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Human capital accumulation in emerging Asia, 1970–2030☆

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ABSTRACT

Emerging Asian economies have made strong progress in improving educational capital in the past 40 years. High educational attainment, especially at the secondary level, has significantly improved emerging Asia's educational achievement. Regressions show that better parental education and income, lower income inequality, declining fertility, and higher public educational expenditures account for higher educational enrollment. But Asia's average years of schooling are forecast to increase to 7.6 years by 2030, from 7.0, significantly slower than the increase of 4.1 years from 1970 to 2010. That would put emerging Asia's educational capital in 2030 at only the 1970 level of the advanced countries, or still 3.5 years behind the level of advanced countries in 2010. For sustained human development, Asian economies must invest in improving educational quality and raising enrollment rates at the secondary and tertiary levels.

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1. Introduction

Well known for its remarkable economic achievements, emerging Asia[1] has grown by over 6.7 percent a year since the 1970s, making it the world's fastest-growing region. Numerous studies have explored this remarkable growth record. They point to several primary explanations, including high saving and investment ratios, a well-educated labor force, macroeconomic stability, and export-oriented development strategies.

Among these factors, there has been considerable focus on high savings and the region's emphasis on exports. By contrast, even though the role of emerging Asia's notable educational achievements in economic growth have often been emphasized, there has been little investigation into how this was achieved in the last five decades. Of the limited literature, Fredrikson and Tan (2008) attribute the success to several factors including (i) high rates of economic growth; (ii) an emphasis on the policies needed to promote high economic growth; (iii) the rapid transition from high to low fertility rates; and (iv) strong public institutions. Lee (2001) discusses the measures Asian countries adopted to expand the quantity and quality of education and emphasizes the role of government in setting educational priorities to meet changing demand, and improve the efficiency of resource utilization. Meanwhile, a number of papers have recognized the positive impact of cultural and religious features in East Asia on educational outcomes. Indeed, studies on Asian-American students' educational expectations and school performance also suggest that family orientation or training, which generally embody Asian culture and values, play an active role in their high expectations and outstanding performance in schools in the United States (Leung, 2001; Goyette and Xie, 1999; Chen and Stevenson, 1995; Peng and Wright, 1994). That is, their parents tend to have high educational expectations of their children and provide strong support (Lee and Barro, 2001).

This paper investigates how emerging Asia achieved its rapid human development from 1970 to 2010, and projects educational progress in the next 20 years.[2] Section 2 presents a brief overview of the region's educational progress in the past 40 years. Section 3

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[1] Emerging Asia includes the People's Republic of China; Hong Kong, China; India; Indonesia; Republic of Korea; Malaysia; Pakistan; Philippines; Singapore; Taipei, China; Thailand; and Viet Nam. Accounting for about 95 percent of developing Asia's GDP and 86 percent of its population, they represent regional trends well.

[2] We focus on educational capital as a main component of human capital. However, human development can be more broadly defined as comprising other factors such as health and skills.

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reviews the empirical literature on the determinants of human capital investment, and examines the empirical relationship between school enrollment rates and income and non-income factors. Section 4 discusses the estimation methodology for generating educational projections and presents our projections of educational attainment of estimates for 2015–2030. The final section provides concluding remarks.

2. Educational progress in emerging Asia, 1970–2010

This section provides a brief overview of the record of human capital accumulation in emerging Asia from 1970 to 2010 compared to other regions. We use Barro and Lee's (2010) estimates of educational attainment of the adult population as a measure of human capital.[3] The data provide estimates of population distribution by educational level and average years of schooling, disaggregated by sex and by 5-year age groups among the population aged 15 years and over for 146 countries at 5-year intervals from 1950 to 2010.

Let's denote $h^a_{j,t}$ as the proportion in age group a, for whom j is the highest level of schooling attained—j = 0 for no school, 1 for primary, 2 for secondary, and 3 for higher at time t. There are 13 5-year age groups ranging from a = 1 (15–19 years) to a = 13 (75 years and over). For those aged 15 years and above, this proportion of population (h^{15+}_j), is simply the average of h^a_j across all age groups, weighted by the corresponding population share by age group, l^a:

$$h^{15+}_t = \sum_{a=1}^{13} l^a_t h^a_t \tag{1}$$

From this, the numbers of years of schooling by age group and for the population aged 15 and above are computed, respectively, as follows:

$$S^a_t = \sum_j h^a_{j,t} Dur^a_{j,t} \tag{2}$$

$$S^{15+}_t = \sum_{a=1}^{13} l^a_t s^a_t = \sum_j h^{15+}_{j,t} Dur^{15+}_{j,t} \tag{3}$$

where Dur_j indicates the duration by educational level.

2.1. Educational attainment trend

As can be seen in Fig. 1, compared to other regions, emerging Asia has shown strong growth in educational attainment in the past four decades. In 2010, its population aged 15 and over had an average 7 years of schooling, up by 4.1 years from just 2.9 years in 1970. By contrast in the same period, the high-income countries raised their average years of schooling by 3.3 years (from 7.7 to 11.0), while developing countries generally (including emerging Asia) added 3.7 years (from 3.4 to 7.1).

Emerging Asia's strong progress is due mainly to a big leap in average years of primary and secondary schooling, which accounts for almost 90 percent of its overall increase. Average years of primary and secondary schooling increased 1.9 and 2.0 years, respectively. In particular, average secondary schooling increased from less than 0.5 years in 1970 to almost 2.5 years in 2010. Tertiary education has grown rapidly, increasing from almost zero in 1970 to 0.3 in 2010. Nonetheless, this still falls a bit short of that in all developing countries. It is interesting to note that the educational progress in emerging countries in the past 40 years has brought them to almost the same educational level as the advanced countries 50 years ago. Educational level and distribution for 2010 in emerging Asia are

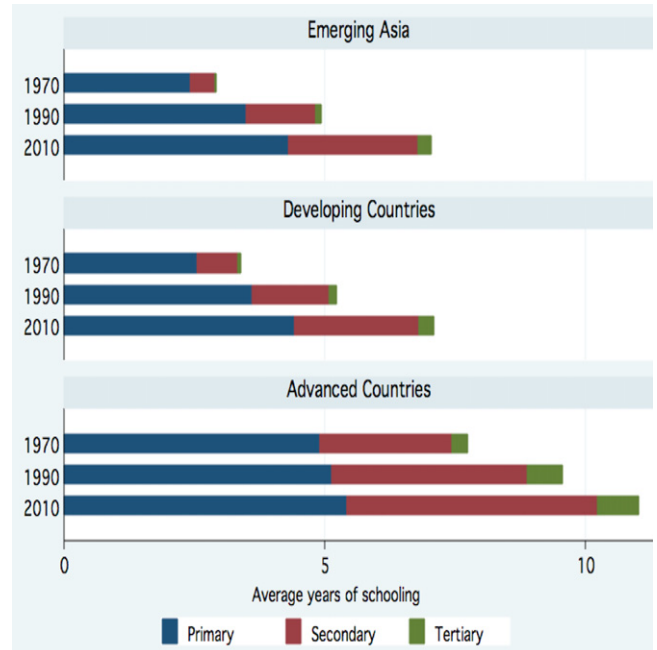

Fig. 1. Educational attainment, emerging Asia, developing countries, and advanced countries total population 15 years and above.

comparable to those of the advanced countries in the late 1960s and 4 years behind the current level of educational capital in advanced countries (11 years of education).

Yet there are substantial educational gaps among emerging Asian countries, as seen in Table 1. The levels of educational attainment in Taipei, China (11.4) and the Republic of Korea (Korea) (11.7) in 2010 are higher than the average in the advanced economies (11). By contrast, in Pakistan and India, although educational progress has been rapid in the past 40 years, the average remains below 6 years—or the average educational attainment of the advanced countries more than 6 decades ago. Average attainment in both Viet Nam (6.5) and Indonesia (6.3) also remain low in 2010.

In terms of the increase in educational attainment since 1970, Malaysia is on top (6 years), followed by Korea (5.4), and Taipei, China (5.3). By contrast, Viet Nam increased only 2.4 years, Indonesia, India, the Philippines, and Thailand added around 3.5 years, and Pakistan and Hong Kong, China 4 years.

2.2. The role of population structure and enrollment rates for educational progress

The continuous high educational attainment of the younger cohorts has been the major factor behind emerging Asia's significant educational progress.

If we distinguish the population between two major age groups—15–24 and 25 and above, we can express Eq. (1) as follows:

$$h^{15+}_{t,j} = l^{15-24}_t h^{15-24}_{t,j} + (1 - l^{15-24}_t) h^{25+}_{t,j} \tag{4}$$

Differencing (4) between time t and $t-5$, we get:

$$\begin{aligned}\Delta h^{15+}_{t,j} &= h^{15+}_{t,j} - h^{15+}_{t-5,j} \\ &= l^{15-24}_{t-5}\Delta h^{15-24}_{t,j} + (1 - l^{15-24}_{t,j})\Delta h^{25+}_{t,j} + \Delta l^{15-24}_{t,j}(h^{15-24}_{t-5} \\ &\quad + \Delta h^{15-24}_{t,j}) - \Delta l^{15-24}_{t,j}(h^{25+}_{t-5} + \Delta h^{25+}_{t,j})\end{aligned} \tag{4'}$$

Therefore, the increase in average years of schooling for the population aged 15 and above is mainly determined by the

[3] Available at http:\\www.barrolee.com.

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