

The Rise of the Middle Class and Economic Growth in ASEAN

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Abstract

This paper presents estimates of the relationship between the share of income accruing to the middle class and gross domestic product per capita of economies from the Association of Southeast Asian Nations. The increase in gross domestic product per capita that these economies experienced during 1970–2010 significantly contributed to a higher share of income accruing to the middle class. The impact of the rise of the middle class on economic growth depends on the countries' initial level of gross domestic product per capita. In the majority of these countries, a rise of the middle

class that is unrelated to gross domestic product per capita growth would have had a significant negative effect on economic growth, based on the values of the countries' gross domestic product per capita in 1970. In contrast, for recent values of gross domestic product per capita, a rise of the middle class would positively contribute to growth in gross domestic product per capita. The paper shows that human capital accumulation is an important channel through which a rise of the middle class affects economic growth.

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The Rise of the Middle Class and Economic Growth in ASEAN

by

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1. Introduction

This paper presents estimates of the relationship between the share of income held by the middle class and economic growth of ASEAN economies. As such, the paper is part of a literature in macroeconomics that examines the relationship between income inequality and aggregate output of countries; see Galor (2011) for a review. At least since Kuznet (1955), it has been noted that the relationship between income inequality and GDP per capita may be non-linear. Galor and Zeira (1993) provide a model that generates such an inverted U-shaped relationship between income inequality and GDP per capita. In their model, a bi-directional causality between income distribution and GDP per capita emerges: (i) an increase in GDP per capita reduces income inequality; (ii) the effect of an increase in income inequality on GDP per capita is positive for relatively poor countries and negative for relatively rich countries. In the Galor and Zeira (1993) model, the mechanism that generates the non-linear effect of income inequality on GDP per capita is human capital accumulation: With credit market imperfections and fixed costs of human capital accumulation, an increase in income inequality increases investment in human capital in relatively poor countries; but the opposite is the case in relatively rich countries.

The first part of this paper presents effects that economic growth during 1970-2010 had on changes of ASEAN countries' shares of income accruing to the third and fourth quintiles. Brueckner et al. (2015) used international oil price shocks and trade-weighted world income of countries as instruments to estimate the effect that exogenous variation in GDP per capita has on various measures of countries' income inequality. Using these estimates and data on changes of ASEAN countries' GDP per capita between 1970 and 2010, this paper computes predicted effects that GDP per capita growth during 1970-2010 had on changes in the income share accruing to the middle class of ASEAN countries. The main finding is that the middle class gained substantially from economic growth over the past four decades: the share of income accruing to the 3rd (4th) quintile increased for the average ASEAN country by around 6 (8) percentage points due to growth in

average incomes during that period.

In the second part of the paper, we present predictions of the effects that changes in income inequality have on ASEAN countries' GDP per capita growth. These predicted effects are computed by combining estimates of the non-linear effect that a change in income inequality has on GDP per capita growth and data on ASEAN countries' initial GDP per capita. Brueckner and Lederman (2015) provide instrumental variables estimates of the effect that an exogenous change in income inequality has on GDP per capita growth. This paper draws on the estimates presented in that paper.

One of the main findings in this paper is that for the majority of ASEAN countries a rise of the middle class would have had a negative effect on economic growth if it would have occurred at an early stage of economic development, as measured by levels of GDP per capita in 1970. ASEAN economies' average income was too low in 1970 for a rise of the middle class to have generated a positive effect on economic growth. In contrast, for current values of average income a rise of the middle class has a positive effect on economic growth in all the ASEAN countries.

Consistent with the Galor and Zeira (1993) model, the paper documents that human capital accumulation is an important mechanism through which the rise of the middle class affects economic growth in ASEAN. At the early stage of development, as measured by 1970 levels of GDP per capita, an increase of the share of income held by the middle class would have had a negative effect on the share of the population with secondary and tertiary education in ASEAN countries. But for recent levels of ASEAN countries' GDP per capita the opposite is the case: An increase in the share of income held by the middle class would increase the share of the population with secondary and tertiary education. Borrowing constraints in investment in human capital¹ may explain the existence of this non-linear relationship between income inequality, economic growth, and education; see the model of Galor and Zeira (1993).

¹ For a discussion of borrowing constraints in investment in human capital, see Chapman (2006); or Asian Development Bank (2011) for a discussion that has a specific focus on Asian countries.

2. Results

2.1 Effect of Economic Growth on the Rise of the Middle Class

Table 1 shows predictions of the country-specific effects that changes in the natural logarithm of GDP per capita between 1970 and 2010 had on the income shares of the 3rd and 4th quintiles in ASEAN countries. To generate these numbers, one first needs an estimate of the causal effect that GDP per capita has on the income share of the 3rd and 4th quintiles. Brueckner et al. (2015) provide such an estimate. For a panel of 104 countries spanning the period 1970-2010, they use oil price shocks and trade-weighted world income as an instrument for GDP per capita. Their panel fixed effects estimates show that exogenous increases in GDP per capita have a significant positive effect on the income share of the 3rd and 4th quintiles.² The relevant equation is:

$$(1) \quad \text{Inequality}_{ct} = e_c + f_t + \alpha \ln(\text{GDP p.c.})_{ct} + \varepsilon_{it}$$

From the estimates provided in Brueckner et al. (2015), we can compute the effect that changes in the natural logarithm of GDP per capita between 1970 and 2010 had on the income shares of the 3rd and 4th quintiles of ASEAN countries. Specifically, this is done by multiplying the coefficients reported in columns (4) and (5) of Table 1 in Brueckner et al. (2015) with the changes of ASEAN countries' natural logarithms of GDP per capita between 1970 and 2010.³ Data on GDP per capita are from the Penn World Table (Heston et al., 2012).

From Table 1, one can see that economic growth of ASEAN countries between 1970 and 2010 had a substantial impact on the share of income accruing to the middle class. In column (1) a measure of the middle class is the income share of the 3rd quintile. In column (2) a measure of the upper middle class is the income share of the 4th quintile. For the average (median) ASEAN country, growth in GDP per capita between 1970 and 2010 increased the income share of the 3rd quintile by around 5.7 (6.2) percentage points. The effect on the 4th quintile is slightly larger, around 7 percentage points.

2 Brueckner et al. (2015) do not find a significant non-linear effect of national income, i.e. $[\ln(\text{GDP p.c.})]^2$, on the income shares.

3 This follows from totally differentiating equation (1): $\Delta \text{inequality}_{ct} = \alpha \Delta \ln(\text{GDP p.c.})_{ct}$.

The ASEAN country with the highest GDP per capita growth rate during 1970-2010 was Singapore. According to Table 1, the income share of the 3rd (4th) quintile was boosted in Singapore due to rapid GDP per capita growth during that period by around 7 (9) percentage points. In contrast, the ASEAN country with the lowest GDP per capita growth rate during 1970-2010 was Brunei. Growth of Brunei's GDP per capita during 1970-2010 increased the income share of the 3rd (4th) quintile by around 3 (4) percentage points.

2.2. Effect of the Rise of the Middle Class on Economic Growth

Brueckner and Lederman (2015) present instrumental variables estimates of the impact that various measures of income inequality have on GDP per capita. The authors use the residual variation in income inequality, ε , that is not due to GDP per capita as an instrument to estimate effects that exogenous variation in income inequality have on GDP per capita.⁴ The relevant equation is:

$$(2) \quad \ln(\text{GDP p.c.})_{ct} = a_c + b_t + \theta_1 \text{Inequality}_{ct} + \theta_2 \text{Inequality}_{ct} * \ln(\text{initial GDP p.c.})_c + u_{ct}$$

Brueckner and Lederman (2015) find that the effect of inequality on GDP per capita differs depending on countries' initial level of GDP per capita. The estimates that these authors provide are useful for computing effects that a rise of the middle class has on GDP per capita of ASEAN economies at different stages of these countries' economic development.

Table 2 reports predicted effects of a 1 percentage point increase in the income share of the 3rd quintile on GDP per capita of ASEAN countries. Column (1) reports predicted effects based on ASEAN countries' initial economic development as measured by GDP per capita in 1970; column (2) reports effects for recent levels of economic development as measured by GDP per capita in 2010. Specifically, for column (1) the predicted effects are generated by combining estimates reported in Brueckner and Lederman (2015) (see their column (4) of Table 1), with the values of countries' GDP per capita in 1970. For column (2) the predicted effects are generated by combining

4 To do this, one needs a consistent estimate of α in equation (1). This estimate is obtained from Brueckner et al. (2015). For papers that have applied such an instrumental variables strategy in the context of foreign aid and fiscal policy, see, for example, Brueckner (2013) and Fatas and Mihov (2001).

estimates reported in Brueckner and Lederman (2015) (see their column (4) of Table 1), with the values of countries' GDP per capita in 2010. Brueckner and Lederman's estimated relationship for country c and period t is:

$$(3) \quad \ln(\text{GDP per capita})_{ct} = -243*Q3_{ct} + 37*Q3_{ct}*\ln(\text{initial GDP per capita})_c$$

where $Q3$ is the income share of the 3rd quintile.

From column (1) of Table 2, one can see that a rise of the middle class would have had a significant negative effect on GDP per capita for the majority of ASEAN countries if it would have occurred at an early stage of economic development as measured by GDP per capita in 1970. For the average (median) ASEAN country, a one percentage point increase in the income share held by the 3rd quintile would have reduced GDP per capita by around 0.15 (0.18) logs. Figure 1 displays in the form of a bar plot the information shown in column (1) of Table 2. The bar plot visualizes the heterogeneity across ASEAN countries: at 1970 levels of GDP per capita, a one percentage point increase in the share of income held by the 3rd quintile would have had a large negative effect in Vietnam, the Lao People's Democratic Republic, and Indonesia; a moderate negative effect in Cambodia, the Philippines, Thailand, and Malaysia; a moderate positive effect in Singapore; and a large positive effect in Brunei.

Column (2) of Table 2 shows that for 2010 levels of GDP per capita, an increase in the income share held by the 3rd quintile has a significant positive effect on GDP per capita in all the ASEAN countries. A one percentage point increase in the income share held by the 3rd quintile increases GDP per capita by over 0.7 (0.9) logs in the average (median) ASEAN country. Brunei and Singapore are at the top end with gains in GDP per capita of over 1.7 logs. In Malaysia, the effect is around 1.2 logs. More modest gains in GDP per capita would be realized in the remainder of the ASEAN countries. But even at the bottom end, a one percentage point increase in the income share held by the 3rd quintile would increase GDP per capita by around 0.5 log. A graphical illustration of these effects is provided in Figure 2.

Table 3 presents results for the income share accruing to the 4th quintile. Column (1) reports effects for an early stage of economic development as measured by GDP per capita in 1970; column (2) reports effects for a recent stage of economic development as measured by GDP per capita in 2010. Specifically, for column (1) the predicted effects are generated by combining estimates reported in Brueckner and Lederman (2015) (see their column (5) of Table 1), with the values of countries' GDP per capita in 1970. For column (2) the predicted effects are generated by combining estimates reported in Brueckner and Lederman (2015) (see their column (5) of Table 1), with the values of countries' GDP per capita in 2010. Brueckner and Lederman's estimated relationship for country c and period t is:

$$(4) \quad \ln(\text{GDP per capita})_{ct} = -263*Q4_{ct} + 40*Q4_{ct}*\ln(\text{initial GDP per capita})_c$$

where $Q4$ is the income share of the 4th quintile.

From column (1) of Table 3, one sees that a rise of the upper middle class would have had a significant negative effect on GDP per capita for the majority of ASEAN countries for levels of GDP per capita in 1970. Specifically, for the average (median) ASEAN country, a one percentage point increase in the income share held by the fourth quintile would have decreased GDP per capita by around 0.2 (0.2) log. In contrast, for current levels of GDP per capita, a rise of the upper middle class would have a significant positive effect on aggregate output in all the ASEAN countries. This is shown in column (2) of Table 3. For 2010 levels of GDP per capita, a one percentage point increase in the income share held by the fourth quintile would increase GDP per capita by around 0.9 (0.7) log in the average (median) ASEAN country.

Tables 4 reports results for the net (i.e. after tax and transfers) Gini. The predicted effects reported there are generated based on the following estimates of Brueckner and Lederman (2015):

$$(5) \quad \ln(\text{GDP per capita})_{ct} = 90*\text{NetGini}_{ct} - 13*\text{NetGini}_{ct}*\ln(\text{initial GDP per capita})_c$$

From column (1) of Table 4, one sees that a decrease in income inequality after tax and transfers would have had a significant negative effect on GDP per capita for the majority of ASEAN

countries for levels of GDP per capita in 1970. Specifically, for the average (median) ASEAN country a one percentage point decrease in the net Gini would have decreased GDP per capita by around 0.1 (0.1) log. In contrast, for current levels of GDP per capita a decrease in the net Gini would have a positive effect on aggregate output in all the ASEAN countries. This is shown in column (2) of Table 4. For 2010 levels of GDP per capita, a one percentage point decrease in the net Gini would increase GDP per capita by around 0.6 (0.4) log in the average (median) ASEAN country.

Table 5 shows that similar results are obtained for the market Gini. The predicted effects reported in Table 5 are generated based on the following estimates of Brueckner and Lederman (2015):

$$(6) \quad \ln(\text{GDP per capita})_{ct} = 90 * \text{MarketGini}_{ct} - 13 * \text{MarketGini}_{ct} * \ln(\text{initial GDP per capita})_c$$

From column (1) of Table 5, one sees that a decrease in market income inequality would have had a negative effect on GDP per capita for the majority of ASEAN countries for levels of GDP per capita in 1970. For the average (median) ASEAN country, a one percentage point decrease in the market Gini would have decreased GDP per capita by around 0.1 (0.1) log. In contrast, for current levels of GDP per capita, a decrease in the net Gini would have a positive effect on aggregate output in all the ASEAN countries. This is shown in column (2) of Table 5. For 2010 levels of GDP per capita, a one percentage point decrease in the net Gini would increase GDP per capita by around 0.3 (0.2) log in the average (median) ASEAN country.

In the Galor and Zeira (1993) model, the mechanism through which income inequality affects aggregate output is human capital accumulation. In the presence of credit market imperfections and fixed costs, only sufficiently rich individuals are able to accumulate human capital. That is why in poor countries a decrease in inequality reduces human capital accumulation; the opposite is the case in relatively rich countries.

We provide evidence that the human capital accumulation mechanism is present in the

sample of ASEAN countries in Tables 6 and 7. Table 6 provides estimates of the predicted effects that a one percentage point increase in the income share held by the 3rd quintile has on the share of the population with secondary education. Table 7 provides estimates of the predicted effects that a one percentage point increase in the income share held by the 3rd quintile has on the share of population with tertiary education. The predicted effects are computed based on the following estimated relationships in Brueckner and Lederman (2015):

$$(7) \quad (\text{Share of Population Secondary Schooling})_{ct} = -9.6*Q3_{ct} + 1.5*Q3_{ct}*\ln(\text{initial GDP p.c.})_c$$

$$(8) \quad (\text{Share of Population Tertiary Education})_{ct} = -5.0*Q3_{ct} + 0.8*Q3_{ct}*\ln(\text{initial GDP p.c.})_c$$

For columns (1) and (2) of Tables 6 and 7, the predicted effects are generated by combining the above estimates with the values of countries' GDP per capita in 1970 and 2010, respectively.

From column (1) of Tables 6 and 7, one sees that a rise of the middle class would have had a negative effect on human capital accumulation for the majority of ASEAN countries for levels of GDP per capita in 1970. This is true regardless of whether the measure of human capital accumulation is the share of population with secondary education or tertiary education. For the average ASEAN country, a one percentage point increase in the income share held by the third quintile would have decreased the share of population with secondary (tertiary) education by around 0.3 (0.4) percentage point. In contrast, for recent levels of GDP per capita, a rise of the middle class would have a significant positive effect on human capital accumulation in all the ASEAN countries. This is shown in column (2) of Tables 6 and 7. For 2010 levels of GDP per capita, a one percentage point increase in the income share held by the third quintile would increase the share of population with secondary (tertiary) education by around 4.1 (1.8) percentage points in the average ASEAN country.

Table 8 reports effects on the investment-to-GDP ratio. For column (1) the predicted effects are generated by combining estimates reported in Brueckner and Lederman (2015) with the values of countries' GDP per capita in 1970. For column (2) the predicted effects are generated by

combining estimates reported in Brueckner and Lederman (2015) with the values of countries' GDP per capita in 2010. Specifically, the estimated relationship for country c and period t is:

$$\text{INV/GDP}_{ct} = -26*Q3_{ct} + 4*Q3_{ct}*\ln(\text{initial GDP per capita})_c$$

Column (1) of Table 8 shows that an increase in the income share of the 3rd quintile has a negative effect on the investment-to-GDP ratio for the majority of ASEAN countries for 1970 levels of GDP per capita. From column (2) of Table 8, one sees that for 2010 levels of GDP per capita the effects are positive for all ASEAN countries.

3. Summary

This paper provided estimates of the relationship between the rise of the middle class and economic growth in ASEAN countries. At early stages of economic development (as measured by GDP per capita in 1970), a rise of the middle class would have decreased GDP per capita growth in ASEAN. However, for current levels of GDP per capita, a rise of the middle class increases growth. The paper documented that human capital accumulation, measured by the share of the population with secondary and tertiary education, is an important mechanism through which changes in the income share held by the middle class affect economic growth.

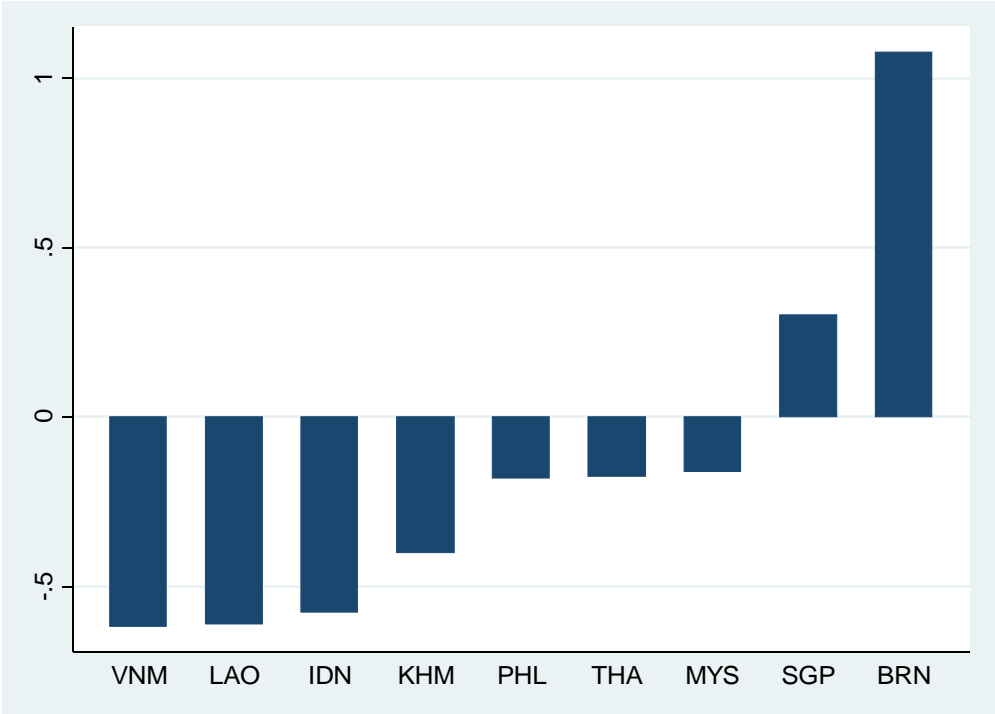
References

- Asian Development Bank (2011). "Higher Education in Asia: An Overview of Issues and Strategies." Available at <https://www.adb.org/sites/default/files/publication/29407/higher-education-across-asia.pdf>
- Barro, R. and J.W. Lee (2013). "A New Data Set of Educational Attainment in the World, 1950-2010." *Journal of Development Economics* 104: 184-198.
- Brueckner, M. (2013). "On the Simultaneity Problem in the Aid and Growth Debate". *Journal of Applied Econometrics* 28: 102-125.
- Brueckner, M., E. Dabla Norris, M. Gradstein (2015). "National Income and Its Distribution." *Journal of Economic Growth* 20: 149-175.
- Brueckner, M. and D. Lederman (2015). "Effects of Income Inequality on Aggregate Output." World Bank Policy Discussion Paper 7317.
- Chapman, B. (2006). *Government Managing Risk: Income contingent loans for social and economic progress*, Routledge, London.
- Fatas, A. and I. Mihov (2003). "The Case for Restricting Fiscal Policy Discretion." *Quarterly Journal of Economics* 118: 1419-1447.
- Galor, O. (2011). "Inequality, Human Capital Formation, and the Process of Development." *Handbook of the Economics of Education*, North Holland.
- Galor, O. and J. Zeira (1993). "Income Distribution and Macroeconomics." *Review of Economic Studies* 60: 35-52.
- Kuznet, S. (1955). "Economic Growth and Income Inequality." *American Economic Review* 45: 1-28.
- Heston, A., R. Summers and B. Aten (2012). "Penn World Table Version 7.1." Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania.

Solt, F. (2009). "Standardizing the World Income Inequality Database." *Social Science Quarterly* 90: 231-242.

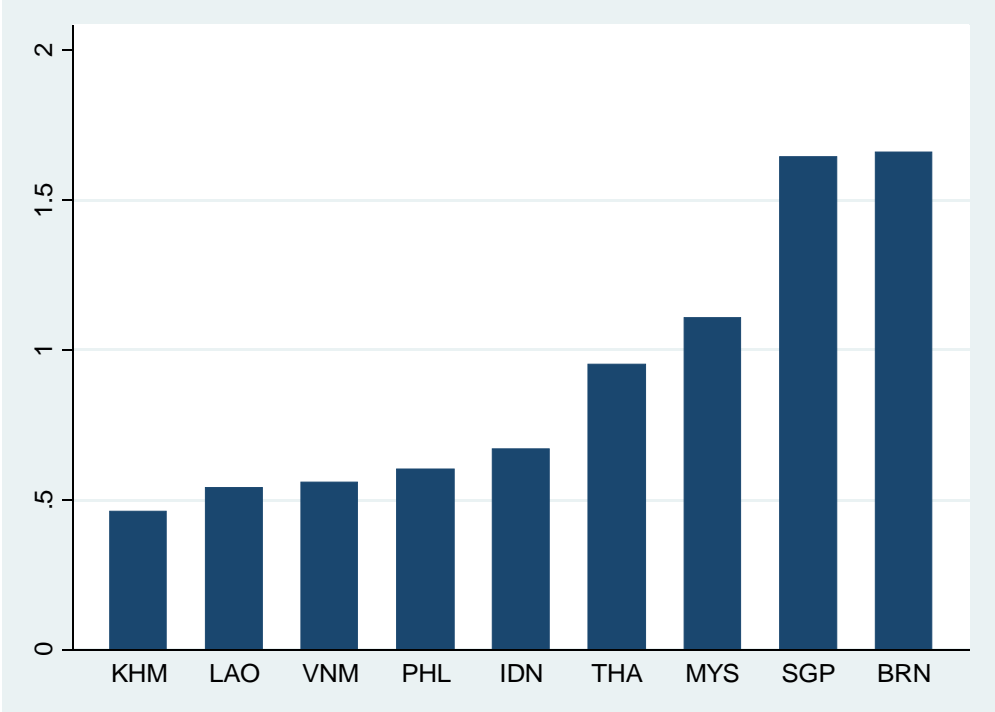
WDI (2014). World Development Indicators. Available for download at <http://data.worldbank.org/>

Figure 1: Effect of a 1 Percentage Point Increase in the Income Share Held by 3rd Quintile on Log GDP per capita (ASEAN countries, 1970)



Note: The figure is based on column (1) of Table 2.

Figure 2: Effect of a 1 Percentage Point Increase in the Income Share Held by 3rd Quintile on Log GDP per capita (ASEAN countries, 2010)



Note: The figure is based on column (2) of Table 2.

Table 1. Effects of Economic Growth During 1970-2010 on the Share of Income Held by the 3rd and 4th Quintile

	Predicted Effect on Income Share Held by 3 rd Quintile	Predicted Effect on Income Share Held by 4 th Quintile
	(1)	(2)
Brunei	3.12	3.88
Cambodia	4.66	5.80
Indonesia	6.74	8.39
Lao PDR	6.22	7.74
Malaysia	6.82	8.49
Philippines	4.24	5.28
Singapore	7.24	9.01
Thailand	6.08	7.57
Vietnam	6.36	7.92
ASEAN Average	5.72	7.12
ASEAN Median	6.22	7.74

Note: The table reports effects (in percent) of changes in the natural logarithms of GDP per capita between 1970 and 2010 on the share of income held by the 3rd quintile (column (1)) and 4th quintile (column (2)). The predicted effects are generated by combining estimates reported in Brueckner et al. (2015), see there columns (4) and (5) of Panel A in Table 1, with the change of the natural logarithm of GDP per capita between 1970 and 2010 for each country.

Table 2. Effect of a 1 Percentage Point Increase in the Income Share Held by the 3rd Quintile on Log GDP per capita

	Level of Economic Development: 1970 GDP per capita	Level of Economic Development: 2010 GDP per capita
	(1)	(2)
Brunei	1.08	1.66
Cambodia	-0.40	0.46
Indonesia	-0.58	0.67
Laos	-0.61	0.54
Malaysia	-0.16	1.11
Philippines	-0.18	0.60
Singapore	0.30	1.64
Thailand	-0.17	0.95
Vietnam	-0.62	0.56
ASEAN Average	-0.15	0.91
ASEAN Median	-0.18	0.67

Note: The table reports effects on log GDP per capita of a 1 percentage point increase in the income share held by the 3rd quintile. For column (1) the predicted effects are generated by combining estimates reported in Brueckner and Lederman (2015), see there column (4) of Table 1, with the values of countries' GDP per capita in 1970. For column (2) the predicted effects are generated by combining estimates reported in Brueckner and Lederman (2015), see there column (4) of Table 1, with the values of countries' GDP per capita in 2010. Specifically, the estimated relationship for country c and period t is $\ln(\text{GDP per capita})_{ct} = -243 \cdot Q3_{ct} + 37 \cdot Q3_{ct} \cdot \ln(\text{initial GDP per capita})_c$.

Table 3. Effect of a 1 Percentage Point Increase in the Income Share Held by the 4th Quintile on Log GDP per capita

	Level of Economic Development: 1970 GDP per capita	Level of Economic Development: 2010 GDP per capita
	(1)	(2)
Brunei	1.12	1.75
Cambodia	-0.46	0.46
Indonesia	-0.65	0.69
Laos	-0.68	0.55
Malaysia	-0.20	1.16
Philippines	-0.22	0.62
Singapore	0.30	1.73
Thailand	-0.22	0.94
Vietnam	-0.69	0.57
ASEAN Average	-0.19	0.94
ASEAN Median	-0.22	0.69

Note: The table reports effects on log GDP per capita of a 1 percentage point increase in the income share held by the 4th quintile. For column (1) the predicted effects are generated by combining estimates reported in Brueckner and Lederman (2015), see there column (5) of Table 1, with the values of countries' GDP per capita in 1970. For column (2) the predicted effects are generated by combining estimates reported in Brueckner and Lederman (2015), see there column (5) of Table 1, with the values of countries' GDP per capita in 2010. Specifically, the estimated relationship for country c and period t is $\ln(\text{GDP per capita})_{ct} = -263*Q_{4ct} + 40*Q_{4ct}*\ln(\text{initial GDP per capita})_c$.

Table 4. Effect of a 1 Percentage Point Decrease in the Net Gini on Log GDP per capita

	Level of Economic Development: 1970 GDP per capita	Level of Economic Development: 2010 GDP per capita
	(1)	(2)
Brunei	0.71	1.09
Cambodia	-0.25	0.31
Indonesia	-0.37	0.44
Laos	-0.39	0.36
Malaysia	-0.10	0.73
Philippines	-0.11	0.40
Singapore	0.20	1.08
Thailand	-0.11	0.63
Vietnam	-0.39	0.37
ASEAN Average	-0.09	0.60
ASEAN Median	-0.11	0.40

Note: The table reports effects on log GDP per capita of a 1 percentage point decrease in the net Gini. For column (1) the predicted effects are generated by combining estimates reported in Brueckner and Lederman (2015) with the values of countries' GDP per capita in 1970. For column (2) the predicted effects are generated by combining estimates reported in Brueckner and Lederman (2015) with the values of countries' GDP per capita in 2010. Specifically, the estimated relationship for country c and period t is $\ln(\text{GDP per capita})_{ct} = 157 * \text{NetGini}_{ct} - 24 * \text{NetGini}_{ct} * \ln(\text{initial GDP per capita})_c$.

Table 5. Effect of a 1 Percentage Point Decrease in the Market Gini on Log GDP per capita

	Level of Economic Development: 1970 GDP per capita	Level of Economic Development: 2010 GDP per capita
	(1)	(2)
Brunei	0.35	0.56
Cambodia	-0.18	0.13
Indonesia	-0.24	0.21
Laos	-0.25	0.16
Malaysia	-0.09	0.36
Philippines	-0.10	0.18
Singapore	0.08	0.56
Thailand	-0.10	0.31
Vietnam	-0.25	0.17
ASEAN Average	-0.09	0.29
ASEAN Median	-0.10	0.18

Note: The table reports effects on log GDP per capita of a 1 percentage point decrease in the market Gini. For column (1) the predicted effects are generated by combining estimates reported in Brueckner and Lederman (2015) with the values of countries' GDP per capita in 1970. For column (2) the predicted effects are generated by combining estimates reported in Brueckner and Lederman (2015) with the values of countries' GDP per capita in 2010. Specifically, the estimated relationship for country c and period t is $\ln(\text{GDP per capita})_{ct} = 90 * \text{MarketGini}_{ct} - 13 * \text{MarketGini}_{ct} * \ln(\text{initial GDP per capita})_c$.

Table 6. Effect of a 1 Percentage Point Increase in the Income Share Held by the 3rd Quintile on Share of Population With Secondary Education

	Level of Economic Development: 1970 GDP per capita	Level of Economic Development: 2010 GDP per capita
	(1)	(2)
Brunei	4.77	7.16
Cambodia	-1.29	2.25
Indonesia	-2.02	3.11
Laos	-2.15	2.58
Malaysia	-0.30	4.89
Philippines	-0.38	2.83
Singapore	1.60	7.10
Thailand	-0.36	4.26
Vietnam	-2.18	2.65
ASEAN Average	-0.26	4.10
ASEAN Median	-0.38	2.83

Note: The table reports effects on the share of population with secondary education (in percent) of a 1 percentage point increase in the income share held by the 3rd quintile. For column (1) the predicted effects are generated by combining estimates reported in Brueckner and Lederman (2015) with the values of countries' GDP per capita in 1970. For column (2) the predicted effects are generated by combining estimates reported in Brueckner and Lederman (2015) with the values of countries' GDP per capita in 2010. Specifically, the estimated relationship for country c and period t is (Share of Population Secondary Schooling)_{ct} = -9.6*Q3_{ct} + 1.5*Q3_{ct}*ln(initial GDP per capita)_c.

Table 7. Effect of a 1 Percentage Point Increase in the Income Share Held by the 3rd Quintile on Share of Population With Tertiary Education

	Level of Economic Development: 1970 GDP per capita	Level of Economic Development: 2010 GDP per capita
	(1)	(2)
Brunei	2.12	3.31
Cambodia	-0.90	0.86
Indonesia	-1.26	1.29
Laos	-1.33	1.03
Malaysia	-0.41	2.18
Philippines	-0.45	1.15
Singapore	0.54	3.28
Thailand	-0.43	1.87
Vietnam	-1.34	1.06
ASEAN Average	-0.38	1.78
ASEAN Median	-0.45	1.15

Note: The table reports effects on the share of population with tertiary education (in percent) of a 1 percentage point increase in the income share held by the 3rd quintile. For column (1) the predicted effects are generated by combining estimates reported in Brueckner and Lederman (2015) with the values of countries' GDP per capita in 1970. For column (2) the predicted effects are generated by combining estimates reported in Brueckner and Lederman (2015) with the values of countries' GDP per capita in 2010. Specifically, the estimated relationship for country c and period t is $(\text{Share of Population Tertiary Education})_{ct} = -5.0 \cdot Q3_{ct} + 0.8 \cdot Q3_{ct} \cdot \ln(\text{initial GDP per capita})_c$.

Table 8. Effect of a 1-Percentage Point Increase in the Income Share Held by the 3rd Quintile on Investment-to-GDP Ratio

	Level of Economic Development: 1970 GDP per capita	Level of Economic Development: 2010 GDP per capita
	(1)	(2)
Brunei	0.11	0.17
Cambodia	-0.05	0.05
Indonesia	-0.06	0.07
Laos	-0.07	0.05
Malaysia	-0.02	0.11
Philippines	-0.02	0.06
Singapore	0.03	0.17
Thailand	-0.02	0.10
Vietnam	-0.07	0.06
ASEAN Average	-0.02	0.09
ASEAN Median	-0.02	0.11

Note: The table reports effects on the investment-to-GDP ratio of a 1 percentage point increase in the income share held by the 3rd quintile. For column (1) the predicted effects are generated by combining estimates reported in Brueckner and Lederman (2015) with the values of countries' GDP per capita in 1970. For column (2) the predicted effects are generated by combining estimates reported in Brueckner and Lederman (2015) with the values of countries' GDP per capita in 2010. Specifically, the estimated relationship for country c and period t is $INV/GDP_{ct} = -26*Q3_{ct} + 4*Q3_{ct}*\ln(\text{initial GDP per capita})_c$.

Appendix Table 1. Descriptive Statistics

Variable	Data Source	Mean ASEAN	Standard Deviation ASEAN
Net Gini	Solt (2009)	0.43	0.05
Market Gini	Solt (2009)	0.48	0.08
3rd Quintile Income Share	Brueckner et al. (2015)	0.14	0.01
4th Quintile Income Share	Brueckner et al. (2015)	0.21	0.01
Ln GDP per capita	Heston et al. (2012)	7.38	1.73
Investment/GDP	Heston et al. (2012)	0.23	0.12
Share of Population Tertiary Education	Barro and Lee (2010)	0.05	0.06
Share of Population Secondary Education	Barro and Lee (2010)	0.10	0.08

Appendix Table 2. List of ASEAN Countries' Log GDP per capita in 1970 and 2010

Country	Log GDP per capita in 1970	Log GDP per capita in 2010
Brunei	9.47	11.03
Cambodia	5.48	7.81
Indonesia	5.00	8.37
Laos	4.91	8.02
Malaysia	6.13	9.54
Philippines	6.07	8.19
Singapore	7.38	11.00
Thailand	6.09	9.13
Vietnam	4.89	8.07