

The Skills of Tigers

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As difficult as it may be for some of us to admit, economists don't always get things right. An example of this less-than-perfect record was the prognosis in the late 1950s regarding which Asian countries were most likely to succeed:

Burma...was one of the countries (the Philippines was another!) predicted by Nobel Memorial prize co-winner Gunnar Myrdal, author of the ambitious three-volume opus *The Asian Drama*, to inherit the mantle of rapid growth in the Asian region. South Korea, in contrast, failed to make Myrdal's list (Fabella 2012).

This widely shared, but inaccurate, prediction was fuelled partly by the head-start that Burma (now Myanmar) and the Philippines had in the human capital they had accumulated relative to other countries. In 1960, the secondary school enrolment rate in the Philippines was 26 percent – higher than that of Malaysia and Hong Kong and indeed higher than that of Portugal and Spain!¹ Poorer Burma's secondary school enrolment rate was much lower at 10 percent, but still-higher than rates of Indonesia and Thailand at the time – which are now significantly richer.

Despite these examples, several East Asian economies which have seen sustained growth are now called the East Asian Tigers -- Hong Kong (China), South Korea, Singapore and Taiwan, China. They also validate an economic proposition put forward by the World Bank's 1993 *East Asian Miracle* report which asserted the importance of human capital formation to their success:

“In the 1960s, levels of human capital were already higher in the HPAEs [high performing Asian economies] than in other low- and middle-income economies. Governments built on this base by focusing education spending...” (World Bank, 1993).

Is this experience being replicated in East Asia's emerging economies which in this study we refer to as the “tiger cubs”? We believe it is, but there are also worrying issues that need to be addressed if they are to sustain their high growth rates into the future, most particularly adjusting to future demographic shifts and ensuring that education systems deliver the skills needed to enhance productivity performance.

Some of the priorities in ensuring education systems are effective are well known and widely accepted. These include a focus on improving the quality of education rather than just expanding quantity. But attention to policy design is important and in need of further research. Design issues include matching the skills acquired today with those in demand tomorrow's global markets; stimulating demand for human capital formation among excluded groups; giving young people who had stopped investing in human capital a second chance to re-enter the mainstream; financing and reforming higher education; and ensuring that educated labour is sufficiently mobile to be allocated to its most productive uses.

Human Capital in the Tigers' Growth Narrative

Forty years ago, large populations were predicted to pose profound threats for many Asian countries in such high profile publications as the Club of Rome's *Limits to Growth*. Contrary to such expectations the East Asian countries used demographics as a springboard to growth. From a very large population base, they not only reduced infant mortality but fertility as well. As a result, the number of people per household who worked *increased* relative to those depending on them; put another way, the dependency ratio fell.

This demographic dividend proved to be an impetus for growth. In South Korea between the 1960s and 2010, for example, the share of people working relative to those not working increased sharply (Figure 1).² Research has since shown that the decline in the dependency ratio led to impressive economic growth; indeed as much as a third of the economic growth rate experienced by the East Asian Tigers has been attributed to this simple fact (Bloom et al, 2000).

[Figure 1 about here.]

Of course the positive growth impacts of the demographic dividend are not automatic. Some Latin American countries, including Chile and Argentina, also experienced fertility decline but did not reap the growth impact of the dividend. One of the implications is that policies and institutions matter. These include long-term structural policies; economic openness; productive investments in infrastructure and good governance. But the most significant variable may be ensuring that the growing youth population is well prepared to contribute to the growing economy as productive workers.

The importance of getting the right policy sequence can be illustrated by developments in South Korea which timed the development of its education system to coincide with shifting demand for skills as the economy industrialized (Figure 2). Initially, primary and secondary education enrolments were ramped up as the war-ravaged economy transitioned to labour intensive exports and then moved to heavy industries. As the country started to develop on the basis of a knowledge-based economy, higher education grew. These investments enabled Korea to avail of the externalities associated with increased education, either through boosts in productivity through better technology adaptation by the more schooled (Romer, 1986) or through schooling helping people, not only to gain skills but also to continuously learn (Lucas, 1988).

[Figure 2 about here.]

In sum, the human capital aspects of the growth narrative in the East Asian Tigers emanated partly from the demographic dividend: more people were working than not. The other important part of the story is that these economies invested in human capital so that as youth entered the labour force there were both fewer dependents to support and more new productive workers.

Demographic and Skill Challenges in Emerging East Asia

Is the growth narrative outlined in the previous section likely to occur in the emerging countries of East Asia, the so-called “tiger cubs”? It is difficult to come up with a definitive answer because this broad question includes answering four subsidiary questions: First, are these emerging economies experiencing the same demographic dividend as the Tigers did? Second, are they reaping economic growth as a result?

To anticipate, the answer to these first two questions is definitively “yes.” A third question then is, is the growth sufficient and sustainable? The answer is “yes, but ...” Growth can be sustained, but the emerging economies need to continue their impressive productivity gains, partly through their education systems. This leads to the fourth and final question: are their education systems up to the task? The answer to that is “belum,” which in Bahasa Indonesia means “not yet”: a much more Asian and optimistic way to express a slightly negative response.

- Emerging East Asia’s demographic dividend and its effects

Emerging East Asia’s population distributions at three points in time, 1960, 1980 and 2010, are telling (Figure 3). In 1960 the region’s population looked very much like a pyramid – the youngest cohorts provided an ample base, with subsequent ages occupying smaller shares of the total. By 1980 a large youth bulge had appeared. Fertility had declined so that there were relatively fewer numbers in the youngest cohorts but the larger base of a generation before is now older. There was a large cohort of young people in the ages of 12-24 who had just entered or were about to enter the labour force.

By 2010 the countries of emerging East Asia had matured; the youth bulge had become a middle-age bulge and the base of the pyramid had continued to shrink. This demographic profile is the source of a dividend for workers relative to non-workers (young children and retired people)

[Figure 3 about here.]

Has this demographic dividend paid off in terms of economic growth? A recent World Bank economic update on East Asia decomposes per capita economic growth into its components (Figure 4). The simple mathematical identity equates GDP per capita to the product of GDP over the number of people who are working, times the number of people who are working relative to those who are of working age, times number of people who are of working age relative to the entire population. The contribution from the demographic dividend comes from the last term in the identity and appears in Figure 4: fertility decline has contributed significantly to the increase in GDP per capita, even in the emerging countries.

[Figure 4 about here.]

- Sustaining growth will require productivity gains

Are the productivity gains from demographic change likely to persist in the future? As we know, the demographic window of opportunity is not open indefinitely. Indeed the middle-age bulge becoming an old-age spread is already being reflected in the more advanced countries in the region such as Japan. Significantly, the dependency ratios in the emerging economies are declining faster than expected, particularly in China, South Korea, Malaysia and Thailand (Figure 5). Dependency ratios will decline for the next few years, but within ten or twenty years these ratios will increase again as populations age.

[Figure 5 about here.]

These trends have several significant implications. The first is that real wages will rise because of the shrinking work force. Real wages have not yet risen in Cambodia or Indonesia; real wages from the first quarter of 2011 are virtually the same as those in the fourth quarter of 2007. Real wages have already risen in China, Malaysia and Thailand, although not alarmingly so -- around 10-15% in Malaysia and Thailand over the 5-year period from 2007 to 2011. In China the real wage index rose by 40% in this period (World Bank, 2011a, b).

Part of the reason real wages have not risen is that labour productivity has also been increasing (Figure 6). China's productivity growth has been dramatic, increasing since 1990 by a factor of four (World Bank 2012). Despite such increases, however, labour productivity still lags the Latin American average and is well behind the OECD average, indicating there is still a long way to go.

[Figure 6 about here.]

- Is education up to the task of enhancing East Asian productivity?

What can be done to improve this productivity performance? It is here that the design and funding of the education systems have significant roles to play. Their track records are mixed. There is no question that enrolments have expanded. In 1950, about one-half of the population in the Asian Tigers had no education; by 2010, this fraction had shrunk to less than one-tenth. In 1950, one-tenth had secondary education; by 2010 this had increased to nearly one-half. Focusing on the past 20 years, the average years of schooling of the population aged 15 and over increased by about two years, faster than the increase in Latin America and the Caribbean or Eastern Europe (Barro and Lee 2010).

But the track record on quality can be improved. Based on performance on international tests such as the Programme for International Student Assessment (PISA) and Trends in Mathematics and Science Study (TIMSS) as a measure of quality, students in the Asian Tigers out-perform students in other countries, including those in the OECD countries. On average, 15-year-old students in Singapore, Hong Kong (China), South Korea and Japan performed better than the students in the United States or than the average for all OECD countries in the 2009 PISA tests, in reading comprehension, math and science (Figure 7).³ In Taiwan (China) students did better in math but did slightly worse in reading than the average U.S. or OECD student. However, Thai and Indonesian PISA scores were lower than those of the Asian Tigers in all three tests. Malaysia did not participate in the 2009 PISA but did

participate in the 2007 TIMSS and in that test outscored Indonesia in both math and science and Thailand in math only, but fell behind the industrial countries (Gonzales *et al.* 2008).⁴

[Figure 7 about here]

This low level of cognitive skills, despite increases in average years of schooling, may be one reason why wage gaps (or wage premia) persist between those with and without secondary or tertiary education across a number of countries. In 2007-08, the wage premium for workers with upper secondary education and employed in primary (natural resources and agriculture) and secondary (manufacturing) industries ranged from 0.2 to 0.4 in diverse countries like Cambodia, China, the Philippines and Vietnam. In services the premium exceeded 0.5 in all four countries, double what it was a decade before (World Bank 2011c). Another possible explanation is that technologies have been shifting in favour of higher skills, essentially increasing the demand for and relative productivity of higher-skilled workers.

In sum, the prognosis for the emerging countries in East Asia is inconclusive. Most of them are reaping the benefits of a demographic dividend which is a temporary phenomenon. Dependency ratios will rise again in the next two decades as populations age. Firm-level analysis shows that education is the second most important constraint (after the availability of credit) on improving total factor productivity and innovation (World Bank 2011c, v1). Thus, countries will need to improve productivity even more than they have and the education systems of many of these countries must be brought up to the task.

Addressing Emerging Asia's Productivity Challenge through Research

The policy challenge for emerging East Asian countries is reasonably clear – how to turn their young people entering their labour forces into more productive workers in order to take full advantage of the demographic dividend. Except for the Asian Tigers which have outperformed industrial countries in international tests, the education systems in other East Asian countries are producing students that have much lower skills than are demanded.

A comprehensive agenda for policy reform is beyond the scope of this paper. On the importance of improving the *quality* of education there is already a rich literature which includes Glewwe (2002), Rivkin, Hanushek and Kain (2005), and Bruns, Filmer and Patrinos (2011). Thus the purpose of this section is to highlight policy issues critical to reform but which require more attention. Such issues include: matching the skills being provided today with those that will be needed in tomorrow's global markets; ensuring that young people who have left school before they acquire work skills are later able to do so; stimulating demand for education and skills training by excluded groups; reforming tertiary or higher education; and allocating educated labour more effectively to its most productive uses. Each issue is discussed in turn.

- Matching skills to the needs of tomorrow's global economy

People with skills will be productively deployed only if labour markets value their skills so they are able to find the “right” job. Youth unemployment rates and views from employers indicate the challenges. Firm-level surveys show that, despite the growing number of educated young people, a significant proportion of firms in Asia perceives skills as a significant obstacle to growth. In Malaysia, Vietnam, Indonesia, Mongolia, Thailand and China, between one-third and one-half of firms report that obtaining worker skills are at least a moderate obstacle for them and at worst a very severe obstacle to grow their businesses (World Bank 2011c). If so, then this would not augur well for the East Asian Cubs that are trying to cash in on the demographic dividend. Part of the problem may simply be that the labour markets are not operating as smoothly as desired. For example, there may be a lack of employment services that help match job vacancies with job seekers.

But another important question is whether education systems are producing the right types of skills employers demand. These systems are increasingly expected to develop new specific technical skills as well as generic non-technical skills such as critical thinking, problem-solving, communication, and creativity, on top of the basic cognitive skills. The distinction between cognitive versus non-cognitive skills is a useful one – also termed “brain” versus “brawn”. In economies that rely predominantly on agriculture or labour-intensive mass production, the benefits of “brawn” are obvious. Recent work on China tries to explain why the returns to education for girls have risen and are now higher than those for boys. Boys’ comparative advantage in “brawn” type work served them well in these early phases. Skills that increased their productivity, such as the cognitive skills to read directions for fertilizer use (which led to the Green Revolution), led to high returns to basic literacy and numeracy. But, as China’s economy evolves toward higher value-added production, demand for “brains” has increased, in turn increasing the wage premium for skills in which girls have advantages (Rosenzweig and Zhang 2012).

Another dimension is that of routine versus non-routine skills, as described in recent work by Acemoglu and Autor (2011). As shown in Figure 8, some jobs require cognitive skills but are repetitive in nature – think of a product quality inspector on a production line visually scanning items on a conveyor belt. In contrast, the jobs that are truly value-adding are those that require cognitive skills, such as creative thinking and interpersonal skills, applied in a non-routine ways.

[Figure 8 about here]

What skills will be in demand in future? A mapping of the demand for skills in the U.S. is interesting and could provide some hints as to what kind of research may be useful for East Asian Cubs. Figure 9 shows that the skills in greater demand are those that require non-routine analytic and interpersonal skills which seem to be in short supply in East Asian skill formation systems. Unfortunately, as far as we know, there is relatively little research yet mapping how these skills have been evolving in East Asia, how they may change in the future, and how these skills can be formed.

[Figure 9 about here]

- Ensuring second-chance skill formation for workers

As noted above, due to low quality more schooling does not necessarily yield more knowledge or skills, including the skill to solve problems, think critically, and relate effectively with others. Moreover, many young people leave school too early, expecting to enter the workforce with less than the knowledge or competencies needed in a competitive, increasingly globalized economy. These youth are more vulnerable not only to unemployment and poverty, but also to teen marriage, pregnancy, and delinquency. They will need a combination of modes of learning that address the reasons for the gaps, including remedial, second-chance, and job training programs that consolidate basic knowledge and competencies learned in school (or make up for those not learned) and add technical or vocational skills that promote employment and entrepreneurship.

Note two examples of second-chance education. At the younger end of the age spectrum, the non-profit organization BRAC runs a large second-chance non-formal school system in Bangladesh (as well as in Afghanistan, Pakistan, and Uganda) which consists of one-room, one-teacher primary schools that enrol about 30 children ages 9 to 11 for a four-year cycle equivalent to primary education. These schools focus on primary school dropouts, especially girls from extremely poor families or ethnic minorities, living in remote areas or have special needs. BRAC claims that over 25 years it has provided the equivalent of primary education to nearly five million children.

In 2005 Colombia introduced “Jóvenes en Acción” (or Youth in Action), a training program targeted at young, urban unemployed adults between the ages of 18 and 25 in the two lowest socio-economic strata of the population.⁵ The program consists of class-based training for three months and an apprenticeship scheme (on-the-job training) with participating firms that lasts another three months. According to an impact evaluation, the program raised earnings and employment especially for women. Women who were offered training earned 19.6 percent more and had a 0.068 higher probability of paid employment, mainly in formal-sector jobs, than those not offered training (Attanasio, Kugler and Meghir 2011).

- Stimulating demand for human capital formation among excluded groups

A key threat to future growth in the East Asian Cub is growing inequality.⁶ One of the ways to avoid inequality-inducing growth is to assure that all groups have access to the opportunity to invest in human capital. Most analysis has focused on the supply side because the assumption is that East Asian societies have always expressed strong demand. Indeed there is some fear of over-education (see, for example, Oliver and Kang 2010). In short, average educational outcomes are higher in East Asia than in other regions, driven by strong demand among middle and high income classes.

Is there evidence that certain groups may be excluded? Figure 10 offers some clues. This figure shows the percentage difference in attendance rates in school of male-female youth, urban and rural dwellers and those in the top versus bottom quintiles of the income distribution. East Asian educational attainment as measured by attendance is more equal than that found in Latin America. The difference in attendance for boys and girls is minimal. But the high attendance differentials between those living in rural versus urban areas and those in the lowest versus the top

quintile of the income distribution suggest that there are groups in these fast-growing economies who are systematically disadvantaged.

[Figure 10 about here.]

What is being done? One way to stimulate demand is through conditional cash transfers which provide grants to families conditional on their meeting educational outcomes. In Cambodia, scholarships for lower secondary school students reduced drop-out rates by one-third, especially among girls (Filmer and Schady 2008). In the Philippines, conditional cash transfer program suggests a 9% increase in schooling for children between the ages of 6-9 during the time of the intervention (Chaudhury and Okamura 2012). There are still relatively few such interventions in East Asia and more research would clearly be useful.

- Reforming higher education

Higher education will be a key provider of skills in the future—including technological and managerial knowledge that could spur innovation-driven growth. But a recent report (World Bank 2011c) shows that systems in the East Asian Cubs may be far from ready. East Asia's tertiary education enrolment rate is low relative to OECD countries. Skill gaps point to shortfalls in the quality of what is being provided. And universities are not providing the innovative research needed to power the transition to higher income status.

The 2011 World Bank report *Putting Higher Education to Work: Skills and Research for Growth in East Asia* identifies five “disconnects” in higher education systems – potential employers are not linked to the educational institutions supplying potential employees; firms that need new technologies are disconnected from those doing research; universities are often not linked to researchers in commercial sectors or think tanks; tertiary institutions – universities, technical colleges, training institutes – are not functioning as a system; and tertiary education is not coordinated with earlier levels of education, even though the quality of its graduates may be pre-determined by how well they were prepared for higher education.

While the report focuses on possible solutions to weaknesses in financing, management and stewardship, further research is desirable on policy and institutional designs to address key issues of mobilizing funds from students and their parents, to identify key public goods that merit public spending and the political economy of giving universities more autonomy in what they teach while holding them accountable for results.

- Facilitating labour mobility

Matching skills to jobs may require labour to move across borders which are not fully porous. Some East Asian countries depend heavily on the remittances of their international migrants. As much as one-quarter of the GDP of Samoa and Tonga comes from remittances while the figure for the Philippines is 10 percent. Even in large economies like China and Indonesia where the share of migrant remittances are less than a few percentage points of GDP, the share of such remittances are a significant percentage of their current account balances (World Bank 2011b).

At the same time, these migrants can contribute much to filling the skill gaps of more developed economies in East Asia for which the demographic window of opportunity has closed and which are confronting aging populations. Yet, migration is still a relatively small part of the solution – only Singapore and Hong Kong (China) have significant inflows.

While much attention is paid to cross-border restrictions, restrictions can also occur within countries, such as in China. The 2012 report *China 2030* considers the *hukou* (household registration system and internal passport) “as one of the key sources of inequality of opportunity in China and its most distinctive feature of social policy” (World Bank and Development Research Center 2012:362). The study estimates that liberalizing such restrictions could have enormous payoffs; for example, moving ten percent of the labour force out of agriculture could increase GDP growth by 6.4 percent points (World Bank and Development Research Center, 2012:363).

The research question is what can be done to help policy makers as they grapple with labour mobility. New research to quantify the economic benefits of freer mobility can produce the hard facts needed by policy makers who must contend with difficult political issues in their own countries.

Conclusion: From Cubs to Tigers through Human Capital Formation?

Human capital formation has been fundamental to explaining the growth of successful East Asian Tigers. Their performance is explained partly by taking advantage of a demographic dividend through astute investments in schooling and training. The East Asian Cubs are well-placed to emulate the Tigers but are challenged by the need to ensure that their own efforts impart skills that boost productivity and are relevant to meet the needs of a rapidly changing global economy. Further research can help, especially in offering solutions for such challenges as providing quality basic education to hard-to-reach or disadvantaged groups, expanding post-basic education to meet greater demand for employable skills, providing second-chance learning opportunities to those who are out of school, and facilitating labour mobility.

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Endnotes

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¹ See Table 18 the first World Development Report of the World Bank (1978).

² While we use South Korea as an example, the general points hold for the other tigers (see World Bank 1993)

³ Although technically not a "tiger economy" because it is a city within a country, Shanghai (China) also kept pace with the other Asian countries.

⁴ Altinok and Murseli (2007) developed a database that aligns and combines the results of several international tests, including the earlier PISA and TIMSS tests. Their database includes the Philippines which performed worse than Malaysia, Thailand and Indonesia in math and science.

⁵ Betcherman *et al.* (2007) developed an inventory of these programs. Among developing regions, youth programs have been most widely implemented in Latin America, which accounts for 24 per cent of the interventions included in the inventory. The shares in the other regions are 14 per cent in Eastern Europe and Central Asia, 10 per cent in Sub-Saharan Africa, 7 per cent in South and East Asia and the Pacific, and 3 per cent in the Middle East and North Africa.

⁶ There are several good pieces on the link between inequality and growth. A comprehensive study is World Bank (2005). See also Wang (2011) on China.