

# Sharing the Growth Dividend: Analysis of Inequality in Asia

**Sonali Jain-Chandra**

*IMF, USA*

*sjainchandra@imf.org*

<https://orcid.org/0000-0002-0860-2941>

**Tidiane Kinda**

*IMF, USA*

*tkinda@imf.org*

<https://orcid.org/0000-0002-4367-8175>

**Kalpana Kochhar**

*IMF, USA*

*kkochhar@imf.org*

<https://orcid.org/0000-0002-5267-3317>

**Shi Piao**

*Ant Financial Services Group, China*

*piaoshix@163.com*

<https://orcid.org/0000-0003-2649-9658>

**Johanna Schauer<sup>1</sup>**

*IMF, USA*

*jschauer@imf.org*

<https://orcid.org/0000-0002-0714-9903>

Received: 26 June 2018 / Revised: 20 March 2019 / Accepted: 8 April 2019 / Published online: 4 September 2019

---

## ABSTRACT

This paper focusses on income inequality in Asia, its drivers and policies to combat it. It finds that income inequality has risen in most of Asia, in contrast to many other regions. While in the past, rapid growth in Asia has come with equitable distribution of the gains, more recently fast-growing Asian economies have been unable to replicate the “growth with equity” miracle. There is a growing consensus that high levels of inequality can hamper the pace and sustainability of growth. The paper argues that policies could have a substantial effect on reversing the trend of rising inequality. It is imperative to address inequality of opportunities, in particular to broaden access to education, health, and financial services. Also, fiscal policy could combat rising inequality, including by expanding and broadening the coverage of social spending, improving tax progressivity, and boosting compliance. Further efforts to promote financial inclusion, while maintaining financial stability, can help.

*JEL Classification:* D31, D63, O15

*Keywords:* Inequality, Gini coefficient, Asia

---

<sup>1</sup> Corresponding author. Phone: +1-202-623-8517.

The views expressed in this paper are those of the authors and do not necessarily represent the views of the IMF, its Executive Board, or IMF management.

## 1. INTRODUCTION

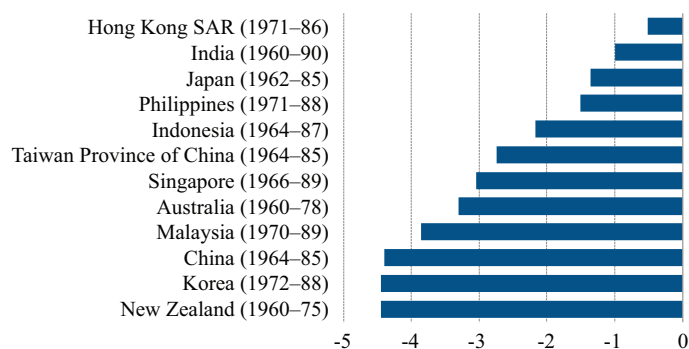
Rising inequality across the globe has attracted much attention from the public and policymakers alike. Until around 1990, Asia grew strongly and secured large gains in poverty reduction while at the same time achieved a fairly equitable society (Figure 1). A large part of this success owed to the “Miracle” countries – Hong Kong SAR, Korea, Singapore and Taiwan Province of China – where sustained rapid growth was accompanied by equitable income distributions.

Since the early 1990s, however the region has witnessed rising income inequality, a break from its own remarkable past of equitable growth, resulting in high levels of inequality particularly in large Asian emerging markets (Figure 2). This is of concern for two reasons. First, the recent literature has found that elevated levels of inequality are harmful for the pace and sustainability of growth. In particular, high levels of income inequality can lead to sub-optimal investment in health and education, which weighs on growth. Also widening inequality can weaken the support for growth-enhancing reforms and may spur governments to adopt populist policies and increase the risk of political instability. Second, increases in inequality in Asia have had a dampening effect on the impact of growth on poverty reduction, leading to less inclusive and less pro-poor growth compared to Asia’s past. In addition to income inequality, Asia, in line with other regions, faces considerable inequality in opportunities.

**Figure 1.**

Selected Asia: Income Inequality, Pre-1990

(Net Gini Index; in Gini points; change during the period indicated in parentheses)

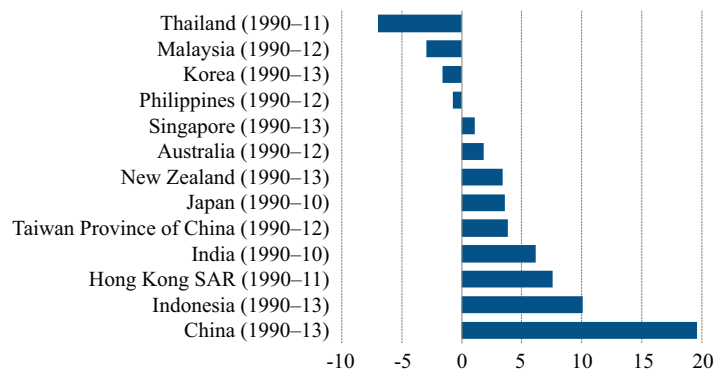


Sources: SWIID Version 5.0; and authors’ calculations.

**Figure 2.**

Selected Asia: Income Inequality, 1990-Latest

(Net Gini Index; in Gini points; change during the period indicated in parentheses)



Sources: SWIID Version 5.0; and authors’ calculations.

Recognizing this, a number of countries have placed the issue of inclusive growth as central to their national goals and in a number of cases explicitly in their development plans. China’s Thirteenth Five-Year Plan (2016–20) emphasizes a more balanced, inclusive, and sustainable growth model, as do India’s Twelfth Five Year Plan (2012–17) and the Philippine Development Plan (2011–16). This objective is also central to development plans in Indonesia and Malaysia.

This paper revisits the increasingly important topic of widening income inequality, focusing on Asia, home to more than half of the world’s population. It contributes to a growing literature on the evolution and drivers of income inequality. The goal is to document the developments in various measures of income inequality as well as inequality of opportunities over time in Asian economies. It will also analyze the drivers of income inequality, as well as the extent to which these are different in Asia and discuss policies to generate more inclusion.

The paper is organized as follows. Section 2 provides a literature survey covering the impact of inequality on the economy. Section 3 discusses data issues and Section 4 illustrates stylized facts on the evolution of inequality in Asia. Section 5 provides the empirical framework and section 6 discusses the results. We conclude in section 7.

## 2. LITERATURE REVIEW

While the recent literature finds that inequality hampers growth, some early empirical work found a positive or non-linear effect of inequality on growth (Banerjee and Duflo, 2003). Inequality was seen as necessary to spur growth by providing incentives, increasing investment, and allowing the accumulation of a minimum of assets necessary for entrepreneurial activities and education (Barro, 2000).

However, beyond violating many people's concept of social justice, recent research has uncovered various negative effects of inequality on economic growth, putting it at the forefront of policy and research agendas. Different channels have been put forth on how inequality can negatively impact growth and stability, including through political economy (e.g., Alesina and Rodrik, 1994; Galor *et al.*, 2009), credit constraints (e.g., Galor and Moav, 2004; Hassler *et al.*, 2007), and economic and financial crises (e.g., Stiglitz, 2012 and Kumhof *et al.*, 2015) and recent empirical work has found a negative relationship between inequality and growth (e.g., Easterly, 2007; Berg and Ostry, 2011; Dabla-Norris *et al.*, 2015a; Berg *et al.*, 2018a, Brueckner and Lederman, 2018).

Theory has suggested many drivers of inequality, which empirical research has aimed at testing using various methods. Recent cross-country studies have confirmed various drivers put forth by economic theory (Milanovic, 2005; OECD, 2011; Dabla-Norris *et al.*, 2015a). Further research focuses on particular drivers to allow more detailed conclusions (e.g., globalization: Jaumotte *et al.*, 2013; labor markets: Jaumotte and Osorio Buitron, 2015; fiscal policy: Woo *et al.*, 2013; financial development: Claessens and Perotti, 2007). In this literature, greater financial openness and technology are usually found to increase inequality, while strengthened labor market institutions, higher government spending and educational attainment have an equalizing effect. The results are less clear-cut for the effects of trade openness and financial deepening. More recent work has focused on the role of technological change, in particular automation, artificial intelligence, and digitization, and its potential impact on inequality (Guellec and Paunov, 2017; Acemoglu and Restrepo, 2018; Berg *et al.*, 2018b).

The study of specific drivers of inequality in Asia has received less attention. The most comprehensive analysis has been done by Zhuang *et al.* (2014). Using micro data for inequality decompositions, the authors argue that technological progress, globalization, and market-oriented reform have driven rising inequality in Asia through capital, skill, and spatial biases. Claus *et al.* (2014) concentrate on the role of fiscal policies in Asian countries using cross-country regressions. They find that the main differences between Asia and the rest of the world arise from the effect of social protection and housing. Balakrishnan *et al.* (2013) look at the drivers of inclusive growth in Asia identifying education, increasing labor share of total income and financial reform as having a positive effect. Aoyagi and Ganelli (2015) do the same and find that fiscal redistribution, monetary policy aimed at macro stability, and structural reforms to stimulate trade, reduce unemployment and increase productivity are important determinants of inclusive growth in Asia. More prevalent are studies looking at subsets of or individual Asian countries (e.g., Cain *et al.*, 2014; Li *et al.*, 2014; Chongvilaivan, 2014; Piketty *et al.*, 2017; Jain-Chandra *et al.*, 2018) and those analyzing particular drivers, such as education and the skill premium (e.g., di Gropello and Sakellariou, 2010; Mehta *et al.*, 2013), infrastructure (Seneviratne and Sun, 2013), rural-urban differences (e.g., Kanbur and Zhuang, 2014) or trade and outsourcing (Hsieh and Woo, 2005). This paper contributes to this literature by using cross-country regressions to analyze the main drivers for increased inequality in Asia. Moreover, we delve further into specific issues by using more disaggregated and precise variables to evaluate the impact of specific policies.

### 3. DATA

While inequality encompasses many different dimensions, this paper focuses primarily on inequality in income or consumption and uses data derived from national household surveys. Any analysis of inequality – and this paper is no exception – is confronted with a number of challenges as cross-country comparisons are highly challenging. First, some national statistical offices collect data on household income while others compile statistics on consumption expenditure. The latter is true for most low- and middle-income countries in Asia, while the high-income countries tend to report income inequality measures. Second, major differences exist among the same inequality measures, such as the sampling unit, the definition of income (net or gross income) or the time period of expenditures or earnings. Due to these constraints, we work with two main data sources which aim to aggregate data in a consistent manner but still cover a broad set of countries.

For most of our data analysis we focus on the Gini coefficient as our unit of analysis, which we obtain from the Standardized World Income Inequality Database (SWIID Version 5.0) assembled by Frederik Solt. This dataset aims to combine two major aspects crucial for our analysis – “maximizing the comparability of income inequality data while maintaining the widest possible coverage across countries and over time.”<sup>2</sup> It reports Gini coefficients for 174 countries from 1960 to the present. Solt uses the Luxembourg Income Study as its standard, as it is based on income surveys only and aims to achieve the highest level of harmonization. Further values are generated using model-based imputation using various supplementary data sources.<sup>3</sup> Still, major issues remain and Solt accounts for this by providing standard deviations of the imputations and a pre-formatted dataset, which allows us to account for the uncertainty of estimates in our cross-country regressions.

In our analysis of trends we also make use of the PovcalNet database from the World Bank as it gives more detailed information on the national distributions of inequality. It constructs mean income and shares in the distribution by decile from national household surveys. Covering 126 countries from 1979 to 2012, it is also being used to calculate the official estimates of global poverty. No adjustments for comparability have been undertaken, but it is specified whether the measure is based on consumption or income data. Thus, one needs to be aware of these shortcomings when looking at aggregations from this source. Overall, consumption inequality tends to be lower than income inequality (Alvaredo and Gasparini, 2015).

### 4. STYLIZED FACTS

Asia has been a growth leader in the world and has achieved remarkably high growth for sustained periods. From 1990–2015, the region grew at around 6 percent per annum, notwithstanding the sharp slowdowns during the Asian Financial Crisis and the Global Financial Crisis. At the same time, during this period, large gains were achieved in poverty alleviation. The poverty rate has fallen from 55 percent in 1990 to 21 percent in 2010, driven in large part by China and India.<sup>4</sup>

However, this impressive economic performance has been accompanied by rising inequality in a number of Asian economies. The average level of the Gini coefficient is now higher in Asia

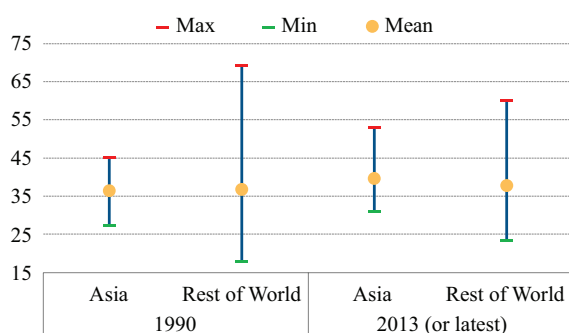
<sup>2</sup> Solt (2009) reports that the SWIID covers double that of the next largest income inequality data set, and its record of comparability is three to eight times higher than those of alternate data sets.

<sup>3</sup> These include United Nations University’s World Income Inequality Database, the OECD Income Distribution Database, the Socio-Economic Database for Latin America and the Caribbean generated by CEDLAS and the World Bank, Eurostat, the World Bank’s PovcalNet, the UN Economic Commission for Latin America and the Caribbean, the World Top Incomes Database, the University of Texas Inequality Project, national statistical offices around the world, and academic studies.

<sup>4</sup> Here, the poverty rate is defined as \$1.25/person/day, which is conventionally used in global poverty analysis. The dollar amount is in terms of purchasing power parity (ppp) as of 2005.

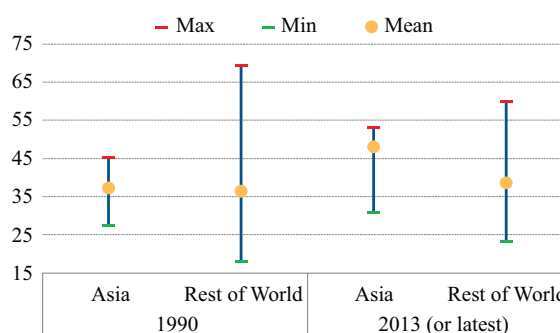
than for the rest of the world. Furthermore, apart from Asia and OECD countries, inequality has been trending down in all other regions. The average Gini coefficient (net of transfers and taxes) has risen from 36 in 1990 to 40 in 2013 in Asia. Over the same time period, the average Gini for the rest of the world has risen less by only two Gini points (Figure 3). More strikingly, on a population-weighted basis, the net Gini in Asia rose from 37 in 1990 to 48 in 2013, reflecting the sharp rise in inequality in the most populous countries (Figure 4). While these changes may appear small, inequality and especially the Gini measure are very persistent over time.<sup>5</sup> On average the within-country standard deviation in this sample is only 2.5 points. Consistent with the rest of the world, the level of inequality is higher in emerging market economies than in advanced economies, and it has been rising faster in the former set of countries (Figure 5 and Figure 6).

**Figure 3.**  
World and Asia: Income Inequality  
(Net Gini Index; in Gini points; average across the region)



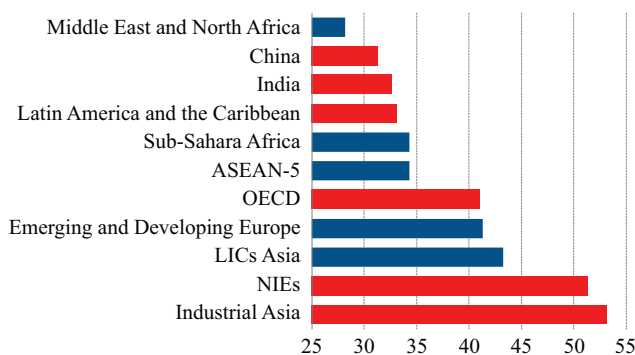
Sources: SWIID Version 5.0; and authors' calculations.

**Figure 4.**  
World and Asia: Population weighted Income Inequality (Net Gini Index; in Gini points; population weighted average across the region)



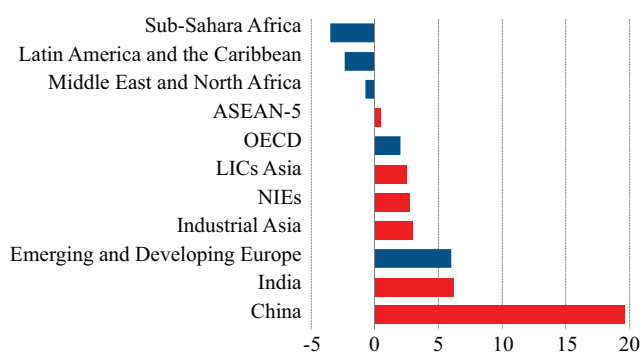
Sources: SWIID Version 5.0; World Bank, WDI database; and authors' calculations.

**Figure 5.**  
Regional Comparison: Income Inequality  
(Net Gini Index; in Gini points; year of 2013; population-weighted average across the region)



Sources: SWIID Version 5.0; IMF, WEO database; and authors' calculations.

**Figure 6.**  
Regional Comparison: Income Inequality  
(Net Gini Index; in Gini points; change since 1990; average across the region)



Sources: SWIID Version 5.0; IMF, WEO database; and authors' calculations.

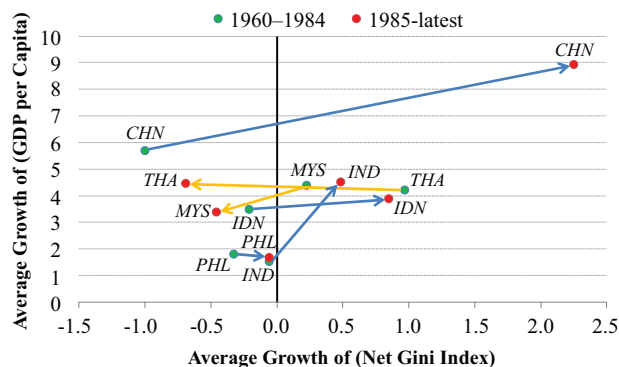
Rising inequality in Asia is in contrast to its own remarkable past record of equitable growth. Pre-1990, Asian economies grew fast but were also able to reduce inequality, leading to growth

<sup>5</sup> See Li *et al.* (1998) for a discussion.

that was inclusive. Since then, however, the region has been unable to replicate the “growth with equity miracle,” as inequality has risen (Figure 7). While impressive poverty reduction has been achieved, poverty rates would have been even lower had inequality not risen.

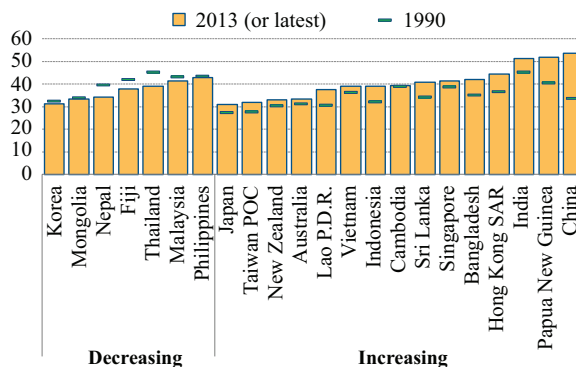
Of the 22 Asian economies analyzed for which sufficient data are available, income inequality, as measured by the net Gini coefficient, rose in 15 countries from 1990 to 2013 (Figure 8). Importantly, it increased sharply in the economies with the largest populations including China, India, and Indonesia.

**Figure 7.**  
Selected Asia: GDP per Capita and Net Gini Index  
(Y-o-Y percent change)



Sources: SWIID Version 5.0; IMF WEO database; and authors’ calculations.

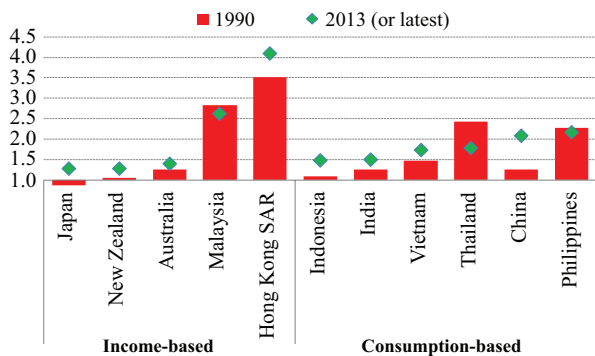
**Figure 8.**  
Selected Asia: Net Gini Index  
(In Gini points)



Sources: SWIID Version 5.0; and authors’ calculations.

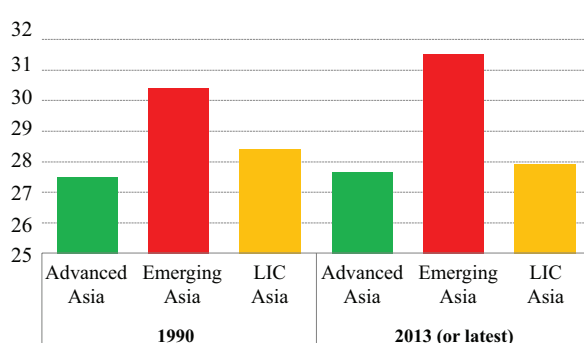
Next, we delve into the entire income distribution and analyze the shifts in income shares driving the rising Gini coefficients.<sup>6</sup> The Palma ratio complements the Gini measure by focusing on the ratio of the top 10 percent to the bottom 40 percent making it more sensitive to changes in the tails of the distribution.<sup>7</sup> For Asia it coincides with the developments in the Gini coefficient, as Malaysia, the Philippines, and Thailand are shown to achieve more equitable income distributions, while the remaining countries have become more inequitable (Figure 9).

**Figure 9.**  
Selected Asia: Palma Ratio  
(In percent)



Sources: World Bank, PovcalNet database; WID; and authors’ calculations.

**Figure 10.**  
Asia: Top 10 Income Share  
(In percent; average across the region)



Sources: World Bank, PovcalNet database; and authors’ calculations.

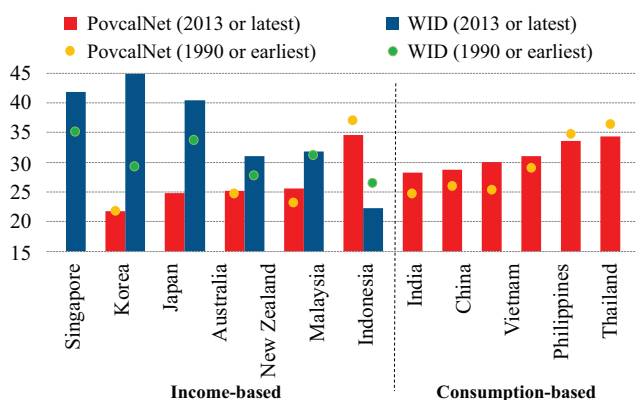
<sup>6</sup> Note that income distribution can also refer to consumption distributions, depending on which is available for the country.

<sup>7</sup> It has been developed based on Gabriel Palma’s (2006, 2011) observation that the share of the 5<sup>th</sup> to the 9<sup>th</sup> decile has been very stable. See Cobham and Sumner (2013) for more detail.

Rising inequality has also been driven by increases in the income share of the top decile, consistent with global trends. In 2013, the top decile of the population earned 32 percent of the income share in emerging Asia and around 28 percent in advanced Asia, compared to 30 and 27 percent of the income share, respectively, in 1990 (Figure 10).

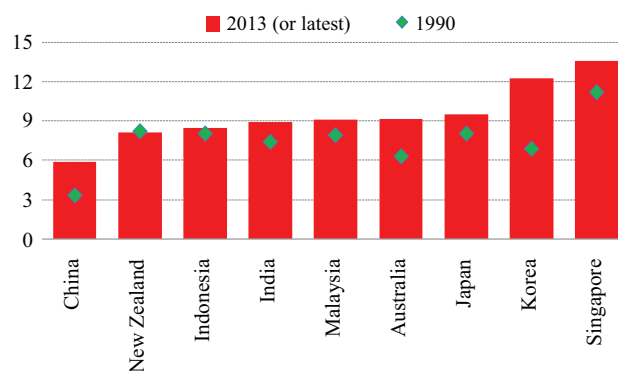
Figure 11 provides the shares of the top 10 percent for Asian countries.<sup>8</sup> Over the last two decades they increased in most of the countries, with Malaysia, the Philippines, and Thailand being an exception. However, there is a striking difference in the level and dynamics of top 10 percent shares between the World Bank Povcal data and the WID. For instance, Korea shows a surprisingly large increase by 16 percentage points since 1995 and records the highest level among the available countries with the top 10 percent earning 45 percent using the WID. However, this contrasts with evidence from the World Bank PovcalNet data, which indicates that the top 10 percent in Korea earned 22 percent of income in 2014, the lowest level among the available countries, and that this share has been stable since 2003. The top 1 percent saw an average increase of 2.2 percent, with the exception of Indonesia.<sup>9,10</sup> While the share increased most for Korea by 5 percentage points, Singapore still records the highest level with a share of 14 percent of income going to the top 1 percent in 2012 (Figure 12).

**Figure 11.**  
Selected Asia: Top 10 Income/Consumption Share  
(In percent)



Sources: World Bank, PovcalNet database; WID; and authors' calculations.

**Figure 12.**  
Selected Asia: Top 1 Income Share  
(In percent)



Sources: World Wealth and Income Database (WID); and authors' calculations.

## 5. METHODOLOGY

This section uses annual data for 82 countries during the period 1990–2013 to present evidence and shed further light on the determinants of income inequality, with a particular focus on Asia.<sup>11</sup> It builds on various studies in the empirical literature to formulate the econometric strategy (e.g., Woo et al., 2013; Dabla-Noris et al., 2015a). The baseline specification, which

<sup>8</sup> We use two main data sources to analyze the dynamic of top income/consumption shares: the World Bank PovcalNet data and the WID. The crucial difference is that the former relies on household surveys, whereas the latter uses income tax data (with China being an exception). As discussed previously, while the former tends to be less equally distributed than the latter, both sources suffer from various shortcomings. The income tax data lack coverage of incomes below the tax threshold and often rely on interpolation to derive the top. Household surveys are subject to sampling and non-sampling errors, which have been shown to result in a lack of coverage of top incomes. Top income shares tend to be underestimated within household surveys (especially above the 99th percentile) and taxation data can, in some cases, provide additional and complementary information.

<sup>9</sup> This data is only reported by the WID and thus only available for few countries.

<sup>10</sup> Chinese data is only available until 2003, Indonesian data until 2004, and Indian data until 1999. The increase might thus be stronger for more recent years.

<sup>11</sup> The sample covers advanced and developing economies and includes 17 Asian countries.

forms the basis of our empirical strategy, controls for standard determinants of inequality such as education, trade openness, and technological progress.

We mainly rely on fixed-effects (FE) panel regressions, with Driscoll-Kraay standard errors for our empirical investigation. The FE with Driscoll-Kraay standard errors are robust to very general forms of cross-sectional and temporal dependence. The error structure under this estimation method is assumed to be heteroskedastic and autocorrelated up to two lags, which helps capture the persistence of income inequality across time. The error is also assumed to be correlated between countries, possibly due to common shocks, for instance those related to technology, international trade, or financial crises. Estimations using FE may be subject to endogeneity, calling for caution when interpreting the causal relationship between inequality and its determinants. In addition to the FE with Driscoll-Kraay standard errors, we test the robustness of our results with two further estimation methods: (i) the generalized method of moments (GMM) in first difference, which includes the lagged Gini as a dependent variable and controls for potential endogeneity by instrumenting all explanatory variables; and (ii) the multiple-imputation approach, which is a simulation-based approach for analyzing incomplete data and corrects for potential bias due to the presence of imputed values in the Gini coefficients (Appendix B).

We estimate the following baseline equation:

$$Inequal_{it} = \delta X_{it-1} + \mu_i + \theta_t + \varepsilon_{it}$$

Where *inequal* denotes for each country *i* and year *t*, a measure of income distribution such as net Gini, market Gini, income share of the bottom 10 percent, and income share of the top 10 percent. As the Gini is over-sensitive to changes in the middle of the distribution and less sensitive to changes at the top and the bottom, we also rely on the Palma ratio, the ratio of the income share of the top 10 percent to that of the bottom 40 percent as an alternative measure of income inequality. This ratio also has the advantage of being a good summary of distributional policies because households between the fifth and the ninth decile tend to have a relatively stable share of national income across countries and over time (Palma, 2011).  $\mu_i$  denote the country-specific fixed effects to control for country-specific factors including the time-invariant component of the institutional and geographical environments.  $\theta_t$  are time-fixed effects to control for global factors and  $\varepsilon_{it}$  is an error term. All explanatory variables in the estimation are lagged by one year to reduce the risks of endogeneity due to reverse causality.<sup>12</sup>  $X_{it-1}$  is the vector of explanatory variables and includes the following variables:

**Education.** This variable is from the Penn World Tables and captures the human capital stock (in the baseline regressions). It is based on data of average years of schooling by Barro and Lee (2013), which is interpolated for annual data and adjusted to account for higher returns to education for earlier years. While many empirical studies have illustrated a negative impact of education on inequality, the theoretical relationship remains ambiguous because of two possible conflicting effects: (i) the “composition” effect predicts a u-shape relationship with an increase in educational attainment causing initially higher inequality which then reverses at a certain point as the group of high skilled expands; (ii) the “wage compression” effect lowers the skill premium and income inequality as the relative supply of educated workers increases. Because our variable of education puts a larger weight on basic education, which is more widespread across countries, we expect a negative relationship between education and inequality.

**Trade Openness** is captured by the sum of exports and imports over GDP. The standard Stolper-Samuelson theorem predicts that trade openness would affect income distribution

<sup>12</sup> Because many factors such as education and access to finance tend to also have a long-run effect on income inequality, our estimations only capture the short-run effect and should therefore be considered as lower bound estimates.



differently depending on countries' relative factor endowments. Developed countries, with their relatively larger endowment in capital, would experience a rise in the relative return to capital and greater income inequality. In contrast, developing countries, with larger endowment in labor, would experience lower income inequality. The empirical literature has however been inconclusive, leading to various extensions of the theoretical predictions.

**Technological Progress** measured by the share of information technology capital in the total capital stock is a proxy for skill-biased technological progress (Jorgenson and Vu, 2011). The majority of the literature considers advances in technology to lead to higher inequality. This is based on the notion of skill-biased technological change, where innovations increase the returns to education and/or replace unskilled labor (Autor *et al.*, 2003). However, it has been pointed out that this channel cannot account for other dimensions of inequality, such as gender and racial gaps (Card and DiNardo, 2002).

**Financial Openness** is measured by the sum of assets and liabilities from the International Investment Position (IIP) data over GDP. Basic theory suggests a similar effect to that of trade in the Heckscher Ohlin model, with advanced countries experiencing higher inequality and developed countries an equalizing effect. However, low-skill intensive outward FDI could at the same time be high-skill intensive for the developing country, causing higher inequality instead (Lee and Vivarelli, 2006).

**Financial Deepening** is captured by domestic credit to private sector as a share of GDP. Various theories explaining the link between financial development and inequality have been put forward. On the one hand, financial services can expand at the extensive margin increasing inclusion of marginalized groups, and allowing them to invest more adequately in human and physical capital. This would tend to reduce inequality (Banerjee and Newman, 1993). On the other hand, financial deepening could transpire at the intensive margin, expanding financial services for those who already enjoy access. As these tend to be established firms and high-income individuals it would worsen income inequality (Claessens and Perotti, 2007).

**Fiscal Policy** captured by government consumption over GDP as a first approximation in the baseline regressions is expected to lower income inequality if well targeted. The composition of fiscal policy determines much of its effect on income inequality (see section 6). While spending on health, education, infrastructure investment, and social insurance provision should decrease inequality, it crucially depends on its coverage and targeting (Rhee *et al.*, 2014). Furthermore, second round effects may exist, offsetting the equalizing effect through higher market inequality. Greater progressivity in taxation is expected to lower inequality. Direct taxes (e.g., personal income tax, and to a lesser extent corporate income tax) are found to equalize the income distribution, while indirect taxes (including consumption taxes and custom duties) tend to increase inequality.

**Inflation.** Inflation (measured by changes in consumer price index) tends to be more detrimental to the poor through various channels. First, wages have been thought to lag inflation, thereby shifting income from wage earners to profits and increasing inequality. Additionally, as the fraction of household wealth held in liquid assets, such as currency, decreases with income and wealth, inflation tends to cause a wealth transfer from the poorest to the richest thereby increasing inequality.

**Democratic Accountability.** This variable from the International Country Risk Group dataset captures how responsive government is to its people with a higher score given to greater responsiveness. Standard models see an equalizing effect in increased democratization, as the

median voter shifts towards the poorer part of the population, increasing redistribution through taxes or public goods (Acemoglu *et al.*, 2012). However, it has been recognized that democracy alone might not be enough to decrease inequality as elites can still capture the political system through various mechanisms (Acemoglu *et al.*, 2013).

**Economic Growth.** The main channel from growth to inequality is described by the Kuznets curve (Kuznets, 1955) and is thought to follow an inverted u-shape relationship. Throughout the development process, inequality first increases and then decreases as the population moves from the traditional to the modern sector. The existing evidence on the Kuznets hypothesis is, at best, inconclusive (Barro 2008).

## 6. RESULTS

We use a three-pronged approach in analyzing and presenting our results. First, we discuss results from our baseline model, which relates various measures of inequality to the most common determinants identified in the literature. Second, because Asia is the focus of this study, we investigate and discuss the extent to which the drivers, particularly the effect of policies, differ in Asia compared to other regions. Third, we further zoom in on each policy issue separately, and use more granular data to assess the way in which that policy affects inequality in Asia. We focus on one policy area at a time to reduce the risk of collinearity while preserving an adequate number of variables and observations for each of our estimations.

### 6.1. Baseline

Results from the baseline regressions are broadly in line with findings in the empirical literature (Table 1). Focusing on the net Gini, our main measure of income inequality, we confirm most of our priors in section 5. In particular, the results highlight that a higher level of human capital and trade openness are associated with lower income inequality (Table 1, column 1). Financial openness and financial sector deepening seem to aggravate inequality. The latter result, which is more robust, is consistent with recent empirical findings (Dabla-Norris *et al.*, 2015a), suggesting that financial sector deepening mainly benefits higher-income groups and high-skilled sectors that already enjoy access to financial services. Government consumption is associated with lower income inequality, as expected. By allowing a transfer of wealth from the poorest to the richest, inflation is associated with higher income inequality while the presence of a government accountable to its people (democratic accountability) is associated with lower income inequality.

Recognizing the methodological shortcomings of the Gini coefficient, we also use alternative measures of income inequality such as the income share of the bottom 10 percent and the income share of the top 10 percent (Table 1, columns 4 and 5) to confirm some of our previous findings. Using the Palma ratio, which is less sensitive to changes in the middle of the distribution, confirms our findings regarding the role of human capital, trade openness, financial opening and deepening as well as inflation in explaining income inequality. In addition, a number of potential drivers turned significant. Growth appears to be equalizing with higher per capita GDP growth being accompanied by lower inequality, consistent with the recent literature. This finding holds for our global sample, however, after 1990, growth in Asia was not accompanied by improving income distribution.<sup>13</sup> As expected, technological progress is associated with higher inequality, most likely reflecting the fact that it tends to disproportionately benefit the relatively more skilled and more privileged.

<sup>13</sup> In Table 2 on Asia-specific drivers, when growth is interacted with the Asia dummy, the coefficient turned positive although not significant. Our main results are robust when growth is replaced with the log of GDP per capita and its squared term.

Fiscal policy and technological progress seem to have been the most important drivers of income inequality in advanced economies, while financial deepening and human capital have been the instrumental drivers in developing economies (Appendix A Table A1). To illustrate this, the cut in government consumption by 1.4 percentage points of GDP observed between 1992 and 2011 for advanced economies in our sample has been associated with an increase of about one third of a net Gini point. During the same period, financial deepening, captured by growth of domestic credit to the private sector of 16 percentage points of GDP, has been associated with an increase by about one Gini point in developing countries.<sup>14</sup>

**Table 1.**  
Drivers of Inequality (Baseline)

Explanatory variables	Dependent variables:				
	Net Gini	Market Gini	Palma ratio (top 10% to bottom 40%)	Bottom 10% income share	Top 10% income share
	(1)	(2)	(3)	(4)	(5)
Growth, $t - 1$	0.023 (1.248)	0.026 (0.840)	-0.010* (-1.891)	0.010* (1.887)	-0.016 (-0.650)
Human Capital, $t - 1$	-0.042*** (-5.951)	-0.002 (-0.269)	-0.010*** (-5.407)	-0.001 (-0.355)	-0.000 (-0.033)
Trade Openness, $t - 1$	-0.006* (-1.786)	-0.003 (-0.816)	-0.003** (-2.121)	-0.002* (-1.689)	-0.009 (-1.414)
Financial Openness, $t - 1$	0.002* (1.727)	0.003*** (2.713)	0.001*** (3.084)	0.000 (0.578)	0.003** (2.483)
Financial Deepening, $t - 1$	0.017*** (7.797)	0.023*** (5.266)	0.003*** (2.923)	-0.000 (-0.062)	0.008* (1.676)
Technology, $t - 1$	-0.000 (-0.001)	0.103 (0.752)	0.067* (1.735)	0.022 (0.810)	0.198 (1.458)
Gov. Consumption, $t - 1$	-0.080* (-1.885)	0.031 (0.750)	-0.001 (-0.083)	-0.001 (-0.053)	0.061 (0.904)
Inflation, $t - 1$	0.006** (2.542)	-0.001 (-0.312)	0.000** (2.089)	-0.001*** (-3.188)	0.004** (2.305)
Democratic accountability, $t - 1$	-0.002* (-1.763)	-0.004*** (-2.884)	0.000 (0.214)	-0.000 (-1.397)	0.001 (0.878)
Observations	990	990	635	635	635
Number of countries	82	82	81	81	81
Time fixed effects	YES	YES	YES	YES	YES

Driscoll-Kraay robust  $t$ -statistics in parentheses. They are robust to very general forms of cross-sectional and temporal dependence. Country fixed effects, time fixed effects and a constant term are included in each regression but are not reported.

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

<sup>14</sup> When splitting the sample between advanced and developing economies, we also find evidence of a Kuznets curve for developing economies and an inverse curve for advanced economies. The inverted Kuznets curve in advanced economies is explained by the fact that greatest income growth occurs to the highest income sectors (technology and finance) during boom periods.

## 6.2. Is Asia Different?

This section investigates whether the drivers of inequality in Asia differ from other regions, with a focus on policy variables. As such, the section augments the baseline regressions with various interaction terms by combining key policy variables with Asia dummies as illustrated below:

$$Inequal_{it} = \delta X_{it-1} + \gamma_{Asia} * Z_{it-1} + \mu_i + \theta_t + \varepsilon_{it}$$

Where all variables are defined as above and  $Z_{it-1}$  refers to human capital, financial deepening, and government consumption.

Although not significant for most variables, the interaction terms with Asian dummies yield a change in the sign of the respective coefficients (Table 2). This suggests that there may exist specific aspects of human capital formation, financial deepening, and fiscal policy that differently explain inequality in Asia compared to other regions. This warrants further investigation.

**Table 2.**  
Drivers of Inequality (Asia Specificity)

Explanatory variables	Dependent variable: Net Gini
Growth, $t - 1$	0.024 (1.045)
Human Capital, $t - 1$	-0.045*** (-5.983)
Human Capital*Asia, $t - 1$	0.002 (0.078)
Trade Openness, $t - 1$	-0.013** (-2.396)
Financial Openness, $t - 1$	0.001 (0.856)
Financial Deepening, $t - 1$	0.011*** (4.522)
Financial Deepening*Asia, $t - 1$	-0.015* (-1.784)
Technology, $t - 1$	-0.093 (-1.513)
Gov. Consumption, $t - 1$	-0.199*** (-3.510)
Gov. Consumption*Asia, $t - 1$	0.14 (1.210)
Inflation, $t - 1$	0.007*** (4.023)
Democratic accountability, $t - 1$	-0.002 (-1.471)
Share of employment in Industry	-0.190*** (-4.828)
Share of employment in Services	0.109*** (5.017)
Observations	848
Number of groups	78
Time fixed effects	YES

Driscoll-Kraay robust  $t$ -statistics in parentheses. They are robust to very general forms of cross-sectional and temporal dependence. Country fixed effects, time fixed effects and a constant term are included in each regression but are not reported.

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

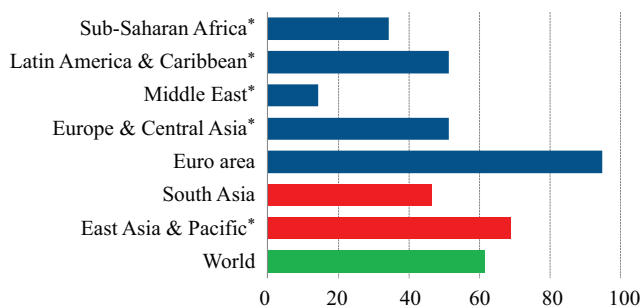
Because many Asian economies experienced sizable structural transformation during the recent decades, we also control for the share of employment in industry and services to capture potential shifts from agriculture to industry and services. These shifts may initially benefit a small segment of the population, leading to higher inequality. However, inequality would subsequently decline as a larger share of the population finds employment in the higher income sectors. Our main results are robust to these additional factors. In addition, a larger share of employment in industry is associated with a decline in income inequality while higher employment in services is associated with higher income inequality. The latter result is probably driven by the rapid growth in the service sector in high-income and upper-middle income nations, moving employment out of the industrial sector. In these countries, the service sector tends to have larger skill premia due to its high duality encompassing lawyers and airline pilots, but also barbers and janitors (Firebaugh, 2003).

**Financial Deepening.** While financial deepening has been associated with higher inequality overall, it has been equalizing in Asia (Table 2).<sup>15</sup> This reflects not only better availability of credit in Asia during the last decade, but also successful policies of financial inclusion that have reached the lower end of the income distribution with an increased geographical outreach. In particular, financial inclusion policies seem to have played an important role for three ASEAN countries in achieving a decline in inequality (Malaysia, Philippines and Thailand). For instance, in Thailand, the number of commercial bank branches per 1,000 square kilometers increased by 50 percent between 2004 and 2012 while the number of automated teller machines (ATMs) per 1,000 square kilometers quadrupled during the same period (Terada and Vandenberg, 2014). Figure 13 and Figure 14 illustrate clearly the good performance of Asian economies when it comes to financial inclusion, such as the greater use of banks accounts or access to credit for entrepreneurial activities.

**Figure 13.**

**Population with Account**

(In percent of total 15+ population ; year of 2014)



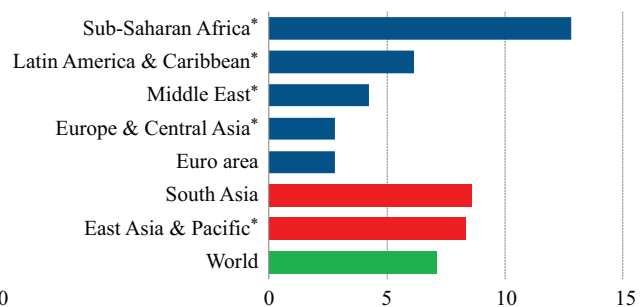
\* Includes only developing countries in each group.

Source: World Bank, Global Findex database.

**Figure 14.**

**Access to Credit for Entrepreneurial Activities**

(Borrow to start, operate, or expand a farm or business; In percent of total 15+ population ; year of 2014)



\* Includes only developing countries in each group.

Source: World Bank, Global Findex database.

**Fiscal Policy.** Using government consumption as a proxy for fiscal policy may not fully capture governments' distributional policies. The empirical literature has also emphasized that what matters more for the distributional impact of fiscal policy is its composition (Clements et al., 2015). In that respect, this section assesses the impact of fiscal policy on income inequality by analyzing the specific role of various tax and expenditure instruments.

<sup>15</sup> An equalizing effect of financial deepening has also been found for India across states (Anand et al., 2014).

The results illustrate that a number of tax and spending instruments are associated with lower income inequality. Progressive taxation, measured by the top corporate tax rate and the top personal tax rate, is associated with lower income inequality (Table 3).<sup>16</sup> Higher social spending (which includes social security pensions and unemployment compensation), education spending, and capital spending are associated with lower income inequality. These negative and significant effects reflect the possible combination of two channels. First, higher social spending such as direct transfers increase the income of the poor through redistribution. Second, higher social, education, and capital spending tend to promote better access for the poor to education and health care, thereby having an equalizing effect.

**Table 3.**  
Drivers of Inequality (Fiscal Policy)

Explanatory variables	Dependent variable: Net Gini	
	(1)	(2)
Top Corporate tax rate, $t - 1$	-0.066*** (-3.541)	-0.065*** (-3.464)
Top Personal tax rate, $t - 1$	-0.053* (-1.785)	-0.048 (-1.481)
Health Spending, $t - 1$	0.239 (1.111)	0.244 (1.190)
Education Spending, $t - 1$	-0.385** (-2.481)	-0.453** (-2.472)
Social Benefits, $t - 1$	-0.193*** (-5.889)	-0.243*** (-6.810)
Capital Spending, $t - 1$	-0.162** (-2.118)	-0.228*** (-2.909)
Top Corporate tax rate*Asia, $t - 1$		-0.017 (-0.358)
Top Personal tax rate*Asia, $t - 1$		0.015 (0.482)
Health Spending*Asia, $t - 1$		-0.446 (-0.947)
Education Spending*Asia, $t - 1$		0.943* (1.968)
Social Benefits*Asia, $t - 1$		0.680*** (3.890)
Capital Spending*Asia, $t - 1$		0.399** (2.642)
Observations	519	519
Number of countries	56	56
Time fixed effects	YES	YES

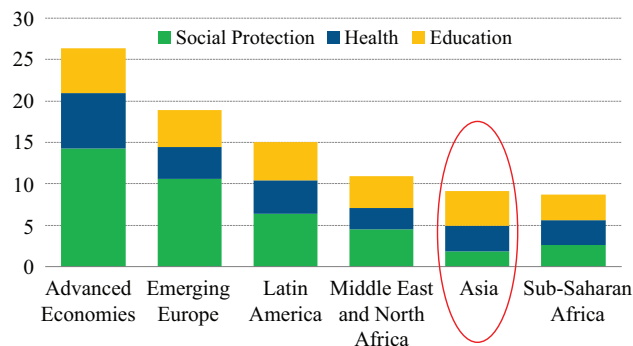
Driscoll-Kraay robust  $t$ -statistics in parentheses. They are robust to very general forms of cross-sectional and temporal dependence. Country fixed effects, time fixed effects and a constant term are included in each regression but are not reported.

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

<sup>16</sup> Comparable results (available upon request) are found when progressivity is measured as the ratio of direct to indirect taxes.

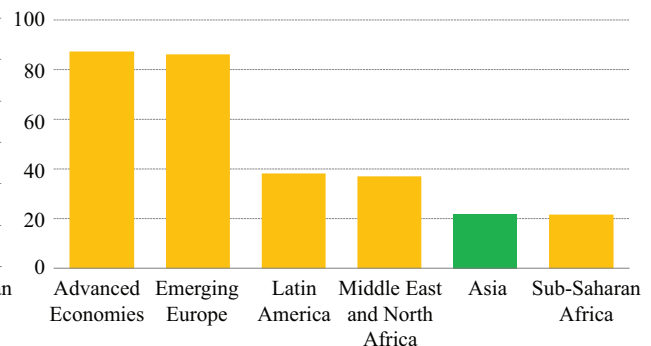
Turning to Asia, it appears that low and poorly targeted policies may have prevented Asian economies from benefitting in terms of equalizing expenditure policies. Indeed, while education, social benefits, and capital spending seem all to have been equalizing in the rest of the sample, they have contributed to higher income inequality in Asia.<sup>17</sup> This could be due to lower coverage of government spending, which may disproportionately benefit the rich in Asia (Figure 15). More generally, social spending is relatively low in Asia (as was found in IMF, 2013), reflecting the lower revenue collection, and this has led to lower coverage of social spending such as social insurance. At only 22 percent, the percent of the population above the legal retirement age and receiving a pension in Asia is about four times lower than the level in advanced economies or Emerging Europe but also much lower than the level in the Middle East or Latin America (Figure 16). Coverage of unemployment benefits is also low in Asia and represents only half of the coverage in other regions. In addition to low coverage, social benefits seem also unequally distributed in Asia.

**Figure 15.**  
Composition of Social Spending  
(In percent of GDP; year of 2010 or latest)



Sources: OECD; Eurostat; ADB; IMF WEO; UN; WHO; World Bank; and authors' calculations.

**Figure 16.**  
Pension Receipt Rate  
(In percent of total population above legal retirement age)



Sources: ILO (2009); Eurostat (2009); World Bank (2009); and authors' calculations.

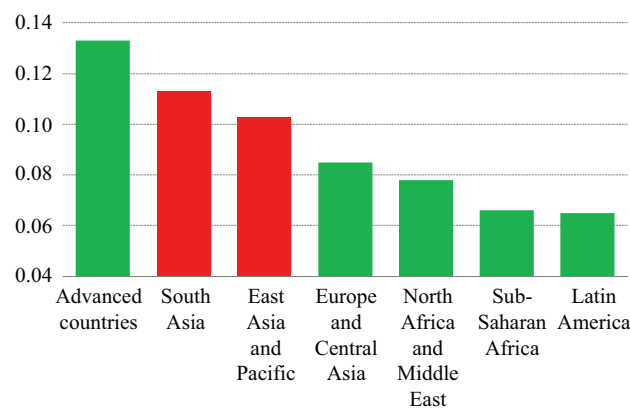
**Human Capital.** To further analyze the importance of education as a driver of income inequality, we specifically investigate the role of skill premium, identified in the literature as a key driver of income inequality.<sup>18</sup> Skill premium is associated with higher inequality overall, reflecting that gains from education have disproportionately benefitted the higher end of the income distribution (Appendix A Table A2). Skill premia seem to have played a greater role in explaining inequality in Asia. Indeed, the contribution of skill premia to higher inequality seems to have been three times larger in Asia than elsewhere. This has also been confirmed by Barro and Lee (2010), who find that Asian countries have the highest returns to schooling after advanced countries. Looking at various levels of education, primary schooling is associated with lower inequality overall but does not seem to impact inequality in Asia, reflecting the importance of broadening higher education to compress skill premia. Higher-level education (tertiary education) is associated with greater income inequality, supporting again the existence of a skill premium for the relatively limited highly skilled labor force.

<sup>17</sup> A similar finding has been made for China in particular (Cevik and Correa-Caro, 2015).

<sup>18</sup> The skill premium is calculated using the Occupational Wages around the World Database, which is based on ILO data. It reports occupational wages for 161 occupations in 171 countries. We take the ratio of the highest to the lowest reported wage as an approximation of the skill premium.

**Figure 17.**

Regional Comparison: Return to Schooling Rate



Source: Barro and Lee (2010).

**Demographics and Labor Market Institutions.** We further assess the robustness of our results to various factors such as (i) demographics, an important element for many Asian economies facing aging pressures, and (ii) labor market institutions that have recently been identified as key drivers of income inequality (Dabla-Norris *et al.*, 2015a; Jaumotte and Osorio Buitron, 2015). Our main results are robust after controlling for these factors. In addition, we find that higher union density is associated with lower income inequality (Appendix A Table A2). A larger share of dependents (below 15 and over 64) over the working age population is associated with higher income inequality while a higher gross replacement ratio is associated with lower income inequality.

## 7. CONCLUSION

This paper has documented the rise in income inequality in most of Asia, in contrast to most other regions. Global factors, such as skill-biased technological change, have had a role to play. However, regional and country-specific factors are also important. In some of the larger countries, spatial disparities, in particular between rural and urban areas, explain much of the increase in income inequality. While Asia has grown rapidly and poverty has been alleviated significantly, higher income inequality has lowered the effectiveness of growth to combat poverty and prevented the building of a substantial middle-class in many countries.

Our findings also suggest that in some respects, the drivers are different in Asia, and these drivers relate to policies. Financial deepening has been equalizing in Asia, in contrast to other regions. On the other hand, higher social sector spending, education spending, and capital expenditure, are associated with higher income inequality in Asia (contrary to the rest of the world), due to weak coverage and the benefits disproportionately accruing to those at the higher end of the income distribution. In addition, in line with the rest of world, greater progressivity in taxation ameliorates income inequality in Asia.

These findings, therefore, suggest that policies could have a substantial effect on reversing the trend of rising inequality. It is imperative to address inequality of opportunities, in particular to broaden access to education, health, and financial services. We focus below on the following policies: strengthening the redistributive effect of fiscal policy, promoting well-designed financial inclusion, and tackling labor market duality and informality.

Although taxes are primarily aimed at collecting revenue to finance redistributive transfers, improving their progressivity and reducing exemptions and preferential rates would help improve



their efficiency and contribute to increasing equity. Expanding and broadening the coverage of social spending is critical. This includes improving low-income families' access to higher education and adequate health services as well as a better targeting of social benefits, which can also finance an expansion of their coverage.

While lower tax and spending levels and higher reliance on indirect taxes limit the extent of fiscal redistribution in developing economies, including developing Asia, fiscal policy can still play an important role in lowering inequality. On the tax side, broadening the tax base for income and consumption taxes while increasing their progressivity is important. Tax compliance also needs to be improved to support effective collection. On the spending side, designing well-targeted transfer programs while avoiding costly universal price subsidy schemes is key. For instance, as administrative capacity improves, conditional cash transfers could be expanded in many countries including Bangladesh, Cambodia, India, Indonesia, Nepal, and the Philippines.

Asia has fared relatively well in boosting financial access among all segments of the population. More can be done to build on this success, as even now, the access to financial services of the bottom 40 percent of the population remains limited. Enabling firms to access credit, increasing the number of households with bank accounts, and using bank accounts to receive government transfers and wages are beneficial. However, policies to foster financial inclusion have to be designed carefully being mindful of the implications for financial stability, and be accompanied by upgrades to bank supervision.

Reducing labor market duality and informality, while putting in place well-designed labor market policies to boost job creation, can reduce income inequality. In high-income Asian countries efforts to reduce labor market duality should be accelerated, in particular addressing gaps in legal protection for regular and non-regular workers, and by encouraging new hiring to take place under contracts that balance job security and flexibility. In low- and middle-income countries, policies to reduce informality could lead to more inclusive growth. Measures to improve the overall business environment, to simplify business registration and reduce red tape, as well as providing incentives to facilitate registration and legal recognition, would be helpful in reducing the incentives to remain in the informal sector.

## APPENDIX

## Appendix A: Regression Results for Inequality

Table A1.

Drivers of Inequality

(Advanced vs. Developing Economies)

Explanatory variables	Dependent variable: Net Gini	
	Advanced economies	Developing economies
	(1)	(2)
Log(GDP per capita)	-0.375*** (-4.948)	0.247*** (6.110)
Squared Log(GDP per capita)	0.020*** (4.697)	-0.015*** (-7.134)
Human Capital, $t - 1$	-0.006 (-0.953)	-0.048** (-2.176)
Trade Openness, $t - 1$	-0.010** (-2.536)	-0.017** (-2.055)
Financial Openness, $t - 1$	-0.002 (-1.655)	0.023 (1.643)
Financial Deepening, $t - 1$	0.003 (0.824)	0.054*** (4.289)
Technology, $t - 1$	0.201* (1.915)	0.158 (1.135)
Gov. Consumption, $t - 1$	-0.240*** (-6.330)	-0.054 (-1.074)
Inflation, $t - 1$	-0.039 (-1.252)	-0.000 (-0.305)
Democratic accountability, $t - 1$	0.003 (1.512)	-0.003** (-2.412)
Observations	472	534
Number of countries	31	51
Time fixed effects	YES	YES

Driscoll-Kraay robust  $t$ -statistics in parentheses. They are robust to very general forms of cross-sectional and temporal dependence. Country fixed effects, time fixed effects and a constant term are included in each regression but are not reported.

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

**Table A2.**  
Drivers of Inequality  
(Human Capital, Demographics, and Labor Market Institutions)

VARIABLES	Dependent variables: Net Gini				
	Human Capital	Demographic and Labor Market Institutions			
	(1)	(2)	(3)	(4)	(5)
Skill Premium, $t - 1$	0.007* (1.982)				
Skill Premium*Asia, $t - 1$	0.022*** (2.998)				
Primary school completion, $t - 1$	-0.140*** (-4.139)				
Primary school compl.*Asia, $t - 1$	0.141* (1.787)				
Secondary school enrollment, $t - 1$	-0.006 (-0.180)				
Secondary school enrol.*Asia, $t - 1$	-0.074 (-0.948)				
Tertiary school enrollment, $t - 1$	0.090* (1.989)				
Tertiary school enrol.*Asia, $t - 1$	-0.032 (-1.130)				
Minimum Wage to Mean Wage, $t - 1$		0.004 (0.802)			
Gross replacement rate, $t - 1$			-0.070*** (-4.474)		
Union density, $t - 1$				-0.030** (-2.278)	
Age dependency ratio, $t - 1$					0.002*** (7.527)
Observations	232	388	521	600	990
Number of groups	42	49	66	55	82
Time dummies	YES	YES	YES	YES	YES

*t*-statistics in parentheses.

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

## Appendix B: Robustness Checks of the Baseline Regression

A first robustness check (Table B1) accounts for the nature of the SWIID data being based on imputed values. The regression is a standard OLS regression without Driscoll-Kraay correction as the two commands cannot be combined. The regression is performed repeatedly using multiple Monte Carlo simulations and results are averaged. The results for the Net Gini support the previous findings. The three estimates with the highest significance remain significant. Those coefficients that were significant at the 10 percent level lose this significance.

A second robustness check (Table B1) is obtained by applying difference GMM, which also accounts for the persistence of the Gini. Due to high serial correlation we instrument with lags four and above. The same three variables remain significant. Additionally, technology is found to increase the net Gini.

**Table B1.**

Robustness Checks Using Multiple Monte Carlo Simulations and Difference GMM

Explanatory variables	Dependent variables:	
	Net Gini, Monte Carlo Simulation	Net Gini, Difference GMM
	(1)	(2)
Growth	0.023 (0.893)	0.021 (1.487)
Human Capital	-0.042*** (-2.638)	-0.017* (-1.817)
Trade Openness	-0.006 (-0.708)	-0.002 (-0.550)
Financial Openness	0.002 (0.912)	0.000 (0.292)
Financial Deepening	0.017*** (4.484)	0.004* (1.710)
Technology	-0.000 (-0.000)	0.138* (1.955)
Gov. Consumption	-0.080 (-1.213)	-0.024 (-0.772)
Inflation	0.006** (2.402)	0.009*** (4.198)
Democratic accountability	-0.002 (-1.443)	-0.000 (-0.321)
Lag of Gini		0.894*** (28.530)
Observations	990	913
Number of countries	82	82
Time dummies	YES	YES
Sargan Test		0.740
AR(4)		0.936

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

## Appendix C: Definitions and Sources of Variables

This appendix provides the definition and the sources of the main variables used in the econometric analysis.

**Table C1.**  
Data Description

Variable Name	Description	Data Source
<b>Dependent Variables</b>		
Net Gini	Gini index of distribution of income before taxes and transfers	Standardized World Income Inequality Database
Market Gini	Gini index of distribution of income after taxes and transfers	Standardized World Income Inequality Database
Palma Ratio	Share of Top 10% to Bottom 40%	PovcalNet, WIID3.0A
Shares of income	Share of income/consumption accruing to each decile	PovcalNet, WIID3.0A
Labor Share	Compensation of employees divided by GDP	Karabarbounis and Neiman (2014), ILOSTAT
<b>Dependent Variables</b>		
Growth	Real GDP growth	IMF, WEO
Human Capital	See Inklaar and Timmer (2013)	Penn World Table
Trade Openness	Total exports and imports (% of GDP)	IMF, WEO
Financial Openness	Total external assets and liabilities outstanding (% of GDP)	IFS
Financial Deepening	Domestic credit to private sector (% of GDP)	World Bank, WDI
Technology	Share of information and communication technology capital in the total capital stock	Jorgenson, Dale and Khuong Vu (2011)
Government Consumption	General government final consumption expenditure (% of GDP)	World Bank, WDI
Inflation	CPI Inflation	IMF, WEO
Democratic Accountability	Democratic Accountability Index	ICRG
Share of Employment in Sectors	Employment in agriculture/industry (% of total employment)	World Bank, WDI
Fiscal Policy Variables	Government revenue/expense/tax, etc.	IMF WEO, etc.
Skill Premium	Ratio of highest to lowest reported occupational wage	Occupational Wages Around the World Database
Schooling Variables	Completion/Enrollment rate, etc.	World Bank, WDI
Minimum Wage to Mean Wage	Ratio of minimum wage to mean wage	Aleksysnka and Schindler (2011)
Gross Replacement Rate	Ratio of unemployment insurance benefits a worker receives relative to the worker's last gross earning	Aleksysnka and Schindler (2011)
Union Density	Trade union density as % of paid employment	Database on Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts, Trade Union Membership Statistics

## References

- Acemoglu, D., Egorov, G., and Sonin, K., 2012, “Dynamics and stability of constitutions, coalitions and clubs,” *American Economic Review*, 102(4), pp. 1446–1476.
- , and Torvik, R., 2013, “Why Do voters dismantle checks and balances?” *Review of Economic Studies*, 80(3), pp. 845–875.
- , and Restrepo, P., 2018, “Artificial Intelligence, Automation and Work”, NBER Working Paper No. 24196.
- Aleksynska, M., and Schindler, M., 2011, “Labor Market Regulations in Low-, Middle- and High-Income Countries: A New Panel Database,” IMF Working Paper 11/154, International Monetary Fund, Washington.
- Alesina, A., and Rodrik, D., 1994, “Distributive Politics and Economic Growth,” *Quarterly Journal of Economics*, 109(2), pp. 465–90.
- Alvaredo, F., and Gasparini, L., 2015, “Recent Trends in Inequality and Poverty in Developing Countries,” In: Atkinson, A., and Bourguignon, F. (eds), *Handbook of Income Distribution*, Volume 2.
- Anand, R., Tulin, V., and Kumar, N., 2014, “India: Defining and Explaining Inclusive Growth and Poverty Reduction,” IMF Working Paper 14/63, International Monetary Fund, Washington.
- Aoyagi, C., 2015, “Asia’s quest for inclusive growth revisited,” *Journal of Asian Economics*, 40, pp. 29–46.
- Atkinson, A., 2010, Top Incomes in a Rapidly Growing Economy: Singapore; in Atkinson, A. B. and Piketty, T. (editors) *Top Incomes: A Global Perspective*, Oxford University Press, Chapter 5.
- Atkinson, A., 2015, Top incomes in Malaysia 1947 to the present (with a note on the Straits Settlements 1916 to 1921), Technical Notes, World Inequality Lab.
- , and Leigh, Andrew, 2007, The Distribution of Top Incomes in Australia; in Atkinson, A. B. and Piketty, T. (editors) *Top Incomes over the Twentieth Century. A Contrast Between Continental European and English-Speaking Countries*, Oxford University Press, Chapter 7.
- , and Leigh, Andrew, 2007, The Distribution of Top Incomes in New Zealand; in Atkinson, A. B. and Piketty, T. (editors) *Top Incomes over the Twentieth Century. A Contrast Between Continental European and English-Speaking Countries*, Oxford University Press, Chapter 8.
- , 2007, Top Incomes in New Zealand 1921–2005: Understanding the Effects of Marginal Tax Rates, Migration Threat and the Macroeconomy; *Review of Income and Wealth*, 54(2): pp. 149–165.
- Autor, D., Levy, F., and Murnane, R., 2003, “The Skill Content of Recent Technological Change: An Empirical Investigation,” *Quarterly Journal of Economics*, 118, pp. 1279–1333.
- Balakrishnan, R., Steinberg, C., and Syed, M., 2013, “The Elusive Quest for Inclusive Growth: Growth, Poverty, and Inequality in Asia,” IMF Working Paper 13/152, International Monetary Fund, Washington.
- Banerjee, A., and Duflo, E., 2003, “Inequality and Growth: What Can the Data Say?” *Journal of Economic Growth*, 8(3), pp. 267–99.
- Banerjee, A., and Newman, A., 1993, “Occupational choice and the process of development” *Journal of Political Economy*, 101(2), pp. 274–298.
- Banerjee, A., and Piketty, T., 2010, Top Indian Incomes 1922–2000; in Atkinson, A. B. and Piketty, T. (editors) *Top Incomes: A Global Perspective*, Oxford University Press, Chapter 1.
- Barro, R., 2000, “Inequality and Growth in a Panel of Countries,” *Journal of Economic Growth*, 5(1), pp. 5–32.
- , 2008, “Inequality and Growth Revisited,” Asian Development Bank Working Paper Series on Regional Economic Integration, No. 11.
- , and Lee, J., 2010, “A New Data Set of Educational Attainment in the World, 1950–2010,” working paper, April 2010.
- , and Lee, J., 2013, “A New Data Set of Educational Attainment in the World, 1950–2010,” *Journal of Development Economics*, 104, pp. 184–198.
- Berg, A., and Ostry, J., 2011, “Inequality and Unsustainable Growth: Two Sides of the Same Coin?” IMF Staff Discussion Note 11/08, International Monetary Fund, Washington.
- , Ostry, J., Tsangarides, C., and Yakhshilikov, 2018a, “Redistribution, inequality, and growth: new evidence”, *Journal of Economic Growth*, 23:259–305.
- , Buffie, E., and Zanna, L., 2018b, “Should We Fear the Robot Revolution? (The Correct Answer is Yes)”, IMF Working Paper 18/116, International Monetary Fund.
- Brueckner, M., and Lederman, D., 2018, “Inequality and Economic Growth: The Role of Initial Income”, *Journal of Economic Growth*, 23: 341.
- Cain, J., Hasan, R., Magsombol, R., and Tandon, A., 2014, “Accounting for inequality in India,” In: Kanbur, R., Rhee, C. and Zhuang, J. (eds), *Inequality in Asia and the Pacific: Trends, Drivers and Policy Implications*, Routledge: London.
- Card, D., and DiNardo, J., 2002, “Skill-Biased Technological Change and Rising Wage Inequality: Some Problems and Puzzles,” *Journal of Labor Economics*, 20(4), pp. 733–783.
- Cevik, S., and Correa-Caro, C., 2015, “Growing (Un)equal: Fiscal Policy and Income Inequality in China and BRIC+,” IMF Working Paper 15/68, International Monetary Fund, Washington.

- Chongvilaivan, A., 2014, “Inequality in Southeast Asia,” In: Kanbur, R., Rhee, C. and Zhuang, J. (eds), *Inequality in Asia and the Pacific: Trends, Drivers and Policy Implications*, Routledge: London.
- Claessens, S., and Perotti, E., 2007, “Finance and inequality: Channels and evidence,” *Journal of Comparative Economics*, 35, pp. 748–773.
- Claus, I., Martinez-Vazquez, J., and Vulovic, V., 2014, “Government fiscal policies and redistribution in Asian countries,” In: Kanbur, R., Rhee, C. and Zhuang, J. (eds), *Inequality in Asia and the Pacific: Trends, Drivers and Policy Implications*, Routledge: London.
- Clements, B., Gaspar, V., Gupta, S., and Kinda, T., 2015, “The IMF and Income Distribution,” In: *Fiscal Policy and Inequality*, International Monetary Fund.
- Cobham, A., and Sumner, A., 2013, “Putting the Gini back in the bottle? The Palma as a policy-relevant measure of inequality,” Working Paper.
- Dabla-Norris, E., Kochhar, K., Ricka, F., Suphaphiphat, N., and Tsounta, E., 2015a, “Causes and Consequences of Income Inequality: A Global Perspective” IMF Staff Discussion Note 15/13, International Monetary Fund, Washington.
- Di Gropello, E., and Sakellariou, C., 2010, “Industry and Skill Wage Premiums in East Asia,” Policy Research Working Paper Series 5379, World Bank, Washington, DC.
- Easterly, W., 2007, “Inequality Does Cause Underdevelopment: Insights from a New Instrument,” *Journal of Development Economics*, 84(2), pp. 755–76.
- Facundo A., Atkinson, A., Piketty, T., Saez, E., and Zucman, G., WID – The World Wealth and Income Database, <http://www.wid.world/>
- Feenstra, R., Inklaar, R., and Timmer, M., 2015, “The Next Generation of the Penn World Table,” *American Economic Review*, 105(10), pp. 3150–3182
- Firebaugh, G., 2003, “The New Geography of Global Income Inequality,” Harvard University Press.
- Freeman, R., and Oostendrop, R., Occupational Wages Around the World Database, <http://www.nber.org/oww/>.
- Gabriel Palma, J., 2006, “Globalizing inequality: ‘Centrifugal’ and ‘centripetal’ forces at work,” DESA Working Paper 35, New York: UN Department of Economic and Social Affairs.
- , 2011, “Homogeneous Middles vs. Heterogeneous Tails, and the End of the ‘Inverted-U’: It’s All About the Share of the Rich,” *Development and Change*, 42(1), pp. 87–153.
- Galor, O., and Moav, O., 2004, “From Physical to Human Capital Accumulation: Inequality and the Process of Development,” *Review of Economic Studies*, 71(4), pp. 1001–1026.
- , Moav, O., and Vollrath, D., 2009, “Inequality in Landownership, the Emergence of Human-Capital Promoting Institutions, and the Great Divergence,” *Review of Economic Studies*, 76(1), pp. 143–179.
- Guellec, D., and Paunov C., 2017, “Digital Innovation and the Distribution of Income”, *NBER Working Paper No.23987*.
- Hassler, J., Mora, V., and Zeira, J., 2007, “Inequality and Mobility”, *Journal of Economic Growth*, 12(3), pp. 235–259. Health Equity Monitor Database, [http://www.who.int/gho/health\\_equity/en/](http://www.who.int/gho/health_equity/en/).
- Hsieh, C., and Woo, K., 2005, “The Impact of Outsourcing to China on Hong Kong’s Labor Market,” *American Economic Review*, 95(5), pp. 1673–1687.
- IMF, 2013, “Asia and Pacific – Shifting Risks, New Foundations for Growth,” *Regional Economic Outlook*, Washington.
- International Labour Office, 2013, ILOSTAT Database (Geneva).
- , Women and men in the informal economy, [http://laborsta.ilo.org/informal\\_economy\\_E.html](http://laborsta.ilo.org/informal_economy_E.html)
- Jain-Chandra, S., Khor, N., Mano, R., Schauer, J., Wingender, P., and Zhuang, J., “Inequality in China – Trends, Drivers and Policy Remedies”, IMF Working Paper 18/127, International Monetary Fund.
- Jaumotte, F., Lall, S., and Papageorgiou, C., 2013, “Rising Income Inequality: Technology, or Trade and Financial Globalization?” *IMF Economic Review*, 61(2), pp. 271–309.
- , and Osorio Butiron, C., 2015, “Inequality and Labor Market Institutions,” IMF Staff Discussion Note 15/14, International Monetary Fund, Washington.
- Jorgenson, D., and Vu, K., 2011, “Information Technology and the World Growth Resurgence,” *German Economic Review*, 8(2), pp. 125–145.
- Kanbur, R., and Zhuang, J., 2014, “Urbanization and inequality in Asia,” In: Kanbur, R., Rhee, C. and Zhuang, J. (eds), *Inequality in Asia and the Pacific: Trends, Drivers and Policy Implications*, Routledge: London.
- Kumhof, M., Rancière, R., and Winant, P., 2015, “Inequality, Leverage, and Crises.” *American Economic Review*. 105(3), pp. 1217–1245.
- Kuznets, S., 1955, “Economic Growth and Income Inequality,” *American Economic Review*, 45(1), pp. 1–28.
- Lee, E., and Vivarelli, M., 2006, “Understanding Globalization, Employment and Poverty Reduction,” Palgrave, Houndmills.
- Leigh, A., and van der Eng, P., 2010, Top Incomes in Indonesia 1920–2004; in Atkinson, A. B. and Piketty, T. (editors) *Top Incomes: A Global Perspective*, Oxford University Press, Chapter 4.

- Li, H., Squire, L., and Zou, H., 1998, “Explaining international and intertemporal variations in income inequality,” *The Economic Journal*, 108, pp. 26–34.
- Li, S., Wan, G., and Zhuang, J., 2014, “Income inequality and redistributive policy in the People’s Republic of China,” In: Kanbur, R., Rhee, C. and Zhuang, J. (eds), *Inequality in Asia and the Pacific: Trends, Drivers and Policy Implications*, Routledge: London.
- Mehta, A., Felipe, J., Quising, P., and Camingue, S., 2013, “Where have All the Educated Workers Gone? Services and Wage Inequality in Three Asian Economies,” *Metroeconomica*, 64(3), pp. 466–497.
- Milanovic, B., 2005, “Can We Discern the Effect of Globalization on Income Distribution? Evidence from Household Surveys,” *The World Bank Economic Review*, 19(1), pp. 21–44.
- Moriguchi, C., and Saez, E., 2010, The Evolution of Income Concentration in Japan 1886-2005; in Atkinson, A. B. and Piketty, T. (editors) *Top Incomes: A Global Perspective*, Oxford University Press, Chapter 3, pp. 76–170.
- OECD, 2011, “Divided We Stand: Why Inequality Keeps Rising,” OECD Publishing, Paris. <http://dx.doi.org/10.1787/9789264119536-en>
- Piketty, T., Yang, L., and Zucman, G., 2017, “Capital Accumulation, Private Property and Rising Inequality in China, 1978–2015”, NBER Working Paper No. 23368.
- PovcalNet: the on-line tool for poverty measurement developed by the Development Research Group of the World Bank, <http://iresearch.worldbank.org/PovcalNet/>.
- Rhee, C., Zhuang, J., Kanbur, R., and Felipe, J., 2014, “Confronting Asia’s rising inequality: policy options,” In: Kanbur, R., Rhee, C. and Zhuang, J. (eds), *Inequality in Asia and the Pacific: Trends, Drivers and Policy Implications*, Routledge: London.
- Seneviratne, D., and Sun, Y., 2013, “Infrastructure and Income Distribution in ASEAN-5: What are the Links?” IMF Working Paper 13/41, International Monetary Fund, Washington.
- Solt, F., 2009, “Standardizing the World Income Inequality Database,” *Social Science Quarterly*, 90(2), pp. 231–42.
- Solt, F., 2014, “The Standardized World Income Inequality Database.” Working paper. SWIID Version 5.0, October 2014.
- Stiglitz, J. 2012. *The Price of Inequality: How Today’s Divided Society Endangers Our Future*. New York: W.W. Norton.
- Stolper, W.F., and Samuelson, P.A., 1941, “Protection and Real Wages,” *Review of Economic Studies*, 9(1), pp. 58–73.
- Terada, Y., and Vandenberg, P., 2014, “Thailand’s State-Led Approach to Financial Inclusion” In: Financial Inclusion in Asia Country Surveys, Asian Development Bank Institute.
- UNU-WIDER, “World Income Inequality Database (WIID3.0A)”, June 2014, [http://www.wider.unu.edu/research/WIID-3a/en\\_GB/database/](http://www.wider.unu.edu/research/WIID-3a/en_GB/database/).
- Woo, J., Bova, E., Kinda, T., Zhang, Y., 2013, “Distributional Consequences of Fiscal Consolidation and the Role of Fiscal Policy: What Do the Data Say?,” IMF Working Paper 13/195, International Monetary Fund, Washington.
- World Inequality Database on Education, <http://www.education-inequalities.org/>.
- Zhuang, J., Kanbur, R., and Rhee, C., 2014, “What drives Asia’s rising inequality?” In: Kanbur, R., Rhee, C. and Zhuang, J. (eds), *Inequality in Asia and the Pacific: Trends, Drivers and Policy Implications*, Routledge: London.