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The Economic Cost of Out-of-School Children in Southeast Asia

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Acronyms

DHS	Demographic and Health Surveys
EAP	East Asia and the Pacific
EFA	Education for All
GDP	Gross Domestic Product
GMR	Education for All Global Monitoring Report
HDI	Human Development Index
MDG	Millennium Development Goals
MICS	Multiple Indicator Cluster Surveys
OOSC	Out-of-School Children
PISA	Programme for International Student Assessment
UIS	UNESCO Institute for Statistics
UN	United Nations
UPE	Universal Primary Education

Acknowledgements

This publication is the result of UNESCO Bangkok's project in cooperation with Educate A Child (EAC) which seeks to eradicate obstacles, both in policy and practice, that would prevent children in Southeast Asia from accessing primary education. The project targets out-of-school children, including those born into poverty, the disabled, migrant and stateless children, girls, those living in remote areas and ethnic minorities in nine Southeast Asian countries: Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Thailand, Timor-Leste and Viet Nam.

This report was prepared by Milan Thomas and Nicholas Burnett of the Results for Development Institute (R4D).

Sheena Bell of the UNESCO Institute for Statistics provided out-of-school children typology figures and technical guidance.

Executive Summary

Although significant progress toward achieving universal primary education has been made over the past decade, out-of-school children (OOSC) remain a pervasive global problem. According to UNESCO Institute for Statistics (UIS 2014), there are nearly 58 million OOSC of primary school age in the world, 7 million of whom are in East Asia and the Pacific (EAP). While EAP has a relatively low rate of OOSC and has made major strides toward achieving universal primary enrolment, we show that there are significant economic costs associated with maintaining the status quo of recent years, and that continued effort to enrol Southeast Asia's remaining OOSC is urgently needed.

To underscore the importance of reducing the number of OOSC in Southeast Asia, this paper uses two methods (developed in Burnett et al. 2013) to estimate the economic cost associated with OOSC in seven countries – Cambodia, Indonesia, Lao PDR, the Philippines, Thailand, Timor-Leste, and Viet Nam. The first estimation approach uses labour market data compiled and analyzed by Montenegro and Patrinos (2014) to estimate the total earnings that will be forfeited in the near future due to undereducated workers if primary school enrolment patterns do not change. The second approach is based on a cross-country regression that estimates the relationship between national education attainment and per capita income in East Asia (Barro and Lee 2010).

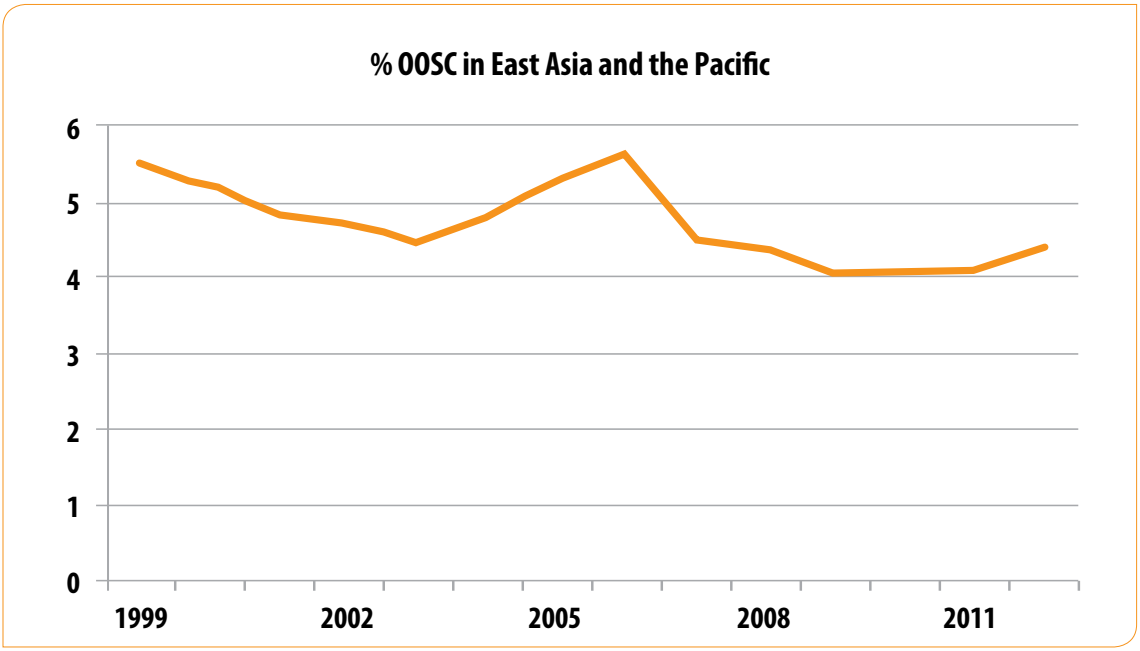
The estimated earnings cost due to OOSC in our subset of seven countries averages over 1% of GDP, but varies substantially in the region, from around 0.1% of GDP in Viet Nam to over 4% of GDP in Timor-Leste. Because these estimates do not account for the non-income benefits of primary education (such as improved health and civic engagement), they are likely lower bounds for the total cost of OOSC in each country. Accounting for the indirect, non-earnings cost associated with OOSC, we find that the cost of OOSC is on average three times higher, and exceeds a year of average economic growth in the country facing the largest OOSC challenge in relative terms (Timor-Leste). Furthermore, for all countries in the sample (even those with very low OOSC rates, like Viet Nam), the estimated economic gain from achieving universal primary enrolment exceeds the estimated increase in public spending required to enrol those OOSC in primary school.

Furthermore, since the private economic cost of OOSC is borne disproportionately by the poorest, universal primary enrolment would reduce inequality in the region, which is high particularly in the three largest economies we analyze (Indonesia, the Philippines, Thailand). Thus, there are strong equity and efficiency arguments in favor of endowing OOSC with quality primary education. Taken together, the findings of this report should provide additional impetus for the push to achieve universal primary education in Southeast Asia, and ensure that the region's citizens have access to primary education and the opportunity to achieve their full economic and social potential.

Background

Despite global initiatives dedicated to achieving universal primary education, nearly 58 million children of primary school age were not enrolled in school in 2012 (UIS 2014). These are the world's out-of-school children (OOSC), over two-thirds of which are in Sub-Saharan Africa and South and West Asia. East Asia and the Pacific (EAP) is home to 7 million OOSC and has a relatively low out-of-school rate for primary school-aged children (4%). Only Central and Eastern Europe and North America and Western Europe had lower OOSC rates as of 2012. Since 1999, EAP's number of OOSC dropped by 42%, from 12 million. However, much of those absolute gains were achieved between 2000 and 2007, and progress in reducing OOSC prevalence has stagnated in recent years (Figure 1).

Figure 1: Progress in Reducing OOSC has Stagnated in East Asia and the Pacific

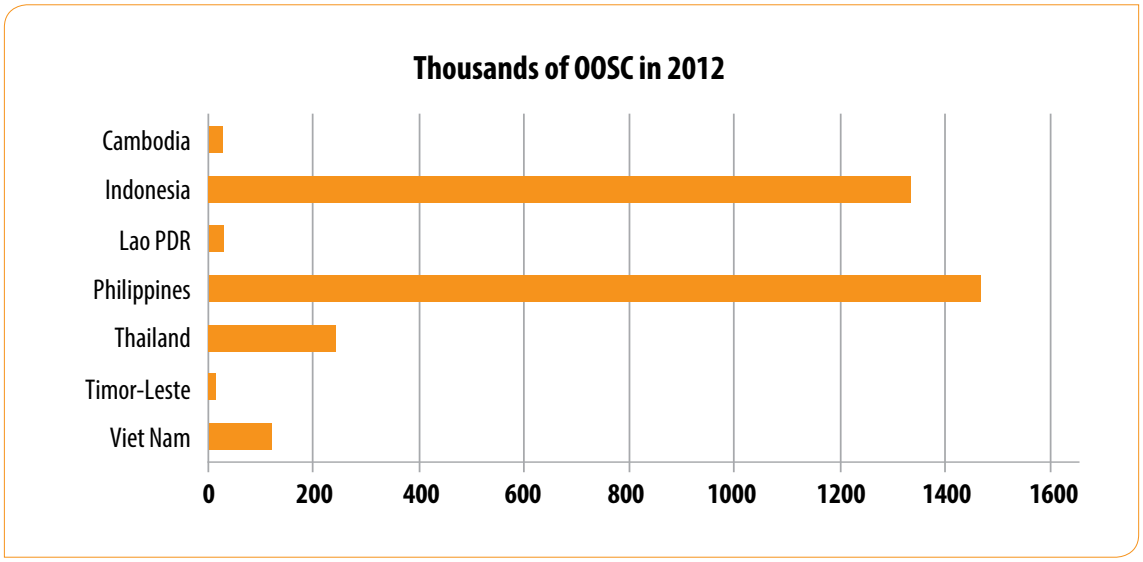


Source: UIS Database, accessed May 2015.

Patterns of OOSC are unique in EAP. Unlike in Sub-Saharan Africa and South Asia, there is no overall gender gap in primary enrolment in East Asia and the Pacific – the OOSC rate is 4% for both boys and girls. In our sample of seven countries, the OOSC rate is slightly higher for boys than for girls, due to small differentials in Timor-Leste, Indonesia, and the Philippines (UIS/UNICEF 2015). For the region as a whole, 47% of OOSC are female (UNESCO 2015). Gender bias and discrimination does become a driver of enrolment gaps at the secondary level, however, especially in Timor-Leste and some communities in Indonesia and Viet Nam where early marriage is common (UIS/UNICEF 2012). EAP also has a smaller rural-urban differential than other regions: 1 percentage point in EAP versus 10 percentage points for the world. Rural-urban differentials vary within the region, from -1 percentage point in Thailand to 12 percentage points in Lao PDR (UIS/UNICEF 2015).

While EAP has a low rate of OOSC, 58% of those OOSC are primary school dropouts. This share is high relative to the rest of the world, for which 23% of OOSC are dropouts (UIS 2014). This suggests that while the other regions face a serious access problem, EAP's greatest challenge is retention.

Figure 2: Total OOSC in a Subset of Southeast Asian Countries

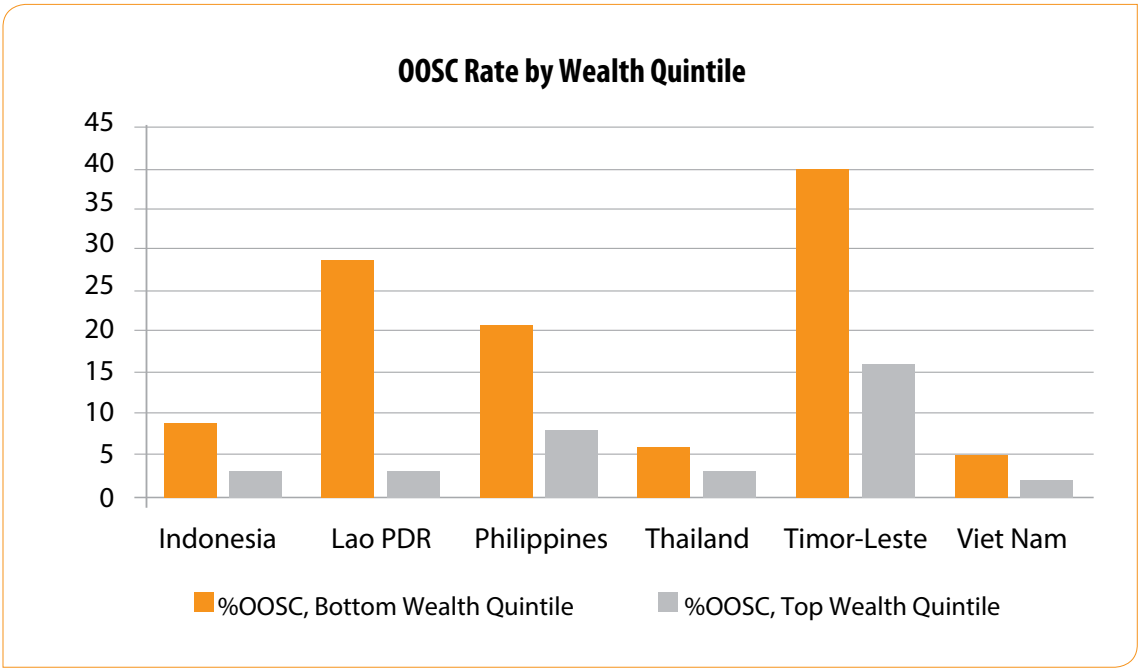


Source: UIS Database (administrative data), accessed May 2015. Data are from 2009 for the Philippines and Thailand.

EAP does mirror the rest of the world in having a significant OOSC poverty gap (see Figure 3). Children from the poorest families are overwhelmingly overrepresented in OOSC populations across countries, because the household costs of attending school are more likely to be prohibitive to the poor (Delprato 2012). Many countries in the region have officially abolished primary education school fees (UIS/UNICEF 2012), but other financial obstacles remain. Richer families are better equipped to cover the costs of books, supplies, clothing, transportation and private tutoring, all of which may be necessary expenses to complement public provision. Furthermore, attending school imposes an opportunity cost that is most burdensome to the poorest families. They are faced with a decision between putting their children to work and enrolling them in school. The direct and indirect costs of schooling are more likely to induce families at the lower end of the income distribution to substitute child work for child education, whether at home or in the labour market. Thus even in countries where access to education is relatively equal, children from richer families are more likely to stay in the system and complete primary education (UNESCO 2015).

Because it hampers financial ability to attend school and physical ability to access and learn in school (Bundy 2009), poverty is a major underlying cause of non-enrolment. Many other barriers to access are cited in the UIS/UNICEF regional report on OOSC in EAP (2012). Lack of demand for education may be driven by misperceptions about the benefits of schooling, or poor quality of education. There may be inadequate supply of education (teachers, materials, schools), particularly for families in remote areas, children living with disabilities and ethno-linguistic minorities. Poor infrastructure is especially an issue in Timor-Leste, where 57% of primary schools have inadequate sanitation facilities (UIS/UNICEF 2012). Natural disasters, which have become more frequent and deadly in East Asia and the Pacific (Thomas et al. 2014), disrupt both the demand and supply side (Seballos et al. 2011). The importance of these barriers is exemplified in a 2008 household survey of the Philippines, which revealed that along with lack of finances, major reasons for non-attendance of primary-aged children include lack of interest, illness/disability, distance from school, and domestic responsibilities (Albert et al. 2012).

Figure 3: OOSC Rates in the Bottom and Top Wealth Quintile



Source: UIS/UNICEF 2015

In summary, the persistence of the OOSC challenge in Southeast Asia is driven by a variety of supply and demand side barriers. Due to their exclusion from school, OOSC forgo the benefits of primary education. In the following sections, we show that OOSC in Southeast Asia represent a major economic failure – an underinvestment in human capital that results in significant income gaps, even in countries that are approaching universal primary enrolment, like Thailand and Viet Nam.

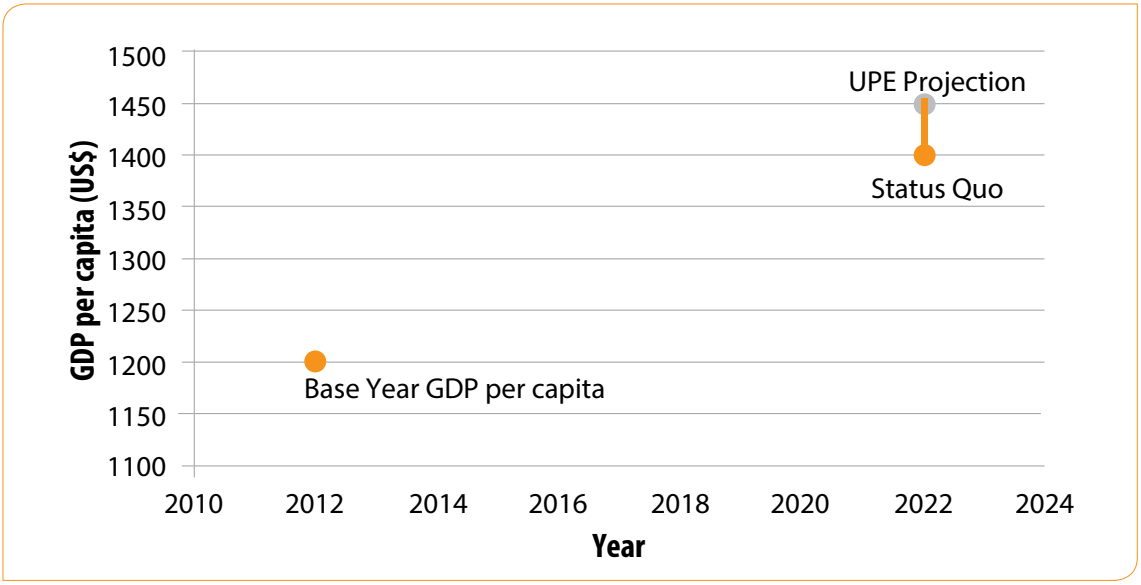
The Economic Cost of Out-of-School Children

Access to basic education is a human right. It also generates social, economic, environmental, and political benefits for individuals, their families, their communities, and future generations. In Burnett, Guison-Dowdy, and Thomas (2013) we discuss the challenge of capturing the range of cross-sector impacts of enrolling out-of-school children in a single measure. Indeed, while non-economic returns have potentially the largest impacts on welfare due to externalities (such as democratization, women's empowerment, and improved public health) and play a central role in justifying domestic and foreign investment in primary education, they are also the most difficult to quantify. On the other hand, gains in labour earnings are easier to measure, but are among the private benefits of education.

We demonstrate that enrolling out-of-school children is not only a moral obligation but a productive investment, and that all seven Southeast Asian countries, regardless of the seriousness of their OOSC challenges, suffer a far greater loss from maintaining OOSC than they would from increasing public spending to enrol those children in primary school. Cost estimation in this paper investigates the question: *If all of today's children expected not to enter primary school were in fact to complete basic education, how much higher would GDP be in the seven Southeast Asian countries when that cohort enters the labour market? (Figure 4).*

We look at the cost of OOSC purely through the lens of access, separating exclusion from education from quality of education, although these issues are closely linked. In particular, poor quality of education can constrain demand for education (see the Discussion section for more on quality of education). Throughout the following exercises, we implicitly hold quality of education constant in the seven countries. We use household survey-based data published in UIS/UNESCO 2015, but readers should note that administrative data (also available in UIS/UNESCO 2015) provide an alternate source of OOSC rate estimates for these countries. For more on OOSC measurement issues, see Omoeva et al. (2013). Two approaches are employed to give an indication of the magnitude of the cost (expressed as a percentage of GDP) that countries can expect to bear if current patterns of OOSC do not improve.

Figure 4: OOSC Cost Estimation



The cost of OOSC can be thought of as the difference in GDP between two hypothetical, forward-looking scenarios: one in which current OOSC trends persist (Status Quo) and one in which today's OOSC who are not currently expected to complete primary education do receive basic education before entering the labour market in the next decade (UPE Projection).

The first approach uses a microeconomic method, aggregating the estimated productivity gaps of individuals who are not expected to enter primary education or have already dropped out. Based on estimates of average earnings gains associated with primary school completion for different countries (Montenegro and Patrinos 2014, Tien 2014) and OOSC typology calculated by UIS, it provides an estimate of how much higher GDP will be in roughly a decade if today's OOSC complete primary education before they enter the workforce. This approach accounts for only the private economic gains of enrolling OOSC.

The second approach uses a macroeconomic method, based on cross-country regressions that estimate the relationship between schooling and income per capita, to address the same question. Unlike the microeconomic estimation, which captures only direct income returns to primary education (the expected increase in private income enjoyed by former OOSC given primary education), the macroeconomic cost estimation should capture some externalities of primary education attainment on GDP, such as increases in national income due to lower crime rates, better public health, and other network effects of schooling. Together, the two approaches show that there are significant economic incentives (equivalent to over a year of average GDP growth in one case) to enrol OOSC populations.

i. Microeconomic Cost Estimation

With an understanding that forgone earnings account for only a portion of the total cost associated with out-of-school children, the following section estimates the economic cost of OOSC in Southeast Asia from a labour market perspective.

In recent decades, the income gains from primary school completion have fallen relative to the returns of higher education (Colclough et al. 2009). Labour economists ascribe this trend to demand- and supply-side developments. The demand for skilled workers has risen at the expense

of unskilled and semiskilled workers, due to skill-biased technological change and higher rates of primary school completion worldwide. There is also concern that increases in enrolment have strained educational infrastructure in developing countries, damaging the quality of schooling and the productivity gains associated with primary education.

The downward trend in relative returns to primary education does not undermine the importance of reducing the number of out-of-school children for three reasons. First, basic education is a human right. Second, primary education is a prerequisite for higher levels of education, so we must take into account returns to all levels of education when considering the total cost of OOSC. Third, primary education has a wide range of non-market benefits that economic studies typically do not capture – informal sector productivity gains, as well as social, political, psychosocial, environmental, and health benefits (reviewed in Burnett et al. 2013). With these arguments in mind, this section presents estimates of the aggregate earnings loss due to OOSC in Southeast Asia.

The economic impact of primary education we consider in this section is the effect of schooling on labour productivity and wages. There is a vast literature, reviewed in Thomas and Burnett (2015), that measures the returns to education in terms of wage premia – the expected percentage difference in earnings between those who complete a given level of education and those who do not (Psacharopoulos and Patrinos 2004). Wage premia estimates provide a measure for the direct private benefit of education completion. As discussed in Colclough et al. (2009), labour market returns to education vary substantially by country and level of education.

One issue with using wage premia from the formal sector to measure the cost of OOSC is that in East and Southeast Asia, it is estimated that over 65% of non-agriculture employment is in the informal sector (Vanek et al. 2014). To overcome the lack of information on the returns to education outside of the formal labour market, it is assumed that the wage premia estimated in studies on the returns to education are representative of the economic benefits that would accrue to all population groups. For example, the 15% wage premium found for Lao PDR (Montenegro and Patrinos 2014) was estimated using survey data of workers in wage labour. The analysis underlying Table 2 assumes that the 15% wage premium will apply to all members of the population in Lao PDR if they complete primary education, even if they end up working in the informal sector or household production. This is a defensible assumption, given the sparse but growing evidence on education returns in the informal sector (for example, see De Brauw and Rozelle 2006 for rural China), and on the positive effect of maternal education on child health (Chen and Li 2009). We also abstract from the uncertain effects of labour market competition that could arise from an influx of basic educated workers.

To calculate the direct cost of OOSC due to forgone primary education (Equation 1), the per capita economic benefits (measured by wage premia) from primary education must be multiplied by the prevalence of primary school non-completion in the school-aged population. However, raw OOSC numbers alone do not reveal how many school-aged children in a cohort will eventually complete primary education under the status quo. Country-level estimates produced and provided by UIS break down OOSC into the three categories (dropped out, likely to enter in the future, unlikely to ever enter) for the most recent year with available data (e.g., based on 2012 Socio-Economic Survey for Cambodia). Those figures are used to derive the percentage of children projected to not complete primary school.

Equation 1

[direct GDP loss from forgone primary education]
= [% non-completing OOSC] × [wage premium to primary education]

The analysis assumes that all late-starters eventually complete primary school, and that no drop-outs or those unlikely to start will ever complete primary school. These are strong assumptions, but reasonable for Southeast Asia, where average rates of repetition are low and rates of survival are high (UNESCO 2015). The final column of Table 1, percentage of non-completing OOSC, is the overall OOSC rate minus the percentage that is likely to start late. These simplifying assumptions belie the complex behavior of OOSC (many of whom enter and leave school multiple times due to idiosyncratic factors like family illness), but they make the analysis possible in the absence of more detailed data on OOSC.

Table 1: Primary School-Aged OOSC in Seven Southeast Asian Countries

Country	% OOSC*	% Left School**	% Likely to Enter**	% Unlikely to Enter**	% Non-Completing OOSC
Cambodia	14%	23%	69%	9%	4.4%
Indonesia	6%	71%	23%	7%	4.6%
Lao PDR	15%	18%	76%	6%	3.7%
Philippines	12%	11%	87%	2%	1.6%
Thailand	4%	8%	0%	92%	4.0%
Timor-Leste	28%	9%	43%	48%	16.0%
Viet Nam	2%	24%	67%	10%	0.7%

***Source:** UIS/UNICEF 2015.

****Source:** UIS calculations based on MICS and DHS 2013.

The percentage of school-aged children that is predicted to not complete primary education (the last column of Table 1) is then multiplied by the wage premium to primary education (the third column of Table 2) to produce estimates in the last column of Table 2.

Table 2: Loss from Forgone Primary Education

Country	% Non-Completing OOSC	Wage Premium to Primary Education*	GDP Loss from Forgone Primary Education
Cambodia	4.4%	8.8%	0.39%
Indonesia	4.6%	13.3%	0.62%
Lao PDR	3.7%	14.6%	0.54%
Philippines	1.6%	8.7%	0.14%
Thailand	4.0%	11.0%	0.44%
Timor-Leste	16.0%	25.7%	4.12%
Viet Nam	0.7%	4.0%	0.03%

***Source:** Average of recent studies cited in Montenegro and Patrinos (2014) and Tien (2014) for Viet Nam.

The next step is designed to account for the value of primary education as a gateway to higher education (Equation 2). Table 3 estimates the additional increase in aggregate income that primary-enrolled OOSC would be expected to generate due to the access they gain to secondary education. This is calculated by multiplying the wage premium to secondary education by the rate of continuation from primary to secondary school (UNESCO 2015) and the rate of secondary school completion. Because data are unavailable for secondary school completion rates, it is very conservatively assumed that only 50% of students complete secondary school. That assumption is based on the lowest rates of primary school completion observed in developing countries. The probability-weighted loss from forgone secondary education is then added to the GDP loss from forgone primary education to generate Table 4.

Equation 2

[probability-weighted GDP loss from forgone secondary education] = [% non-completing OOSC] × [wage premium to secondary education] × [rate of continuation from primary to secondary school] × [rate of secondary school completion]

Table 3: Probability-Weighted Loss from Forgone Secondary Education

Country	Rate of Continuation to Secondary School*	Wage Premium to Secondary Education**	Expected Loss from Forgone Secondary Education
Cambodia	80%	3.3%	0.06%
Indonesia	96%	9.9%	0.22%
Lao PDR	87%	7.0%	0.11%
Philippines	99%	6.0%	0.05%
Thailand	95%	10.4%	0.20%
Timor-Leste	95%	4.8%	0.36%
Viet Nam	93%	25.6%	0.08%

***Source:** UNESCO 2015. Data were unavailable for Thailand, so the regional transition rate was used.
****Source:** Average of recent studies cited in Montenegro and Patrinos (2014) and Tien (2014) for Viet Nam.

Table 4: Economic Cost of OOSC by Microeconomic Estimation

Country	Earnings Cost of OOSC as % of GDP
Cambodia	0.45%
Indonesia	0.84%
Lao PDR	0.65%
Philippines	0.18%
Thailand	0.64%
Timor-Leste	4.48%
Viet Nam	0.11%

Table 4, which adds the last columns of Tables 2 and 3, can be interpreted as the direct economic cost (lost productivity as measured by wages) incurred by today's OOSC that will not have completed primary education in each of the countries when those OOSC reach working age. It can also be visualized as the vertical orange gap between the two points in Figure 4.

To generate an estimate of the total cost (economic and non-economic costs combined) of OOSC requires calculation of the forgone non-market benefits of primary education. There are also significant behavioral impacts of education that might take years or decades to manifest. For example, education has been shown to accelerate demographic transition in developing countries. By lowering dependency rates, increasing investment, and raising female labour force participation, educating OOSC can have large economic impacts aside from direct productivity gains. Since OOSC forgo all of these benefits, the economic cost estimated in Table 4 likely provides a lower bound for the total cost of OOSC.

This section has provided an indication of the magnitude of the economic cost of today's OOSC in terms of lost private earnings. While these appear small in percentage terms, these costs translate to annual losses with macroeconomics ramifications (Table 5). Enrolling OOSC would generate returns that dwarf the annual aid to basic education for these countries.

Table 5: Absolute Loss Earnings due to OOSC

Country	Earnings Cost of OOSC as % of GDP	GDP in US$ billions (2013)	Earnings Cost in US$ millions	Aid to Basic Education in US$ millions (2012)
Cambodia	0.45%	15.2	68	27
Indonesia	0.84%	868.3	7,288	158
Lao PDR	0.65%	11.2	73	28
Philippines	0.18%	272.1	495	78
Thailand	0.64%	387.3	2,469	6
Timor-Leste	4.48%	1.3	58	12
Viet Nam	0.11%	171.4	183	65

***Source:** UNESCO 2015

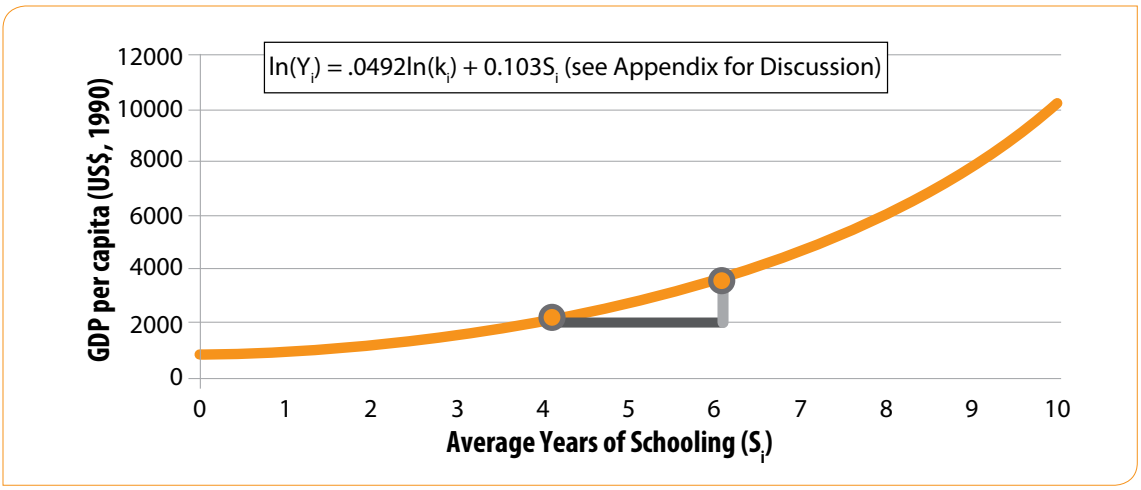
In the next section, macroeconomic analysis is employed to provide an alternatively specified set of estimates.

ii. Macroeconomic Cost Estimation

In the previous section, we focused on private gains that OOSC would derive from boosted labour productivity. While a macroeconomic cost estimation approach is less specific on the source of economic gains, it has the potential to provide a more comprehensive estimate of the cost of OOSC and provides a second set of estimates against which the estimates from the previous section can be compared.

The technique for macroeconomic modeling of the relationship between education levels and income levels is derived from labour economics literature, in which an individual worker's wage is dependent on his or her education attainment and other individual characteristics (Mincer 1974). Extending Mincerian equations to the aggregate level, macroeconomic modeling uses cross-country or time-series data (regional, national, or international) to estimate the income gains associated with the accumulation of human capital. Those gains can alternatively be considered the cost of underinvesting in human capital (i.e. having a persistent OOSC population). Barro and Lee's (2010) estimation of a regional Mincerian equation for East Asia is presented graphically in Figure 5. For more details on this type of regression, refer to the Appendix.

Figure 5: The Education-Income Relationship



Using data from 146 countries from 1950-2010, Barro and Lee (2010) fit the curve displayed above. In the graph above, the orange line segment represents the increase in per capita GDP associated with an increase in a hypothetical population's average years of schooling from 4 to 6 years.

Using the type of Mincerian equation graphed in Figure 5, the cost of OOSC can be estimated as the difference between two hypothetical, forward-looking scenarios. In the first scenario, education policy follows the status quo so that the expected number of years of schooling in each country (estimated in UNDP 2013) is unchanged. In the second scenario, a stronger push is made to achieve universal primary enrolment, so that the expected lifetime schooling of the population (S in Figure 5) rises in proportion to the current percentage of children expected not to complete primary education. Recent completion data are unavailable for most EAP countries, so we conservatively assume that each non-completing OOSC gains an expected additional four years of schooling by entering primary education.

Barro and Lee specify a model of the education-income relationship using multivariate regression, panel effects, and instrumental variable estimation to resolve issues of omitted variable bias and endogeneity. By controlling for other possible influences on GDP (notably physical capital), they attempt to isolate the causal effect of education attainment on national income. Table 6 shows the macro-estimated costs of OOSC based on Barro and Lee's estimation of the education-income relationship for the same Southeast Asian countries analyzed in the microeconomic estimation exercise.

Table 6: Economic Cost of OOSC by Macroeconomic Estimation

Country	Expected Years of Schooling* (Status Quo)	% Non-Completing OOSC	Expected Years of Schooling (No OOSC Scenario)	Economic Cost of OOSC as a % of GDP**	Economic Cost in US$ millions (2013)
Cambodia	10.5	4.4%	10.7	1.9%	282
Indonesia	12.9	4.6%	13.1	2.0%	17,051
Lao PDR	10.1	3.7%	10.2	1.6%	175
Philippines	11.7	1.6%	11.8	0.7%	1,766
Thailand	12.3	4.0%	12.5	1.7%	6,529
Timor-Leste	11.7	16.0%	12.3	7.2%	93
Viet Nam	11.9	0.7%	11.9	0.3%	474

*UNDP 2013

**Estimated using the Barro and Lee (2010) regression

Bearing in mind that these cost calculations are based on the regional average relationship between income and education, Table 6 suggests that Southeast Asian countries' GDP losses due to OOSC will be significant on a macroeconomic scale, particularly for Timor-Leste. These estimates are generally much higher than the microeconomic estimates (on average, by a factor of 2.8), likely because this second method captures some of the indirect positive externalities (better health, safety, intergenerational effects) associated with primary education, on top of direct private income gains.

Discussion: The Urgency of Enrolling Out-of-School Children

The costs estimated in the previous section appear even more striking when compared to back-of-the-envelope estimates of additional public spending required to achieve universal primary enrolment in the seven countries (Table 7). Calculations for the second to last column assume that the cost of achieving universal primary education is linear - that the average cost of enrolling an OOSC is equal to the current average public spending per primary school student. For example, if current public spending on primary education is 1% of GDP and 50% of children are in school, spending 2% of GDP on primary education will cover 100% of children. This may overestimate the cost of enrolling OOSC, since fixed costs, such as school buildings, need not necessarily be replicated to provide for OOSC. On the other hand, scaling-up primary education to reach marginalized OOSC likely requires spending on education infrastructure, involving some new fixed costs in addition to higher variable costs for targeted interventions. With this in mind, the last column of Table 7 adds an additional 14% on top of expansionary spending for interventions to reach marginalized youth, such as disability access, income transfers for the poor, and emergency education for conflict situations (see UIS/UNICEF 2015, Chapter 4 for a complete discussion).

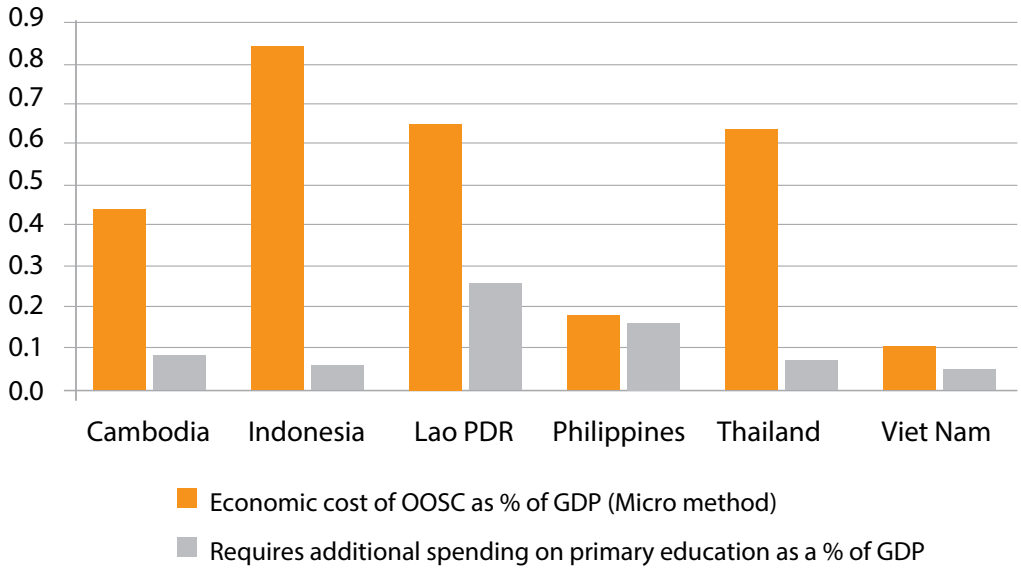
Table 7: Benchmarking the Economic Cost of Out-of-School Children

Country	Economic Cost of OOSC as % of GDP (Micro method)	Economic Cost of OOSC as a % of GDP (Macro method)	Expansionary Spending on Primary Education as a % of GDP*	Augmented Required Spending
Cambodia	0.45%	1.9%	0.07%	0.08%
Indonesia	0.84%	2.0%	0.05%	0.06%
Lao PDR	0.65%	1.6%	0.23%	0.26%
Philippines	0.18%	0.7%	0.15%	0.17%
Thailand	0.64%	1.7%	0.07%	0.08%
Timor-Leste	4.48%	7.2%	No data	No data
Viet Nam	0.11%	0.3%	0.04%	0.05%

*Based on government expenditure on primary education as a % of GDP (UIS database, accessed May 2015).

While the estimates in the last column of Table 7 are rough, they allow a first pass at putting the costs of OOSC in perspective. For all countries with available data, the estimated earnings cost of OOSC alone (Micro method) outweighs the additional public spending required to enrol OOSC (see Figure 6). Even for Viet Nam, which is approaching universal primary enrolment, enrolling OOSC appears to be a highly cost-effective investment.

Figure 6: Benchmarking the Economic Cost of Out-of-School Children



A crucial issue that we have not addressed is the possibility of quality of education suffering as enrolment increases, reducing the benefits of primary education, lowering the economic cost of OOSC, and invalidating these cost estimates. Maintaining and improving quality as access to primary education expands is a critical concern, given Hanushek and Woessman's (2007) finding that the quality of education is more important for economic growth than years spent in school. The cost estimates above focus only on the education access issue, putting aside the need to also improve quality. Hanushek and Woessmann (2015) use projections based on the Programme for International Student Assessment (PISA) data and find that ensuring that primary education provides baseline skills for all students (on top of universal access) would result in gains far larger than the ones estimated above. For low-income countries, they find that the return to improving quality of schools is three times higher than the return to expanding enrolment at current quality levels. Thus achieving universal primary enrolment is just a first step toward unlocking the full economic returns to education.

Conclusion

This study analyzes the economic cost of out-of-school children in Southeast Asia using two approaches. The first approach aggregates the forecasted forgone private income of OOSC populations in seven Southeast Asian countries, predicting how much will be lost as a percentage of GDP in the future due to their lack of primary education. The second method computes the income gap due to out-of-school children based on a regional model of the relationship between education attainment and aggregate income. We benchmarked those estimates against additional public spending required to enrol OOSC.

Together, the two approaches show that there are significant economic incentives to educate OOSC in Southeast Asia. On top of the economic benefits, there is a range of non-market benefits that are not explicitly accounted for in the quantitative analysis. Given the large and numerous benefits associated with primary education, programs that increase access to education for OOSC are critical interventions to promote economic and social development.

In relative terms, the cost of OOSC analyzed in this study are not as high as those estimated for South Asian and Sub-Saharan African countries in Thomas and Burnett (2014). However, Asian countries tend to be richer than the non-Asian countries covered in our previous report. Consequently, the cost of OOSC in East Asian countries (particularly in the populous lower-middle income countries studied here - Indonesia, the Philippines, and Thailand) is in many cases greater in absolute terms than the cost of OOSC in developing countries of other regions.

Given the high share of dropouts among EAP's OOSC population, any strategy for improving enrolment must focus on reducing unit costs of providing education, improving quality of education, boosting demand for education, and reaching marginalized children. Discussions of policies and interventions that have contributed to progress toward OOSC reduction (such as the Philippines' Pantawid Pamilyang Pilipino conditional cash transfer program) are reviewed in UNESCO (2015), while UIS/UNICEF (2012) proposes some solutions that are tailored to the EAP region.

Until progress toward universal primary education returns to pre-2007 rates in East Asia and the Pacific, out-of-school children will continue to represent a lack of protection of fundamental human rights, an unconscionable underinvestment in human capital, and a costly barrier that prevents the region from reaching its full economic and social potential.

Appendix

This appendix goes into greater detail about the econometric specifications underlying the macroeconomic estimation method.

A generic Mincerian equation is shown below (Equation 3):

Equation 3: Mincerian Equation

$$\ln(Y_i) = f(S_i, Z_i)$$

The natural logarithm of income of country i (in macroeconomic studies) or individual i (in microeconomic studies) is a function f of average years of schooling (S_i) and a vector of other explanatory variables, Z_i. In a microeconomic study, this could include the individual's experience or gender. In a macroeconomic study, Z could include policy or demographic variables.

Using average years of schooling data for the working age population (age fifteen and older) from the Barro-Lee dataset, Psacharopoulos and Patrinos (2011) estimate the following Mincerian equation to describe the relationship between income and education from 1950-2010:

Equation 4: Psacharopoulos and Patrinos' Model

$$\ln(Y_i) = 6.645 + 0.258S_i$$

S_i is mean years of schooling in country i.
$\ln(Y_i)$ is the natural logarithm of per capita income (GDP) in country i.

Psacharopoulos and Patrinos use a single variable regression – they do not condition their results on other characteristics of the countries in their sample. This is equivalent to excluding the vector Z in Equation 3. According to their estimates, each additional year of schooling is associated with a 26% increase in per capita income. This is consistent with a number of studies, such as Krueger and Lindahl (2001), who estimate a rate of return to schooling between 18% and 30%, and Heckman and Klenow (1997), who find that an additional year of schooling in a country is associated with a 30% higher per capita GDP.

Due to the exclusion of the vast number of non-educational factors that could potentially impact GDP, Equation 4 should not be interpreted as a causal relationship between education attainment and income. In addition to omitted variable bias, Equation 4 has other methodological issues. As shown in the microeconomic analysis section, the empirical evidence is that the returns to education differ substantially among countries and time periods. In estimating an average relationship across countries and over time, Equation 4 masks considerable variation in the economic cost of OOSC.

Unfortunately, the Barro-Lee dataset only provides education attainment figures at five-year intervals, so there is not enough data to generate meaningful country-level Mincerian equations (only thirteen observations are available per country). There is also the possibility that Equation 4 is a product of spurious regression: except in Africa (where income and education attainment

stagnated between 1980 and 2000), both income and mean years of schooling have been trending strongly upward worldwide since 1950, and regressing income on schooling could thus estimate an artificially strong relationship.

In Barro and Lee (2010) the relationship between years of schooling and income is estimated using the natural log of GDP per worker (individuals age 15-64) as the independent variable (Equation 5). This is manipulated algebraically below so that the independent variable is the natural log of GDP per capita instead. They run regional regressions, and the estimate for East Asia is presented below.

Equation 5: Fixed-effects Estimation for East Asia with Instrumental Variable for Schooling (Parental Education)

$$\ln(Y_i/w_i) = 0.103S_i + 0.492\ln(K_i/w_i)$$

$$\ln(Y_i/n_i) = \ln(w_i/n_i) + 0.103S_i + 0.492\ln(K_i/w_i)$$

ln(.) is the natural logarithm operator.

Y_i is the total income in country i.

S_i is instrumented average years of schooling in country i.

K_i is the per capita physical capital stock in country i.

w_i is the working age population (15-64) in country i.

n_i is the total population in country i.

Barro and Lee's specification has a number of advantages over that of Psacharopoulos and Patrinos. Barro and Lee add physical capital stock (a function of national investment and depreciation) as an explanatory variable. They also use the instrument variable estimation technique to resolve the potentially biasing effects of the endogeneity of human capital accumulation (causality between income and schooling is likely to go in both directions). They use parental income (proxied by national average years of schooling lagged by ten years) as an instrument for S, and use fixed-effects estimation, which allows for country-specific tendencies in income trajectories. By controlling for other possible influences on GDP, all of these additional econometric techniques bring the estimation closer to isolating a causal effect of education attainment on national income.

The coefficient on mean years of schooling (S_i) in Barro and Lee's global regression is 47% of Psacharopoulos and Patrinos' global estimate of 0.26. This suggests that, by not controlling for the effect of physical capital on income, Psacharopoulos and Patrinos overestimate the effect of education on income by a factor of 2. Due to the advantages of Barro and Lee's specification, estimates in this paper are based on their model.

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