0.08	0.05	0.34	91.05
Tertiary general	5.69	0.80	0.70	6.31	84.67
General education	19.39	23.53	9.98	41.25	74.61
Vocational education	5.18	2.76	2.02	7.96	85.28
Total	27.98	33.44	13.96	58.93	74.94

Source: Author's calculations based on the 2008 Viet Nam Household Living Standard Survey.

IV. EQUITY IN HUMAN CAPITAL

In general, Viet Nam has successfully provided widespread access to social services such as education and health. However, since launching the *doi moi* political and economic reform program in 1986, the quantity and quality of Viet Nam's public services have been deteriorating and school fees have even been introduced in some cases (World Bank 2008). This presents the government with a big challenge in promoting equity.

Table 6 provides insights into the equity of access to education, including vocational education, by income quintile. It presents the total population aged 15 years and older at different levels of education by quintile, where each quintile is constructed based on per capita household income.² As expected, more individuals from the richest 20% of the income distribution are concentrated in general education, particularly at the tertiary level: more than 70% of university graduates come from the richest 20%, while just 0.8% come from the poorest 20%. Similarly, access to vocational education among the richest quintile is almost seven times higher than that for the poorest.

² Household income is composed of incomes from wages and salaries, farming (e.g., crops, livestock, agricultural services, hunting and trapping, forestry, aquaculture, etc.), subsidies, rents, and other income.

Table 6: Population Aged 15 Years and Older by Education Level and by Quintile (million)

Education Level	Poorest	2nd Quintile	3rd Quintile	4th Quintile	Richest	Total
No degree	4.34	3.30	2.63	2.38	1.37	14.02
Primary	3.16	3.29	3.39	3.12	2.14	15.11
Lower secondary	3.20	4.13	4.21	3.88	3.15	18.57
Upper secondary	0.85	1.56	1.90	2.16	2.84	9.31
Short-term technical	0.15	0.28	0.44	0.66	0.71	2.23
Long-term technical	0.04	0.12	0.22	0.35	0.53	1.26
Professional secondary	0.06	0.20	0.34	0.67	1.01	2.28
Vocational college	0.00	0.01	0.03	0.05	0.13	0.22
Tertiary general	0.03	0.08	0.24	0.68	2.46	3.49
General education	7.24	9.06	9.74	9.84	10.59	46.47
Vocational education	0.25	0.61	1.03	1.73	2.37	6.00
Total	11.83	12.98	13.40	13.96	14.33	66.49

Source: Author's calculations based on the 2008 Viet Nam Household Living Standard Survey.

Inequity is also evident in human capital, as seen in Table 7: the share of human capital is 16% for the poorest quintile and 25% for the richest. More strikingly, human capital in vocational education is just 4% for the poorest quintile and almost 40% for the richest, clearly indicating that individuals from poorer households have limited access to vocational education.

Table 7: Shares of Human Capital by Quintile for Population 15 Years and Older (%)

	General Education	Vocational Education	Total
1st Quintile (Poorest)	14.26	4.04	16.02
2nd Quintile	18.22	10.06	18.20
3rd Quintile	19.97	17.04	19.41
4th Quintile	21.15	28.86	21.33
5th Quintile (Richest)	26.39	39.99	25.04
Total	100.00	100.00	100.00

Source: Author's calculations based on the 2008 Viet Nam Household Living Standard Survey.

Inequity in human capital in Viet Nam can be largely explained by two factors: the high concentration among the poorest 20% of the population without basic primary education and the dominance by the richest 20% in vocational education. General education as a whole is quite equitable: there is inequity in access at the tertiary levels, but at the primary and secondary levels inequity across income groups is relatively small. As in most developing countries, only a small number of people, mainly from rich households, are able to afford university or higher education. To address such inequity, scholarships that target students from poor households or minority ethnic groups could be effective.

We have seen that the poor have less opportunity for education than the rich, but do the poor have at least the same employment opportunity as their richer counterparts at a given level of education? As seen in Table 8, the number of people employed, either as wage and salary or

self-employed workers, increases moderately with income level, from about 9.2 million in the poorest quintile and leveling off at about 10.2 million in the richest quintile. As expected, the number of those employed with less than primary education peaks among the poorest and declines gradually with higher income levels. By comparison, for both general and vocational education, employment increases with income and is highest at the richest quintile. As is often the case in developing countries, the issue concerning the poor is not really the absence of employment, in that the poor cannot afford to be unemployed. As such, high employment rates can be observed in developing countries, with the uneducated poor largely engaged in the self-employed primary sectors such as agriculture, forestry, and fisheries. Viet Nam is no exception.

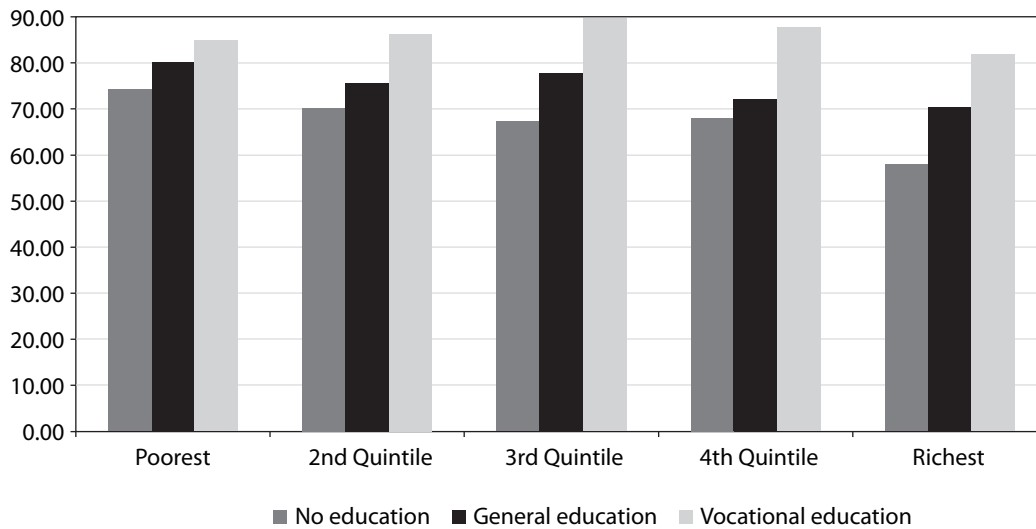
**Table 8: Employment by Education Level and Quintile
for 15 Years and Older (million)**

Education Levels	Poorest	2nd Quintile	3rd Quintile	4th Quintile	Richest	Total
No degree	3.22	2.32	1.77	1.62	0.79	9.72
Primary	2.76	2.84	2.96	2.54	1.70	12.79
Lower secondary	2.51	3.13	3.30	2.83	2.09	13.86
Upper secondary	0.51	0.84	1.13	1.15	1.56	5.19
Short-term technical	0.13	0.25	0.41	0.58	0.62	1.98
Long-term technical	0.03	0.10	0.20	0.31	0.42	1.06
Professional secondary	0.05	0.17	0.29	0.58	0.79	1.88
Vocational college	0.00	0.01	0.03	0.05	0.12	0.20
Tertiary general	0.02	0.06	0.20	0.58	2.09	2.95
General education	5.80	6.86	7.59	7.10	7.45	34.79
Vocational education	0.21	0.53	0.93	1.52	1.94	5.13
Total	9.23	9.71	10.28	10.24	10.18	49.64

Source: Author's calculations based on the 2008 Viet Nam Household Living Standard Survey.

The total number of employed people presented in Table 8 does not provide information on the proportion of employment at a given level of education. To account for the true picture of employment, we have calculated the employment rate (in percentage terms) in relation to the number of people that acquired a given level of education. Note that this employment rate by education level indicates employability or the probability of being employed given a particular level of education. It is often argued in the literature that education increases the probability of employment. Indeed, Figure 2 reinforces the idea that employment rises with some education as compared to no education. More interestingly, employability increases even more sharply with vocational education than with general education, a result consistent across income groups. This suggests that vocational training or education, on average, tends to provide more job opportunities in Viet Nam than general education and/or no education at all.

Figure 2: Employment Rate by Education Level and Quintile for 15 Years and Over (%)



Source: Author's calculations based on the 2008 Viet Nam Household Living Standard Survey.

Figure 2 also shows that the employment rate falls as income increases, a pattern that holds for the no-education and general education groups, but not for vocational education. This result broadly supports our earlier argument that the poor cannot afford to be unemployed. While employment or job availability is indeed an important indicator of healthy labor markets in developing countries, it should not overshadow the importance of the issue of quality or productive jobs. This brings us to the utilization of human capital, a concept that takes into account productivity at each level of education.

Table 9 presents the human capital that is utilized across various quintiles. The results reveal that total utilized human capital increases as we move from lower to upper quintiles. It is the utilized human capital that provides incomes to households, not the amount of human capital possessed.

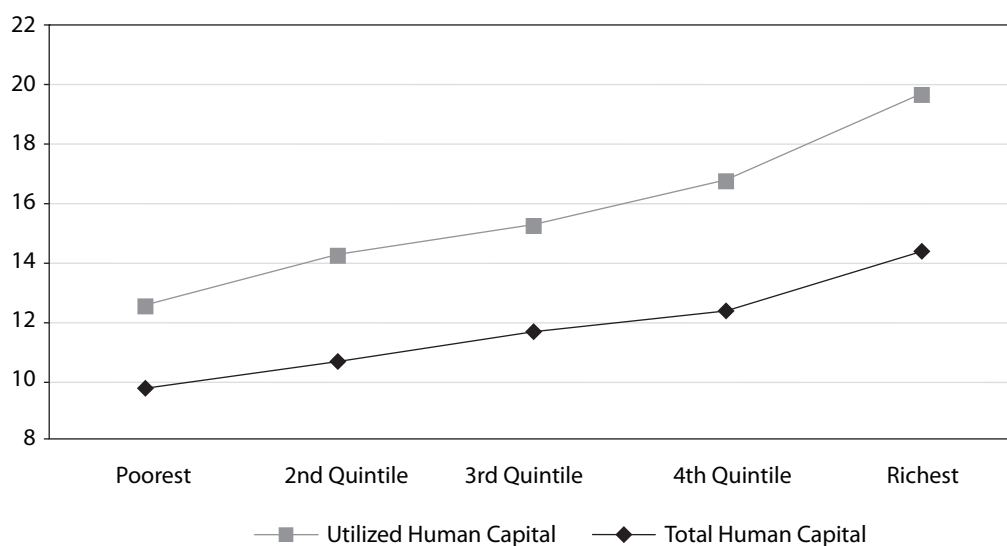
Table 9 also suggests that human capital with lower productivity—i.e., those with no formal educational degree—is utilized largely by the poorest quintile. For both general and vocational education, while utilization of human capital increases with income, the gap in utilization among the poorest and the richest quintiles is much wider for vocational education. Recall from our earlier results (Table 3) that the productivity of vocational education is on average higher than that of general education.

Table 9: Utilized Human Capital by Quintile (million)

	No Degree	General Education	Vocational Education	Total
1st Quintile (Poorest)	3.22	6.26	0.32	9.80
2nd Quintile	2.32	7.53	0.81	10.65
3rd Quintile	1.77	8.51	1.42	11.70
4th Quintile	1.62	8.42	2.36	12.40
5th Quintile (Richest)	0.79	10.53	3.05	14.37
Total	9.72	41.25	7.96	58.93

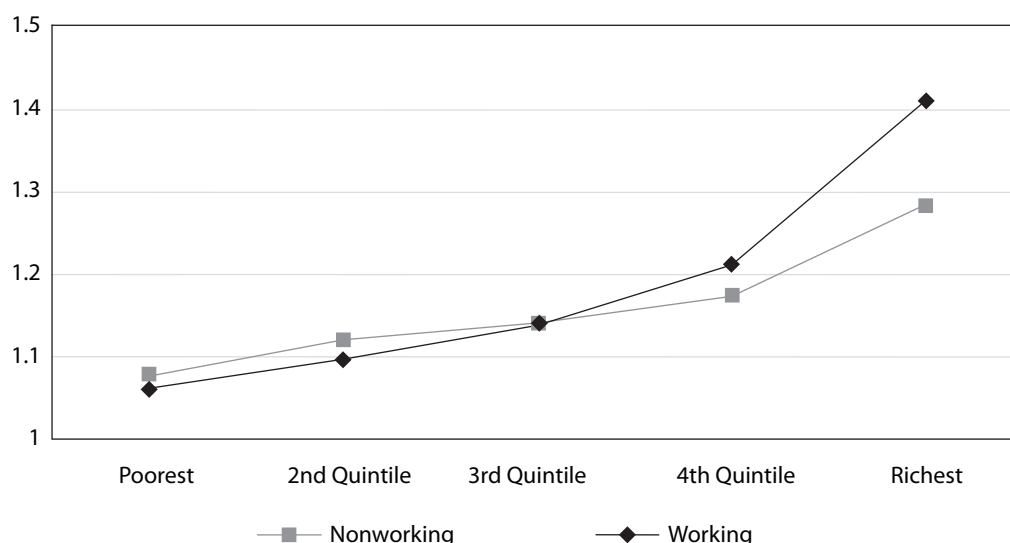
Source: Author's calculations based on the 2008 Viet Nam Household Living Standard Survey.

Figure 3 depicts the total and utilized human capital among the working-age population (15 years and over). It shows that the gap between total and utilized human capital is lower among those from poorer households than those from richer households. In other words, the poor possess lower stocks of human capital, but they tend to utilize it more. This may be because the poor cannot afford to remain unemployed since they tend to have low productivity; as such, the poor have no choice but to utilize whatever human capital they possess at full capacity. Such results are in fact consistent with the common characteristics of the working poor often observed in developing countries.

Figure 3: Total and Utilized Human Capital for Population 15 Years and Older (million)

Source: Author's calculations based on the 2008 Viet Nam Household Living Standard Survey.

Figure 4: Per person Human Capital of Working and Non-working Population, 15 Years and Older (million)



Source: Author's calculations based on the 2008 Viet Nam Household Living Standard Survey.

We have also calculated per-person human capital among the working and non-working population, 15 years and older. While the working population utilizes human capital, the non-working population does not. As illustrated in Figure 4, the stock of human capital per person increases with income level, and its utilization also rises as we move from the poorest quintile to the richest. The difference in the possession of human capital between working and non-working population is quite small among the population in the bottom three quintiles, but as we move to the upper quintiles (fourth and fifth), the difference becomes more prominent: among the rich, the working population has significantly higher human capital than the non-working population.

V. HUMAN CAPITAL ACROSS SOCIOECONOMIC AND DEMOGRAPHIC GROUPS

This section deals with the profile of human capital across various socioeconomic and demographic groups in Viet Nam. The analysis to be presented here could be useful in developing policies for human capital in the country. It will inform policy makers about the differences in human capital possession and utilization across various groups. This profile of human capital will help us diagnose disparities in human capital among socioeconomic and demographic groups, which, in turn, can be used for policies to help increase human capital among economically and socially disadvantaged groups. For this study, we have considered several socioeconomic and demographic characteristics of human capital, including gender, location in urban or rural areas, ethnicity, age, marital status, and income.

A. Gender

In developing countries, it is commonly perceived that women are likely to have relatively low incomes and high incidence of poverty compared to men. We could then pose a related question about human capital: how do males perform in acquiring human capital compared to females? Table 10 helps us answer this question. The employment rate presented in Table 10 is defined as the percentage of all persons employed in the labor market. The results show that 78.08% of all males aged 15 years and older are employed; the corresponding rate among adult females is 71.45%. Compared to other developing countries, women in Viet Nam tend to have a higher employment rate.

Table 10 also shows that the average per capita human capital possessed by adult males is 1.21 as compared to 1.16 for adult females. While this gender difference in the possession of human capital in Viet Nam appears to be rather small, a more insightful conclusion could be drawn by comparing these results with those for other countries. The results also reveal that the overall utilization of human capital by adult males is 77.92%, which is higher than for females (72.04%).

**Table 10: Human Capital by Gender
for Population 15 Years and Older**

	Male	Female	Total
Number of persons (million)	32.16	34.33	66.49
Employed persons (million)	25.11	24.53	49.64
Employment rate (%)	78.08	71.45	74.66
Average human capital per person	1.21	1.16	1.18
Total human capital (million)	38.79	39.88	78.67
Average human capital of employed persons	1.20	1.17	1.19
Utilized human capital (million)	30.23	28.73	58.96
Percentage of utilized human capital (%)	77.92	72.04	74.94

Source: Author's calculations based on the 2008 Viet Nam Household Living Standard Survey.

B. Geographical Location

Human capital possession and utilization may differ depending on the geographical location of an individual. Table 11 illustrates this point. In 2008, more than 71% of the working population 15 years and older were living in rural areas. This percentage has been declining over time due to ongoing urbanization in Viet Nam (Giang and Pfau 2007). As expected, per capita human capital in urban areas is about 16% higher than in rural areas (1.31 vs. 1.13, respectively). The gap in per capita human capital between urban and rural areas is even higher among the employed population (1.35 vs. 1.13). This result is somewhat expected because there is generally an urban bias in the supply of educational services.

The results also suggest that the percentage utilization of human capital in urban areas is about 68%, while it is 78% in rural areas. This means that while the urban population possesses higher per capita human capital, the utilization rate is much lower there than among their rural counterparts. This may be because the employment rate in the agricultural sector is

generally high and, thus, a large proportion of the working population is technically employed, albeit with lower earnings.

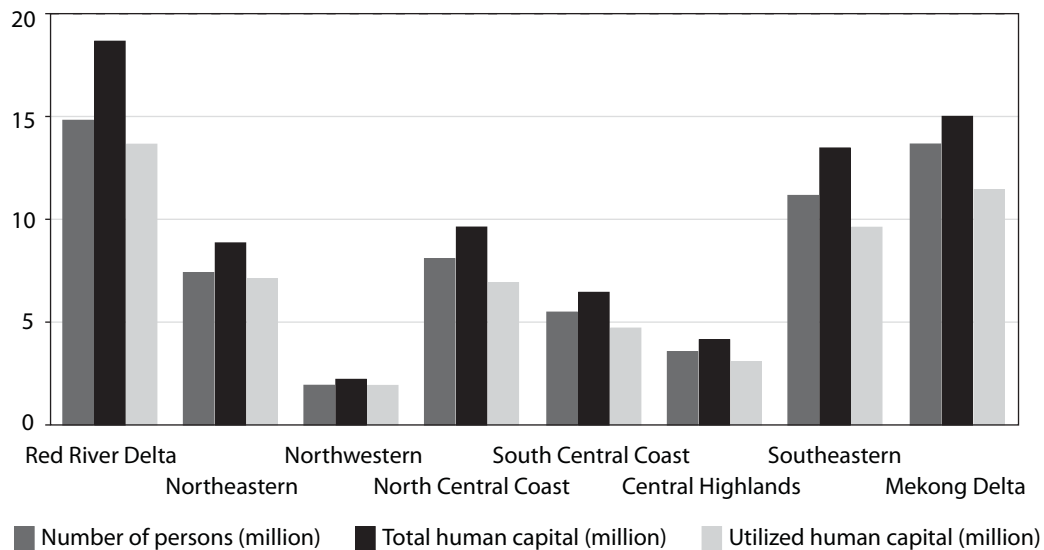
Table 11: Human Capital by Urban and Rural Area for 15 Years and Older

	Urban	Rural	Total
Number of persons (million)	18.99	47.51	66.49
Employed persons (million)	12.59	37.05	49.64
Employment rate (%)	66.33	77.98	74.66
Average human capital per person	1.31	1.13	1.18
Total human capital (million)	24.89	53.79	78.67
Average human capital of employed persons	1.35	1.13	1.19
Utilized human capital (million)	16.98	41.98	58.96
Percentage of utilized human capital (%)	68.22	78.05	74.94

Source: Author's calculations based on the 2008 Viet Nam Household Living Standard Survey.

In addition, we divided Viet Nam into eight economic regions: the Red River Delta, Northeast, Northwest, North Central Coast, South Central Coast, Central Highlands, Southeast, and Mekong River Delta. According to our results in Figure 5, almost 60% of the working population lives in the largest agricultural regions in the country including the Red River Delta, the Southeast, and the Mekong River Delta; total and utilized human capital are highest in these three regions as well. By contrast, the Northwest, which is the poorest region in Viet Nam, has the lowest endowment of human capital among the regions.

Figure 5: Human Capital by Economic Regions for Population, 15 Years and Older



Source: Author's calculations based on the 2008 Viet Nam Household Living Standard Survey.

C. Ethnicity

About 87% of the working-age population is of Kinh ethnicity, whereas the non-Kinh account for only 13% of the population aged 15 years and older. It is interesting to note that while total human capital is greater among the Kinh, its utilization rate is far higher among the non-Kinh. Indeed, the non-Kinh utilize more than 84% of their total human capital, which was almost equivalent to their employment rate in the same period. These results echo the same message of the working poor noted earlier in this study: poverty suffered among ethnic minorities in Viet Nam is far more severe compared to their Kinh counterparts even though their employment rate and human capital utilization rate are higher. These findings suggest that the non-Kinh are more likely to be poor due to their disadvantage in the endowment of human capital, among many other reasons.

**Table 12: Human Capital by Ethnic Group
for Population 15 Years and Older**

	Non-Kinh minority	Kinh	Total
Number of persons (million)	8.62	57.87	66.49
Employed persons (million)	7.24	42.40	49.64
Employment rate (%)	83.97	73.27	74.66
Average human capital per person	1.09	1.20	1.18
Total human capital (million)	9.43	69.24	78.67
Average human capital of employed persons	1.10	1.20	1.19
Utilized human capital (million)	7.93	51.03	58.96
Percentage of utilized human capital (%)	84.07	73.70	74.94

Source: Author's calculations based on the 2008 Viet Nam Household Living Standard Survey.

D. Age

In Table 13, we divide the working-age population into four age groups. Viet Nam has a young population, with almost 63% of its working-age population belonging to the 15–24 or 25–44 age groups. On the other hand, the elderly population, aged 60 years and over, account for about 14% of the working-age population. As would be expected, the elderly population has a much lower employment rate than their younger counterparts. It is striking to note, however, that the elderly population has much lower per capita human capital than the young. This suggests that educational attainment in Viet Nam has been improving over time; that is, younger generations have more education than their parents and grandparents.

Given their disadvantages in employment and human capital endowments, the elderly are more likely to be in poverty than the young. Strikingly, households with working elderly members have a higher poverty incidence than those with non-working elderly members. This finding could be explained by the fact that most of such households are in rural areas working in agriculture. They also have larger household sizes, with more children under 15 years old. These factors contribute to the higher vulnerability to poverty. This highlights the importance of social pensions targeted to the elderly: given the characteristics of the working elderly, not only do such social transfers address poverty in the short run, but they can also help build human capital in the long run as the transfers will be shared among household members, including school-age grandchildren of the elderly member.

**Table 13: Human Capital by Age Group
for Population 15 Years and Older**

	15–24 Years	25–44 Years	45–59 Years	60 Years and Over
Number of persons (million)	17.70	24.01	15.54	9.25
Employed persons (million)	9.27	22.68	13.73	3.95
Employment rate (%)	52.38	94.49	88.38	42.76
Average human capital per person	1.19	1.20	1.19	1.11
Total human capital (million)	21.06	28.83	18.55	10.23
Average human capital of employed persons	1.18	1.20	1.19	1.10
Utilized human capital (million)	10.95	27.30	16.35	4.34
Percentage of utilized human capital (%)	52.02	94.70	88.15	42.47

Source: Author's calculations based on the 2008 Viet Nam Household Living Standard Survey.

E. Marital Status

We now look at how human capital varies by marital status of the working-age population. As Table 14 shows, about 62% of the working-age population is married. Our results suggest that total human capital and its utilization rate are higher among married workers than among unmarried workers. The table also shows that a higher proportion of the married workforce is employed, as compared to the other groups. This result is to be expected since married workers are more likely to have families and dependents. Thus, married workers do not have the option to remain unemployed for an extended period of time.

Table 14: Human Capital by Marital Status for Population 15 Years and Older

	Never Married	Married	Others
Number of persons (million)	19.24	41.38	5.87
Employed persons (million)	10.51	36.23	2.90
Employment rate (%)	54.64	87.55	49.34
Average human capital per person	1.19	1.20	1.19
Total human capital (million)	22.88	49.71	7.01
Average human capital of employed persons	1.18	1.20	1.19
Utilized human capital (million)	12.42	43.61	3.45
Percentage of utilized human capital (%)	54.27	87.74	49.21

Note that "Others" includes widowed, divorced, or separated.

Source: Author's calculations based on the 2008 Viet Nam Household Living Standard Survey.

VI. INEQUALITY IN HUMAN CAPITAL ACROSS SOCIOECONOMIC GROUPS

This section discusses inequality in human capital across different socioeconomic and demographic groups and investigates the contributions of inequality between and within these groups to overall inequality in human capital. To this end, we use the Theil index of inequality (1967). This measure has gained popularity because of its property of decomposability: if a population is divided into a number of groups, then the measure of overall inequality can be decomposed into between-group and within-group measures of inequality. While the within-group component is a simple weighted average of the subgroup inequality values, the between-group component measures the inequality contribution due solely to differences in the group means.

Table 15 presents inequality in human capital across various socioeconomic groups. Inequality in human capital among males is slightly higher than among females, by about 13.5%. While the difference in inequality in human capital within male and female populations is small, it is far more prominent in other socioeconomic groups. Indeed, sharp differences in

Table 15: Inequality in Human Capital by Socioeconomic Group

	Total Human Capital	Utilized Human Capital
By Gender		
Male	2.35	2.49
Female	2.07	2.32
By Area		
Urban	3.45	3.86
Rural	1.42	1.53
By Region		
Red River Delta	2.54	2.64
Northeastern	2.13	2.27
Northwestern	1.84	1.93
North Central Coast	1.83	1.93
South Central Coast	2.21	2.42
Central Highlands	1.61	1.83
Southeastern	2.78	3.22
Mekong Delta	1.44	1.66
By Ethnicity		
Non-Kinh (minority)	1.15	1.24
Kinh (majority)	2.33	2.55
By Age Group		
15–24 years	1.33	1.77
25–44 years	2.68	2.73
45–59 years	2.53	2.48
60 years and over	1.95	1.60
By Marital Status		
Never married	1.86	2.60
Married	2.45	2.39
Others	1.28	1.57
Total	2.22	2.42

Source: Author's calculations based on the 2008 Viet Nam Household Living Standard Survey.

inequality are observed across regions: while inequality in human capital is highest in the Southeast region, it is lowest in the Mekong Delta. Similarly, the substantial difference in the inequality of human capital within ethnic groups is also quite evident: the distribution of human capital among the Kinh is far more unequal than among ethnic minorities. Turning to age groups, we observe that the distribution of human capital among individuals in the over-60 age group is relatively more equal than among those in the 25–44 and 45–59 age groups.

Table 16 takes the analysis a step further by explaining total inequality by within-group and between-group inequality. The results suggest that inequality in human capital is largely caused by within-group inequality, which is true for all groups considered for this study. This finding suggests that to reduce total inequality, policies need to be geared towards addressing within-group inequality.

Table 16: Total Inequality in Human Capital Explained by Within- and Between-group Inequality

Socioeconomic and Demographic Groups	Total Inequality Explained by		R-square
	Within-group Inequality	Between-group Inequality	
Total Human Capital			
Gender	2.20	0.02	0.80
Urban/rural area	2.00	0.22	11.17
Economic region	2.12	0.10	4.49
Ethnicity	2.20	0.02	1.00
Age group	2.19	0.04	1.66
Marital status	2.17	0.05	2.25
Utilized Human Capital			
Gender	2.41	0.01	0.39
Urban/rural area	2.12	0.29	13.84
Economic region	2.31	0.11	4.44
Ethnicity	2.39	0.03	1.12
Age group	2.39	0.03	1.17
Marital status	2.39	0.03	1.11

Source: Author's calculations based on the 2008 Viet Nam Household Living Standard Survey.

VII. SKILLS AND PRODUCTIVITY

The importance of skills in modern economics and in economic policy discourse is widely acknowledged. Changing skills occupy a key role in various explanations of both economic growth and the changing distribution of wages observed in many developed and developing countries in recent decades. It is argued that technological and organizational changes in the workplace increase demand for higher-level skills and for particular skills in the areas of information technology, problem solving, and communication. Raising the skills of national workforces through education and training has thus become a primary objective of economic

policies aimed at developing national competitiveness. In this context, skills may be academic, cognitive, or technical, and are closely related to productivity.¹

However, despite the far-reaching theoretical and practical importance of skills, studies on the empirical measurement of skills are comparatively underdeveloped. The unit of measurement most commonly called upon as a proxy for skills is some indicator of educational attainment, most commonly years of schooling. But measuring skills using only educational indicators is insufficient. Instead, what is needed is to measure skills and account for their productivity. In Section II, we defined skills intensity as the ratio of human capital to employment. Table 17 presents measures of skills intensity by occupational groups for Viet Nam. The occupational groups are arranged in ascending order of skills intensity. As may be

Table 17: Occupations Ranked by Skills Intensity

Occupational Groups	Employment	Human Capital	Skills Intensity
Unskilled workers in agriculture, sylviculture, etc.	22.99	24.88	1.08
Skilled worker in agriculture, sylviculture, etc.	2.00	2.19	1.09
Unskilled workers in mining and construction	3.89	4.28	1.10
Skilled manual workers in mining and construction	1.55	1.75	1.13
Sale and service unskilled workers	5.82	6.60	1.13
Food processing, woodworking and textile	2.69	3.14	1.17
Workers making sophisticated goods	0.35	0.40	1.17
Modelers, salesmen, product introducers, etc.	1.26	1.50	1.20
Other handicraftsmen and related workers	0.66	0.79	1.21
Personal services and protection services	0.99	1.20	1.21
Assemblers and machine operators	0.33	0.41	1.25
Drivers and operators of motorized equipment	1.07	1.36	1.28
Metal workers, mechanical workers, etc.	0.80	1.04	1.30
Production machine operators	0.12	0.17	1.37
Customer service staff	0.25	0.35	1.40
Communist Party offices at all levels	0.06	0.08	1.46
White-collar personnel	0.41	0.59	1.46
Associations	0.11	0.16	1.47
People's council and committee at local level	0.33	0.51	1.53
Life and health sciences at mid level	0.25	0.40	1.63
Other mid-level professionals	0.65	1.07	1.66
Natural and Technical sciences at mid level	0.11	0.18	1.68
Army forces	0.11	0.19	1.71
Firms, factories, manufactures, etc.	0.20	0.34	1.72
Education and training at mid level	0.73	1.35	1.84
Life and health sciences at top level	0.14	0.28	2.02
Education and Training at top level	0.65	1.35	2.07
People's court and control institute	0.01	0.02	2.07
Natural and technical sciences at top level	0.25	0.53	2.10
Other top-level professionals	0.84	1.79	2.12
Leaders in corporations and companies	0.01	0.02	2.14

Source: Author's calculations based on the 2008 Viet Nam Household Living Standard Survey.

¹ Soft skills or work-related attitudes could also be part of skills. However, soft skills are difficult to define and are therefore hardest to measure. There appears to be a new intensity of demand for soft skills. Yet, this study does not include this definition of skills in the measurement because of data availability.

expected, skills intensity is lowest for unskilled workers and skilled workers in the primary sectors such as agriculture, silviculture, and aquaculture. These unskilled manual workers may need to possess strength, stamina, and fortitude, but these attributes cannot be described as skills. On the other end of the scale are top-end professionals in all fields who have a skills intensity index of 2.14. Similar results can be seen from our estimates of skills intensity by industrial group (Table A.1 in the Appendix).

Educational institutions are the main suppliers of skills, and it is important that they know which occupations require what skills so that courses can meet the demand for skills in various occupations in the labor market. The index of skills intensity given in Table 17 can be disaggregated according to different educational levels,² and these disaggregated indices can be used by educational institutions in planning curricula. Such planning may be an important step in reducing the mismatch between the skills requirements of labor markets and the skills supplied by educational institutions.

Our analysis of skills intensity quantifies which occupations demand more (or less) skilled labor and, as such, can be used to address the issue of mismatches between the skills produced in the educational system and the skills needed in the labor market. Future research could look at the variation of job tasks within and between occupations, although this is beyond the scope of the current study.

VIII. CONCLUSIONS AND POLICY IMPLICATIONS

The concept of human capital is related to the productivity of workers: a person with more years of schooling, for instance, will likely be more productive and earn more as a result than one with less schooling. However, the measures of human capital that are currently widely used—such as years of schooling—do not directly take account of workers' productivity. This paper has developed a new measure of human capital that takes account of the different levels of education that people possess while accounting for their productivity. In this sense, it adopts a multidimensional approach to measuring human capital. Using Viet Nam's household survey data, the paper has developed profiles of human capital for individuals and households for different socioeconomic and demographic characteristics.

The results highlight the existing inequities in Viet Nam's education system, particularly at the post-secondary level. While access to primary and secondary education is fairly equitable, access to tertiary education remains highly inequitable: more than 70% of university graduates come from the richest 20%, while just 0.8% come from the poorest 20%. This inequity in access to post-secondary education results in inequities in possessed human capital, which is then transmitted to inequity in employment opportunities and earnings. Even if data show that the poor are more likely to utilize whatever human capital they possess (unemployment is not an option for the poor), their lack of human capital makes them more likely to be working in informal sector jobs with low productivity, low wages, and inadequate security.

The data also show that vocational education can be a viable alternative for people who are unable to attend university. Although rates of return to vocational education at the tertiary level are still lower than those for tertiary general education, even short-term technical training

² Disaggregation by different educational level was not possible in this study due to the lack of observations at each level of education.

has higher returns than upper-secondary general education. Moreover, those with vocational education are more likely to be employed in wage and salary jobs than those with only general education. Unfortunately, vocational education remains highly inequitable and is largely out of reach for the poor: access to vocational education among the richest quintile is almost seven times higher than for the poorest.

Inequities in human capital are likewise observed across various socio-demographic groupings, many of which reflect the income-based inequities described above. While gender-based inequities are relatively benign, geographical inequities are more pronounced: on average, working-age people in urban areas have 16% more human capital than those in rural areas, while the poorest Northwest region has the lowest stock of human capital in the country. Moreover, ethnic minorities continue to be disadvantaged in Viet Nam, with the non-Kinh having higher poverty rates and lower human capital compared to the majority Kinh ethnic group. On the other hand, data also reveal that human capital among the older generations are lower compared to the younger generations, implying a gradual improvement in accessibility to education over time.

Finally, this paper investigated the contributions of inequality between and within socio-demographic groups to overall inequality in human capital in Viet Nam. The study finds that inequality in human capital mainly comes from differences within groups, rather from differences in average human capital between groups. This implies that to reduce total inequality in human capital, the government needs to implement policies that can explicitly and directly address inequality within socioeconomic and demographic groups.

APPENDIX:INDUSTRIES RANKED BY SKILLS INTENSITY

Industries	Employment	Human Capital	Skills Intensity
Renting and leasing of machinery and equipment	0.02	0.02	1.07
Fishing and aquaculture	1.53	1.65	1.07
Agriculture and related services	23.45	25.45	1.09
Undifferentiated goods- and services-producing activities	0.01	0.01	1.09
Manufacture of coke and refined petroleum	0.01	0.01	1.09
Food and beverage services	1.65	1.83	1.11
Other mining and quarrying	0.13	0.15	1.11
Manufacture of wood and of products of wood	0.82	0.92	1.12
Construction of buildings	2.50	2.80	1.12
Security and investigation	0.02	0.02	1.12
Forestry and related services	0.29	0.32	1.13
Activities of households as employers	0.18	0.21	1.13
Manufacture of food products	1.14	1.29	1.13
Other manufacturing	0.12	0.14	1.14
Activities of other membership organization	0.02	0.03	1.15
Manufacture of furniture	0.49	0.57	1.16
Lottery, gambling, and betting	0.08	0.10	1.17
Manufacture of other non-metallic mineral	0.41	0.48	1.17
Manufacture of leather and related products	0.42	0.49	1.18
Retail trade, except of motor vehicles	4.10	4.82	1.18
Manufacture of textiles	0.30	0.35	1.18
Other personal services	0.55	0.65	1.18
Waste collection, treatment, and disposal	0.07	0.09	1.21
Employment activities	0.02	0.02	1.22
Manufacture of chemicals and chemical products	0.06	0.08	1.24
Land transport and transport via railways	1.12	1.38	1.24
Wholesale and retail trade	0.34	0.42	1.24
Manufacture of wearing apparel	1.34	1.65	1.24
Manufacture of electrical equipment	0.06	0.07	1.25
Manufacture of beverages	0.22	0.28	1.26
Sports, amusement, and recreation	0.10	0.12	1.26
Real estate	0.13	0.17	1.26
Mining of metal ores	0.03	0.04	1.26
Manufacture of paper and paper products	0.15	0.19	1.26
Building and landscape services	0.03	0.03	1.26
Manufacture of fabricated metal products	0.39	0.49	1.27
Warehousing and support	0.12	0.16	1.27
Wholesale trade except of motor vehicles	0.94	1.21	1.28
Manufacture of basic metals	0.13	0.17	1.29
Mining support services	0.02	0.02	1.29
Manufacture of rubber and plastics products	0.12	0.16	1.29
Repair of computers	0.17	0.22	1.29
Manufacture of tobacco products	0.01	0.01	1.33
Manufacture of computer and electronics	0.07	0.09	1.33
Water collection, treatment, and supply	0.04	0.06	1.34
Accommodation	0.17	0.22	1.35
Specialized construction	0.16	0.22	1.35
Manufacture of other transport equipment	0.10	0.14	1.36
Water transport	0.14	0.19	1.37
Repair and installation of machinery	0.09	0.13	1.40
Sewerage and sewer treatment	0.01	0.01	1.41

Industries	Employment	Human Capital	Skills Intensity
Information services	0.03	0.04	1.42
Civil engineering	0.22	0.31	1.44
Motion picture, video, and television	0.01	0.02	1.44
Manufacture of machinery and equipment	0.08	0.11	1.45
Postal and courier	0.05	0.07	1.46
Mining of coal and lignite	0.11	0.16	1.46
Printing and reproduction of recorded materials	0.06	0.09	1.47
Libraries, archives, and museums	0.03	0.05	1.48
Manufacture of pharmaceuticals, medicine	0.06	0.09	1.50
Electricity, gas, steam, and air conditioning	0.15	0.24	1.53
Creative, art, and entertainment	0.03	0.05	1.55
Other financial activities	0.03	0.05	1.59
Residential care activities	0.02	0.03	1.62
Communist party, sociopolitical organization	1.36	2.21	1.63
Office administrative and support	0.04	0.07	1.64
Telecommunication	0.09	0.15	1.65
Manufacture of motor vehicles, trailers	0.02	0.03	1.65
Social work	0.00	0.00	1.68
Computer programming and consultancy	0.05	0.09	1.68
Broadcasting and programming	0.04	0.07	1.69
Human health	0.40	0.67	1.69
Advertising and market research	0.05	0.09	1.74
Activities of extraterritorial organization	0.00	0.01	1.76
Remediation and other waste management	0.01	0.01	1.77
Travel agency and tour operator	0.04	0.06	1.77
Other professional, scientific, and technology	0.07	0.13	1.78
Insurance, reinsurance, and pension funding	0.04	0.07	1.79
Financial services, except insurance	0.13	0.24	1.81
Veterinary	0.01	0.02	1.83
Education	1.64	3.07	1.87
Activities of head office	0.01	0.02	1.88
Publishing	0.02	0.04	1.89
Extraction of crude petroleum and natural resources	0.02	0.03	1.89
Architectural and engineering	0.05	0.09	1.95
Legal and accounting	0.02	0.05	1.99
Scientific research and development	0.02	0.05	2.02

Source: Author's calculations based on the 2008 Viet Nam Household Living Standard Survey.

REFERENCES

- Azariadis, C., and A. Drazen. 1990. Threshold Externalities in Economic Development. *Quarterly Journal of Economics*. Vol. 105(2). pp. 501–526. MIT Press.
- Barro, R. 1991. Economic Growth in a Cross Section of Countries. *Quarterly Journal of Economics* 106(2). pp. 407–443.
- Barro, R., and J.W. Lee. 2010. A New Data Set of Educational Attainment in the World, 1950–2010. *NBER Working Paper* 15902.
- Bartel, A., and F. Lichtenberg. 1987. The Comparative Advantage of Educated Workers in Implementing New Technology. *Review of Economics and Statistics* 69(1). pp. 1–11.
- Becker, G. 1964. *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education*. Chicago: University of Chicago Press.
- Cohen, D., and M. Soto. 2007. Growth and Human Capital: Good Data, Good Results. *Journal of Economic Growth* 12(1). pp. 51–76.
- Giang, T., and W. Pfau. 2007. Patterns and Determinants of Living Arrangements for the Elderly in Viet Nam. *MPRA Paper* 24949. University Library of Munich, Germany.
- Gintis, H. 1971. Education, Technology, and the Characteristics of Worker Productivity. *American Economic Review* 61(2). pp. 266–279.
- Hanushek, E., and D. Kimko. 2000. Schooling, Labor Force Quality, and the Growth of Nations. *American Economic Review*. 90 (5). pp. 1184–1208
- Hanushek, E., and L. Woessmann. 2009. Schooling, Cognitive Skills, and the Latin American Growth Puzzle. *NBER Working Papers* 15066. National Bureau of Economic Research, Inc.
- Mankiw, G., D. Romer, and D. Weil. 1992. A Contribution to the Empirics of Economic Growth. *Quarterly Journal of Economics*, May 1992. 107(2). pp. 407–437.
- Mincer, J. 1958. Investment in Human Capital and Personal Income Distribution. *Journal of Political Economy* 66. University of Chicago Press.
- Theil, H. 1967. *Economics and Information Theory*. Amsterdam: North Holland.
- World Bank. 2008. *Viet Nam: Higher Education and Skills for Growth*. Washington, DC: World Bank.

On Measuring Human Capital: A Case Study of Viet Nam

This study develops a productivity-based single measure of human capital, taking account of different levels of education and productivity differentials across workers. Using this new measure, the paper presents empirical estimates of human capital in Viet Nam and compares the stock of human capital contributed by vocational and general education. It also deals with equity in human capital particularly as contributed by vocational education, and measures this equity across income quintiles and various socioeconomic and demographic groups in Viet Nam.

About the Asian Development Bank

ADB's vision is an Asia and Pacific region free of poverty. Its mission is to help its developing member countries reduce poverty and improve the quality of life of their people. Despite the region's many successes, it remains home to two-thirds of the world's poor: 1.8 billion people who live on less than \$2 a day, with 903 million struggling on less than \$1.25 a day. ADB is committed to reducing poverty through inclusive economic growth, environmentally sustainable growth, and regional integration.

Based in Manila, ADB is owned by 67 members, including 48 from the region. Its main instruments for helping its developing member countries are policy dialogue, loans, equity investments, guarantees, grants, and technical assistance.

Asian Development Bank
6 ADB Avenue, Mandaluyong City
1550 Metro Manila, Philippines
www.adb.org/economics



Printed on recycled paper

Printed in the Philippines