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COVID-19 and Inequality in Asia: Breaking the Vicious Cycle

by Emilia Jurzyk, Medha Madhu Nair, Nathalie Pouokam, Tahsin Saadi Sedik, Anthony Tan, Irina Yakadina

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Abstract

The COVID-19 pandemic risks exacerbating inequality in Asia. High frequency labor surveys show that the pandemic is having particularly adverse effects on younger workers, women and people that are more vulnerable. Pandemics have been shown to increase inequalities. As a result, income inequality, which was already high and rising in Asia before the pandemic, is likely to rise further over the medium term, unless policies succeed in breaking this historical pattern. Many Asian governments have implemented significant fiscal policy measures to mitigate the pandemic's effect on the most vulnerable, with the impact depending on the initial coverage of safety nets, fiscal space, and degree of informality and digitalization. The paper includes model-based analysis which shows that policies targeted to where needs are greatest are effective in mitigating adverse distributional consequences and underpinning overall economic activity and virus containment.

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[1] We are grateful to Helge Berger, Davide Furceri, Jonathan D. Ostry, Changyong Rhee, Alison Stuart, Rui Xu, Jiae Yoo, and seminar participants at the IMF for helpful comments and suggestions.

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I. INTRODUCTION

Before the COVID-19 pandemic, rising income inequality was already among key challenges in Asia. While in the past, rapid growth in Asia had been accomplished with an equitable distribution of the gains, since the early 1990s fast-growing Asian economies have been unable to replicate the "growth with equity" miracle (Jain-Chandra and others 2016). Indeed, since then, the region has witnessed rising income inequality. The change in inequality (delta) in Asia is higher than in other regions, with the level of inequality surpassing the world average. The rise in inequality is even more striking on a population-weighted basis on the account of higher inequality in the most populous countries in Asia.

Absent the right policies, the COVID-19 pandemic poses a high risk of further worsening inequality. The virus pushed the world economies into a Great Lockdown, which triggered the worst recession since the Great Depression (IMF, 2020a; Deb et al. 2020). Evidence from other regions also suggests that the pandemic is worsening distributional outcomes, for example in the United States (Shibata 2020) and the United Kingdom (Haioglu, Känzig, and Surico 2020). Against this background, the paper answers the following questions: (i) what is the likely effect of the COVID-19 on inequality in Asia; and (ii) what policies could protect the most vulnerable while helping the recovery.

To answer the first question, the paper documents the long-term trends in inequality and uses the 2020 high-frequency labor survey data to identify the impact of the COVID-19 shock on the workers and sectors most affected, and provides preliminary evidence on the varied employment effects of the pandemic.

To answer the second question, information from the IMF Policy Tracker is used to analyze the policy responses of Asian governments since the start of the pandemic to protect the most vulnerable. In addition, the paper uses a novel and extended version of Susceptible-Infected-Recovered (SIR)-macro model by Engler, Pouokam, Rodriguez, and Yakadina (forthcoming)—with different types of agents and a fiscal policy block—to assess how various fiscal measures could help soften the crisis impact on widening inequality.

The key findings range from empirical contributions to model simulations and policy analysis. The COVID-19 pandemic is taking its toll on Asia's labor markets, and the picture is bleak. High-frequency labor market indicators have sharply deteriorated, and substantially more than during the Global Financial Crisis (GFC). Aggregate hours worked have declined both at the extensive (employment rate) and intensive margins (hours worked per employee). Unemployment has surged while labor force participation has plunged—an early sign of scarring effects. Moreover, the pandemic is having particularly adverse effects on the already vulnerable: younger workers and women. During the pandemic Asia's youth have suffered greater job losses than other age categories and the gender pay gap—already the second largest globally—has widened.

Income inequality is likely to keep rising over the medium term, damaging economic growth and social cohesion (October 2020 Regional Economic Outlook: Asia and Pacific; see also the companion paper; Saadi Sedik and Xu, forthcoming). This is similar to the findings of Furceri, Loungani, Ostry and Pizzuto (2020) who provide evidence that major epidemics

over the past two decades, even though smaller in scale than COVID-19, have led to persistent increases in the Gini coefficient, raised income shares to higher-income deciles, and lowered the employment to population ratio for those with basic education compared with those with higher education. One channel through which pandemics may increase inequality is the acceleration in automation and robotization (October 2020 Regional Economic Outlook: Asia and Pacific; see also Saadi Sedik and Yoo, forthcoming). Indeed, while automation may raise productivity, it also increases inequality by displacing lower paid workers in routine manual occupations.

Lessons from past pandemics also suggest that the resulting higher levels of inequality could undermine social cohesion and jeopardize future growth, increasing the risks of a vicious cycle. This is especially salient for countries with already high inequality going into this crisis ((October 2020 Regional Economic Outlook: Asia and Pacific; Saadi Sedik and Xu, forthcoming a and b).

According to the IMF Policy Tracker, many Asian governments have implemented significant fiscal packages to mitigate the pandemic's effect on the most vulnerable, however the impact varies depending on the initial coverage of social safety nets and fiscal space but also the degree of informality and digitalization.

Finally, model-based analysis shows that policies targeted to where needs are greatest are effective in mitigating adverse distributional consequences and underpinning overall economic activity and virus containment. In particular, fiscal support measures when governments have access to external financing not only help diminish the economic cost of the pandemic but can significantly reduce the number of infections and, thus, save lives. The favorable effects are larger for targeted than for untargeted measures. Allowing governments to borrow externally helps support the economy throughout the pandemic recession but may require more progressive fiscal measures to avoid excessive pandemic debt accumulation and preserve medium-term debt sustainability.
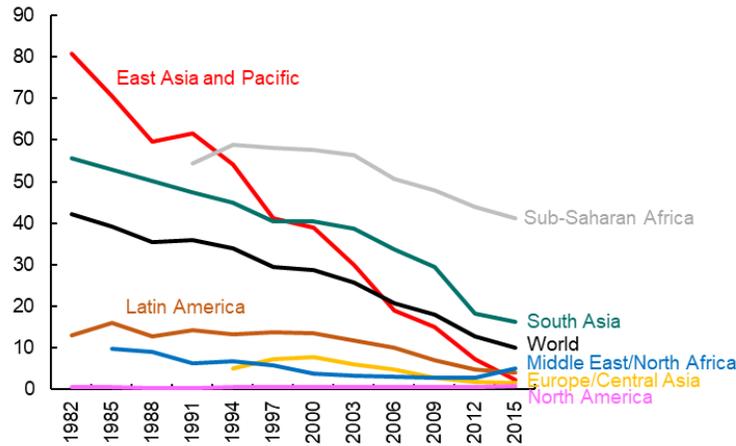
The rest of the paper is organized as follows. Section II presents regional inequality trends before COVID-19. Section III shows how the pandemic and its economic toll exacerbated these trends. Section IV analyzes the policy measures by Asian governments in response to the crisis. Section V presents model-based policy recommendations. Section IV concludes.

II. Key Inequality Trends in Asia Before COVID-19

Asia has been a growth leader and has achieved remarkably high growth for sustained periods, lifted millions out of poverty and virtually eliminated incidence of extreme poverty (Figure 1). However, in a number of Asian economies this impressive economic performance has been accompanied by rising inequality, particularly since the early 1990s—a break from the region's remarkable past (Jain-Chandra and others 2016). This means that Asia's last 25-plus years of growth have been less inclusive and less pro-poor (Balakrishnan et al., 2013; and Figure 2). The change in inequality (delta), as measured by the net Gini index, in Asia is currently higher than in other regions (Figure 3), with the level of inequality surpassing the world average. The increase in inequality is even more striking on a population-weighted basis, reflecting the sharp rise in inequality in the most populous countries in Asia, notably

China, India and Indonesia.2 This reflects larger income gains for the top 10 percent of the population (Figure 4).

Figure 1. Extreme Poverty (per capita household consumption below $1.90/day)
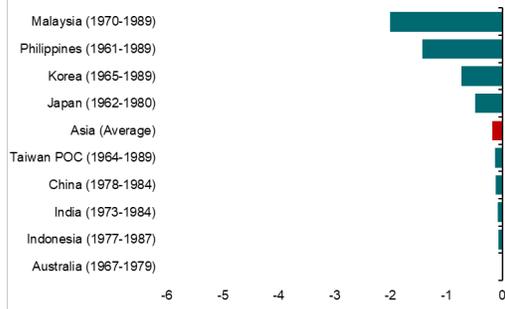*(Share of the population living in extreme poverty)*

Source: World Bank, IMF staff calculations
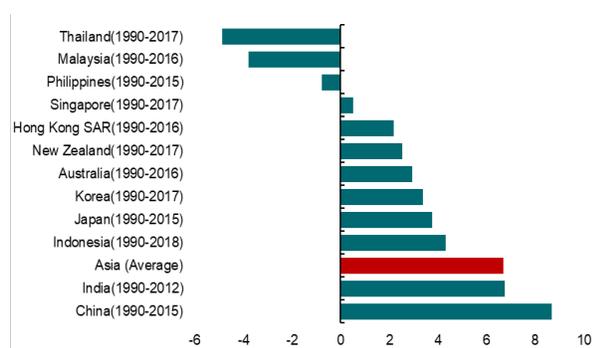Note: Poverty gap is a ratio showing the average shortfall of the total population from the poverty line.

Figure 2: Selected Asia: Income Inequality
(Net Gini Index; in Gini points; change during the period indicated in parentheses)
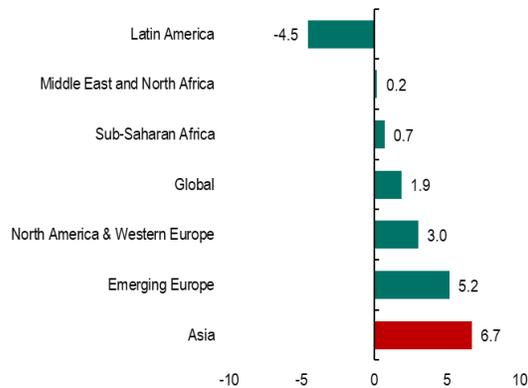
(a) Pre-1990 (1960s to mid-1980s)   (b) Post-1990 (1990 to 2018, or latest)

Source: SWIID v8.2, IMF staff calculations.
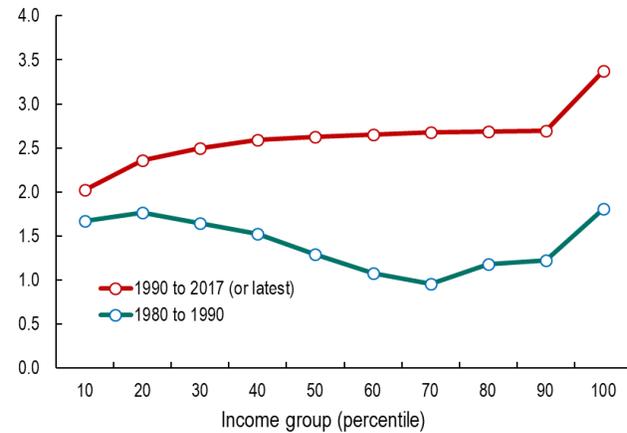Note: Average for Asia is based on population-weighted average.

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2 Alternative measures of income equality, such as the Palma ratio, also showed consistent trend.

Figure 3. Change in Income Inequality: Regional Comparison
(Net Gini index, in Gini points; average across region)

Region	Value
Latin America	-4.5
Middle East and North Africa	0.2
Sub-Saharan Africa	0.7
Global	1.9
North America & Western Europe	3.0
Emerging Europe	5.2
Asia	6.7

Source: SWIID v8.2, IMF staff calculations.
Note: Regional aggregation is based on population-weighted average.

Figure 4. Asia: Growth Incidence Curve
(Annual compounded mean income/consumption growth (USD), by decile, in percent)

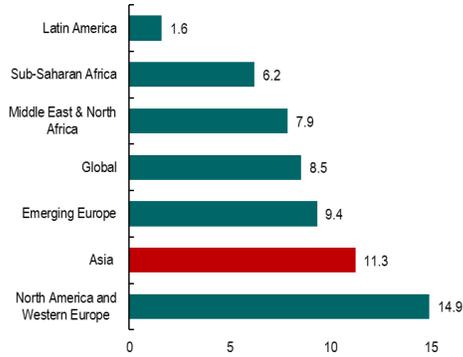Legend: 1990 to 2017 (or latest); 1980 to 1990. X-axis: Income group (percentile).

Source: World Bank PovCal database, IMF staff calculations.
Note: Data refers to the median income/consumption growth over corresponding period.

Gender. From the gender perspective, men continue to make up an overwhelming majority of top earners globally. According to ILO data, gender income disparity in Asia remains the second largest, after North America and Western Europe, where Asia's men take home around 11 percent more as compared to their female counterparts (Figure 5). Gender income inequality remains persistent in Asia because it is partly rooted in culture and tradition in some countries that prevent women from equal access to education and employment opportunities (Jayachandran, 2015; UN, 2020). Asian countries that ranked among the top 20 in the United Nation's human development index (HNI)–which measures social and economic achievements, fared poorly in the gender development index (UNDP, 2019).
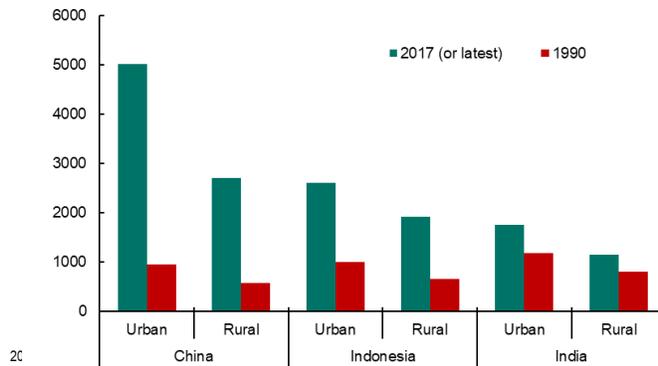
Urban versus rural. In the spatial dimension, the inequality of income (or consumption) between urban and rural households in Asia remains large, notably in its largest economies. In China, the gap has widened significantly since the 1990 (Figure 6). According to (Kanbur and Zhuang, 2013), rural–urban income divide accounts for 45 percent of the economy-wide inequality in China (India and Indonesia: 25 percent and 20 percent, respectively).

Figure 5. Gender Income Inequality, Regional Comparison
(Gender wage gap, in percent of average male wages, 2018 or latest)

Source: ILO, IMF staff calculations.
Asia refers to Australia, China, Indonesia, Korea, Mongolia, Nepal, Philippines, Sri Lanka, Thailand and Vietnam.

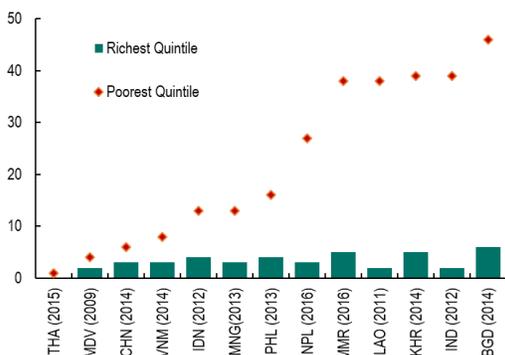**Figure 6. Selected Asia: Urban-Rural Inequality of Income (or Consumption)**
(USD, average)

Source: World Bank

Inequality of Opportunities. Apart from inequality of outcomes, Asia is also confronted with considerable inequality of opportunities, such as access to education, health, financial services. The widening inequality of opportunities not only preserves inequality of outcomes, but also perpetuates social divisions (UN, 2020; Aiyar and Ebeke, 2019).
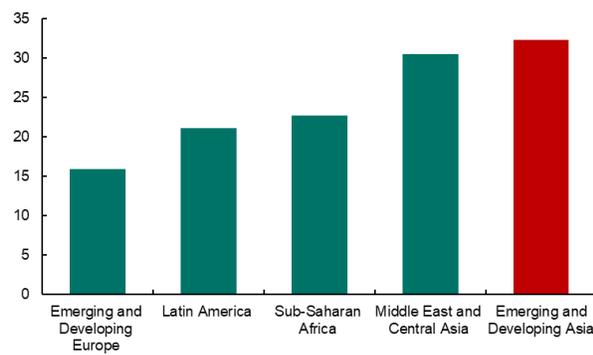
Education. Figure 7 shows that there is a large gap between educational attainments of the wealthiest quintile and the poorest quintile in Asia, defined as the share of population aged 20-24 with less than four years of schooling. As access to basic education by the poor is limited; they are more likely to be trapped in the cycle of poverty, further hampering economic mobility. As well as facing a large education gap, the Asian emerging and developing economies (EMDEs) also have the largest share of youth not in education, employment or training (Figure 8).

Figure 7. Selected Asia: Access to Education by Wealth Quintile
(Attained less than 4 years of education, percent of total population aged 20-24)

Source: World Bank, IMF staff calculations.
Note: Selected Asian countries are based on available data.

Figure 8. Share of Youth Not in Education, Employment or Training (NEET), Regional Comparison
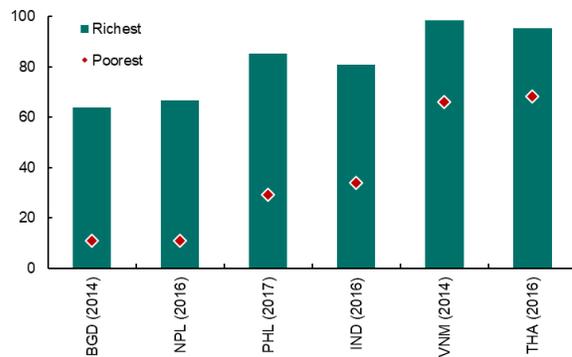*(Percent)*

Source: ILO, IMF staff calculations
Note: Data are based on population-weighted averages.

Healthcare. There is also a persistent and sizeable gap in access to healthcare between high- and low- income households in Asian EMDEs. Figure 9 shows that there is a large gap in the reproductive, maternal, newborn and child health coverage, notably in South Asia. Such disparities could also reflect insufficient medical services in rural areas, partly due to poor infrastructure (such as rail and road connectivity), as well as absence of universal healthcare coverage.

Financial services. The lack of access to financial services also constrain low-income households from investing in their future, such as for education and training. Figure 10 shows that in some Asian EMDEs, there remains a notable gap in the share of adults with bank accounts between the top 60 percent and the bottom 40 percent of the income distribution (such as in Lao PDR and the Philippines).

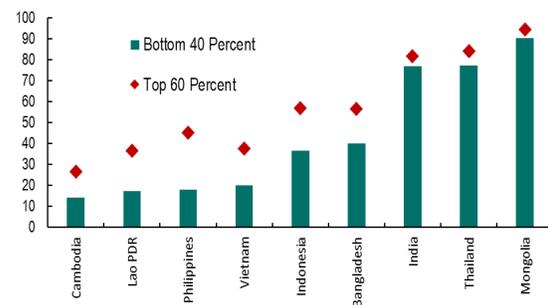**Figure 9. Selected Asia: Access to Health by Wealth Quintile**
(Percent, coverage of reproductive, maternal, newborn and child health)

Source: WHO, IMF staff calculations.
Note: Selected Asian countries are based on available data.

Figure 10. Selected Asia: Access to Financial Services by Income Share
(Accounts at a financial institution; in percent of total population aged 15 and above)

Source: World Bank, Global Findex Database, IMF staff calculations.
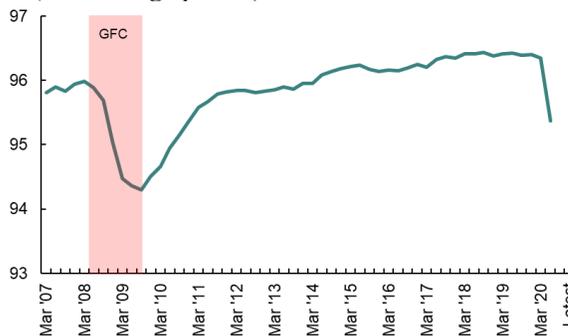Note: Selected Asian countries are based on available data.

III. LABOR MARKET SURVEYS INDICATE RISING INEQUALITY

In this section, we use high-frequency labor survey data to identify which types of workers-sectors are more impacted by COVID-19 shocks and compare the impact of the pandemic to that of the Global Financial Crisis (GFC). We focus on the effects on employment across different industry classifications (whether they are high contact sectors, requiring physical human interactions) and job flexibility (whether remote work is possible). We then study worker demographics (such as gender, age, and skill/education levels) to document how the pandemic has worsened distributional outcomes exacerbating inequality trends in Asia discussed earlier.
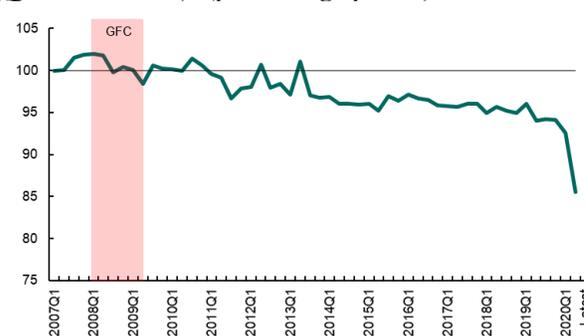
Pandemic Effects on Employment and Earnings

We find that Asia's labor market conditions have deteriorated markedly, more than during the Global Financial Crisis (GFC). The aggregate effects of the pandemic on Asia's employment was negative across the board, as aggregate hours worked declined both at the extensive (employment rate) and intensive margins (hours worked per employee), surpassing the GFC (Figures 11 and 12). As a result, unemployment rate surged and labor force participation plunged—a first sign of scarring effects (Figures 13 and 14).

Figure 11. Asia: Change in Employment Rate
(Percentage points)

Source: Haver Analytics, IMF staff calculations
Notes: Asia refers to Australia, Hong Kong, Indonesia, Japan, Korea, Malaysia, New Zealand, Philippines, Singapore, Taiwan Province of China, Thailand and Vietnam. Data are seasonally-adjusted, based on population-weighted average

Figure 12. Asia: Change in Weekly Hours Worked
(Q1 2007 = 100), (percentage points)

Source: Haver Analytics, IMF staff calculations
Notes: Asia refers to Australia, Hong Kong, Japan, Korea, Philippines and Singapore. Data are seasonally-adjusted, based on population-weighted average.

Figure 13. Asia: Change in Unemployment Rate
(Percentage points)

Source: Haver Analytics, IMF staff calculations
Notes: Asia refers to Australia, China, Hong Kong, India, Indonesia, Japan, Korea, Malaysia, New Zealand, Philippines, Singapore, Taiwan Province of China, Thailand and Vietnam. Data are seasonally-adjusted, based on population-weighted average

Figure 14. Asia: Change in Labor Force Participation Rate
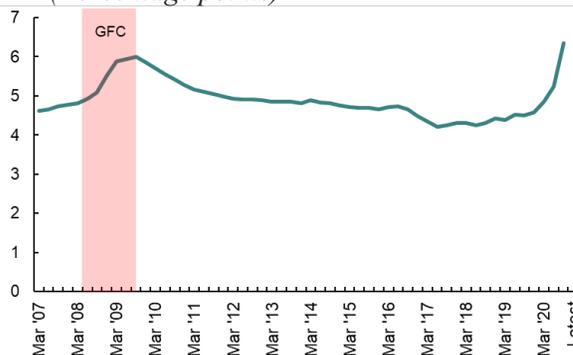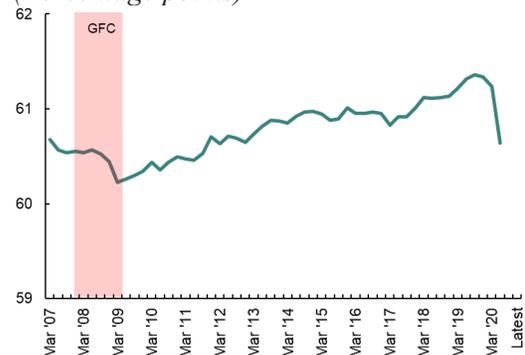*(Percentage points)*

Source: Haver Analytics, IMF staff calculations
Notes: Asia refers to Australia, Hong Kong, Indonesia, Japan, Korea, Malaysia, New Zealand, Philippines, Singapore, Taiwan Province of China, Thailand and Vietnam. Data are seasonally-adjusted, based on population-weighted average

The effects on Asia's employment varies, with significant heterogeneity across industries, as the lockdowns and closure of non-essential businesses had differential impact on the type of jobs that had been lost. Essential industries (such as utilities, healthcare and groceries) continue to remain in business, while "social jobs" ─ those that require face-to-face interactions were prohibited from operating during the beginning of the pandemic recession. Job losses during the pandemic can also be differentiated in terms of job flexibility, depending on whether workers are able to work from home (remote work),[3] which in turn depends on workers having certain skillsets/education levels. The following are the key stylized facts.[4]
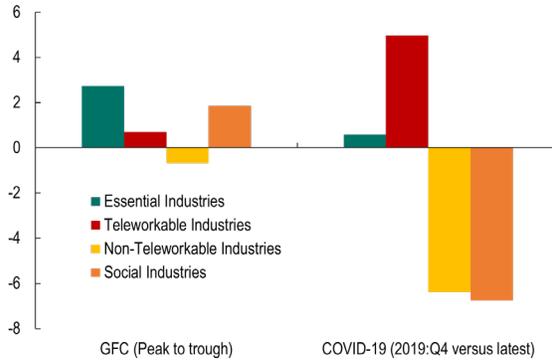
- First, high contact social industries[5] that require physical interactions for the consumption of goods (such as hotels/restaurants and retail) were the most affected, recording the largest declines in employment (over 6 percentage points in June as compared to pre-COVID in December 2019). These industries were closely associated with the travel and tourism sector, which have notably been hit hard. In contrast, job creation in these sectors remained positive during the GFC (Figures 15 and 16).

- Second, non-teleworkable industries were the second most impacted. These are mostly in the mining, manufacturing and construction industries, where remote work is not possible, and consistent with the findings in Brussevich and others (2020).

- Third, workers in both social and non-teleworkable industries are characterized by a larger share of workers with lower average earnings. For example, the average monthly wage in the social sector is less than one-third that of essential and teleworkable industries. This shows that the pandemic has led to widening the already large income disparities in the region, leaving lower income workers further disadvantaged and exacerbating income inequality (Figure 17 and 18).

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[3] However, this would also depend on industries having the necessary pre-requisites, such as access to technology and IT infrastructure for effective teleworking. Workers in emerging market economies are likely to face significant challenges during strict lockdowns given limited access to technology (Brussevich and others, 2020).

[4] Similar trend can be observed, for example in the U.S. (Shibata, 2020) and Euro area (Botelho, et al., 2020).
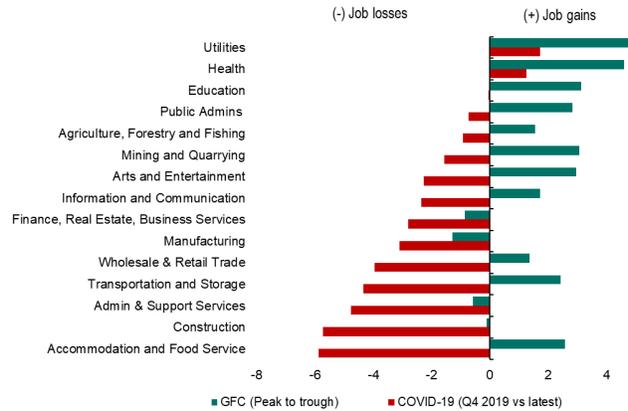
[5] Social industries refer to those industries where consumption of goods require physical interactions such as wholesale, retail, leisure/tourism and entertainment. Essential industries refer to agriculture, utilities, transport, information/communication, health and public administration; social industries refer to wholesale/retail, hotels/restaurants, arts/entertainment; teleworkable industries refer to finance, business/professional services and education; and non-teleworkable industries refer to mining, manufacturing and construction. Even though health is a social industry by definition, it is regarded in this study as an essential industry due to the health risk posed by the pandemic. See Shibata, 2020, Dingel and Newman, 2020.

Figure 15. Asia: Change in Employment by Industry Classification during Crises
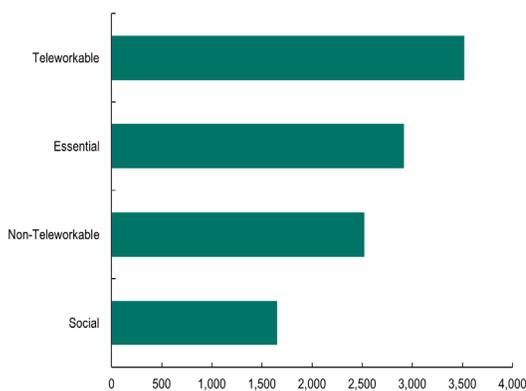*(Percentage points)*

Source: Haver Analytics, IMF staff calculations
Notes: COVID-19 = coronavirus disease; GFC = global financial crisis. Asia refers to Australia, Hong Kong SAR, Indonesia, Japan, Korea, Malaysia, New Zealand, Singapore, Taiwan Province of China, Thailand, The Philippines, and Vietnam. Data are seasonally adjusted, based on June 2020 data. Essential industries refer to agriculture, utilities, transport, information and communication, and health and public administration; social industries refer to wholesale and retail, hotels and restaurants, and arts and entertainment; teleworkable industries refer to finance, business and professional services, and education; and non-teleworkable industries refer to mining, manufacturing, and construction.

Figure 16. Asia: Change in Employment (All Industries), GFC versus Pandemic Recession
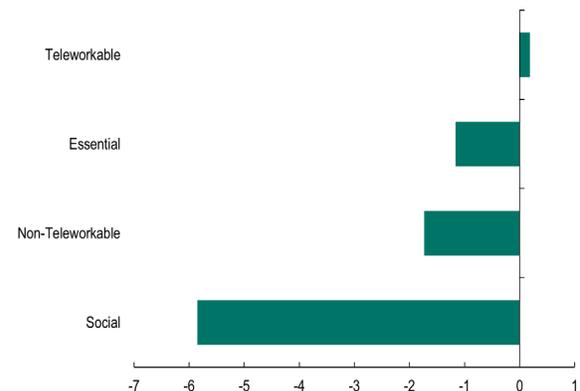*(Percentage points)*

Source: Haver Analytics, IMF staff calculations
Asia refers to Australia, Hong Kong SAR, Indonesia, Japan, Korea, Malaysia, New Zealand, Singapore, Taiwan Province of China, Thailand, The Philippines, and Vietnam. Data are seasonally adjusted, based on June 2020 data.

Figure 17. Asia: Average Monthly Wages (Apr 2020)
(in USD)

Source: Haver Analytics, IMF staff calculations
Notes: Asia refers to Japan, Korea, Taiwan Province of China and Thailand.

Figure 18. Asia: Change in Average Monthly Wages from Pre-COVID levels (Dec 2019 to latest)
(Percentage points)

Source: Haver Analytics, IMF staff calculations
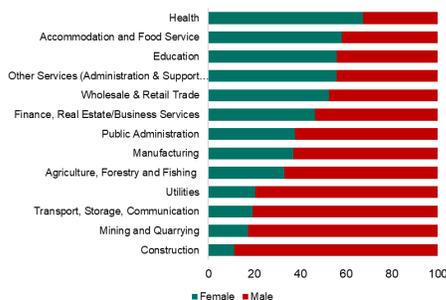Notes: Asia refers to Japan, Korea, Taiwan Province of China and Thailand.

Pandemic Effects on Employment by Worker Demographics

Gender

The pandemic is having a major impact on the well-being of many vulnerable groups, including in Asia. There is a growing literature documenting that women are amongst those most heavily affected, amplifying existing socioeconomic inequalities (UN, 2020; UNDP, 2020; Boinol et al., 2019). Women represent a larger share of essential workers on the frontline, such as first responders in the healthcare industry, and cashiers at groceries/pharmaceutical stores (OECD, 2020). Not only that women are more exposed to greater risk of infection, but there remains a significant gender income gap, underscoring the notion that women continue to be underpaid as compared to their male counterparts. Industries that were hit hard by the pandemic also predominantly employed women (Figure 19). Asia's gender inequality is further exacerbated by the region's high share of informality (including the gig economy), where women account for the bulk of the share. They are more likely to be in lower paying jobs with little security or protection.

Another key distinguishing factor that women bore the brunt of the pandemic is that women, in many societies, are the primary care providers. Given the travel restrictions, home quarantines, school and day-care center closures, additional burden of care on the young and the elderly falls disproportionately on women, even as some women (and their partners) have the option to work from home. A key reason is a "guilt gap" between women and men, where women often feel compelled to take on more professional sacrifices (Aoyagi, 2020). Between December 2019 and June 2020, Asia's female participation rate declined by 1.3 percentage points compared to a 1.0 percentage point decline for male (Figure 20), as more women exited the labor force. Without policies to prevent scarring and support female employment opportunities, the pandemic could potentially accentuate the already high gender inequality in the region.
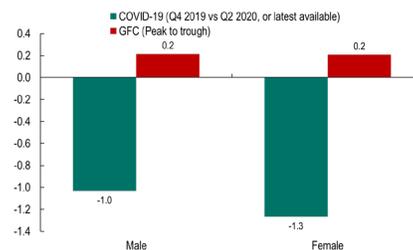
Figure 19. Asia: Share of Employment by Gender (All Industries)
(Percent)

Source: ILO, IMF staff calculations
Notes: Asia refers to Australia, Hong Kong, Indonesia, Japan, Korea, Malaysia, New Zealand, Philippines, Singapore, Thailand and Vietnam. Data refers to 2018.

Figure 20. Asia: Change in Labor Force Participation Rate (by Gender)
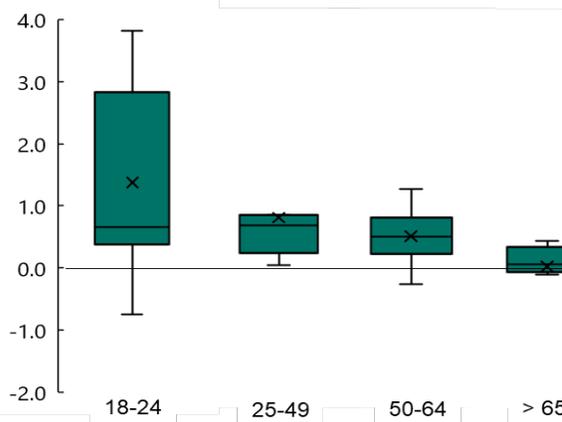*(Percentage points)*

Source: Haver Analytics, IMF staff calculations
Notes: COVID-19 = coronavirus disease; GFC = global financial crisis. Asia refers to Australia, Japan, Korea, Hong Kong, Thailand, and The Philippines. Data are seasonally adjusted. For COVID-19, data are up to June 2020.

Age

Looking at the age dimension, Asia's youth experienced sharper job losses compared to other workers during the pandemic, with the average youth unemployment rate rising by 1.4 percentage points by June 2020 (Figure 21). As discussed in Section II, prior to the pandemic, Asia had one of the highest shares of youth not in employment, education or training, particularly in developing countries. The current crisis is aggravating this inequality trend, as youth are typically the most vulnerable to worsening economic conditions (Ahn et al., 2019) and they are mostly employed in sectors requiring social contact (Figure 22). There are, however, substantial variations across Asia, with the increase in youth unemployment most notable in Australia and Thailand.
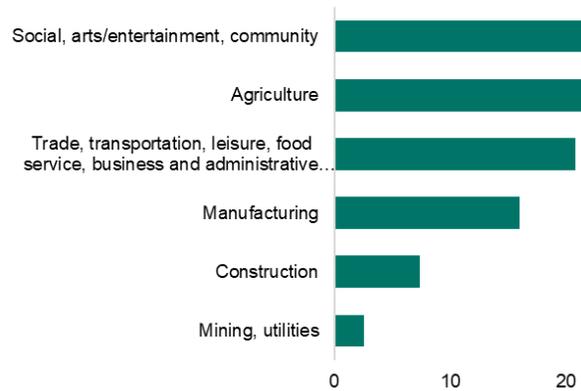
Figure 21. Asia: Change in Unemployment Rate by Age Cohorts
(Percentage points)

Source: Haver Analytics.
Note: Asia refers to Australia, Japan, Korea, New Zealand, Taiwan Province of China, and Thailand. Data refers to the change in unemployment rate from December 2019 to June 2020. Data are seasonally adjusted. The horizontal line inside each box represents the median; the upper and lower edges of each box show the top and bottom quartiles, respectively; and the top and bottom markers denote the maximum and the minimum, respectively; x is the mean.

Figure 22. Asia: Share of Youth Employment (By Selected Industries), 2018 or latest
(Percentage points)

Source: ILO, IMF staff calculations
Notes: Asia refers to Bangladesh, Brunei, Cambodia, Lao PDR, Mongolia, Myanmar, Nepal, Tonga, Korea and Vietnam.

Education

Looking further into how crises events affected workers with different education background reveals the following observations:

- Workers with primary education and below have been the most affected by the pandemic, with the average employment rate declining by 1.5 percentage point as compared to pre-pandemic levels—surpassing the GFC (Figure 23). This is consistent with the observation that workers with lower levels of educational attainment tend to be more susceptible to job losses, as these jobs generally do not allow workers the option for telework, which typically requires at least a college degree (Shibata, 2020).

- For workers with secondary education and above, the magnitude of the decline in average employment rates relative to pre-pandemic levels were largely similar across both recessions.

Figure 23 Asia: Change in Employment Rates by Education Level
(Percentage points)

Source: Haver Analytics, IMF staff calculations

Notes: Asia refers to Hong Kong, Korea, Taiwan Province of China and Thailand. Data refers to the change in unemployment rate from December 2019 to June 2020. Data are seasonally adjusted. The horizontal line inside each box represents the median; the upper and lower edges of each box show the top and bottom quartiles, respectively; and the top and bottom markers denote the maximum and the minimum, respectively; x is the mean.

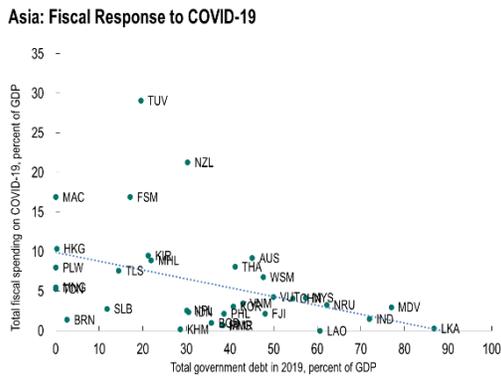## IV.   POLICIES TO BREAK THE VICIOUS CYCLE

Governments in Asia have immediately responded to COVID-19 crisis with policy packages, some sized in double-digit percentage of GDP. We compile and analyze such policy measures using the IMF Policy Tracker and find that effective crisis responses go hand-in-hand with the following country characteristics: (i) benefiting from a larger fiscal space; (ii) having broader social safety nets; (iii) exhibiting lower levels of informality; and (iv) having a higher degree of digitalization.

Looking at the first characteristic, countries with lower outstanding debt at the end of 2019 and therefore larger fiscal space have been more able to respond effectively and protect the vulnerable, in contrast to the ones that entered the crisis with weaker initial conditions and thus were facing greater challenges (Figure 24, panel 1).
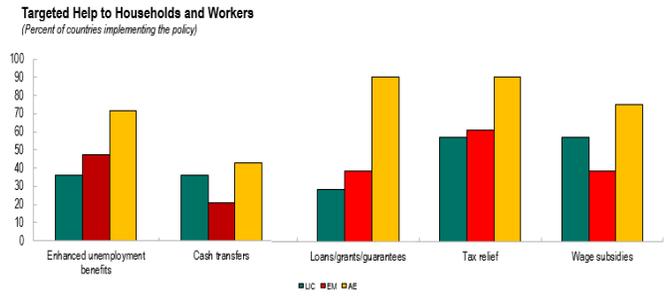
Second, a higher share of the advanced economies in Asia introduced targeted benefits that aimed to support the population and preserve firms and jobs. Many advanced economies introduced cash transfers, enhanced unemployment benefits, wage subsidies, and fiscal support to firms (Figure 24, panel 2). These measures were utilized by fewer emerging markets and low-income countries.

Figure 24. Asia's Policy Responses

1. Asia: Fiscal Response to COVID-19
(Percent of GDP)

Asia: Fiscal Response to COVID-19

Sources: IMF WEO Database; IMF Survey of Policy Responses to COVID-19.

Source: IMF survey of policy responses to COVID-19.
Note: COVID-19 = coronavirus disease pandemic.
Country abbreviations are International Organization for
Standardization country codes.

2. Targeted Help to Households and Workers
(Percent of countries implementing the policy)

Targeted Help to Households and Workers
(Percent of countries implementing the policy)

Sources: IMF World Economic Outlook database; and IMF survey of
Note: COVID-19 = coronavirus disease pandemic. AE = advanced economy;
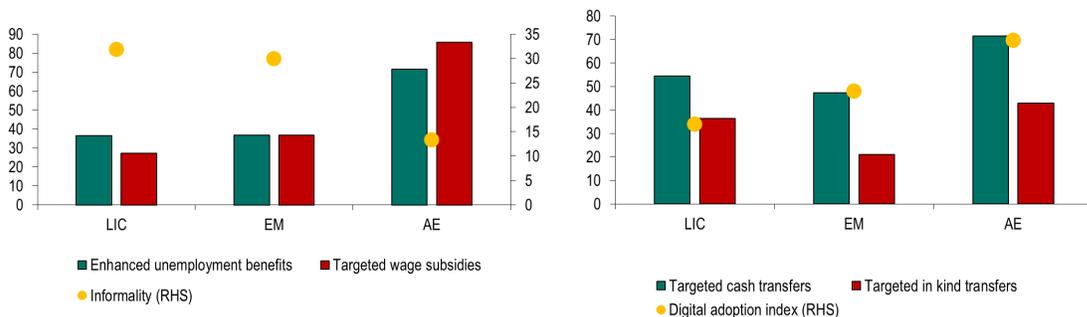EM = emerging market; LIC = low-income country.

Third, a less frequent adoption of such measures among low-income countries and emerging markets was likely related to a higher degree of informality. With a higher share of workers not covered by the social insurance schemes (either because they were employed outside of the formal sector, were self-employed or held jobs in the new gig economy), reaching workers through channels designed for formal employment was limited. (Figure 25, panel 1).

Fourth, digitalization likely helped: countries with higher levels of digital adoption were better placed to deliver support to population as governments were able to use tools like digital wallets, existing electronic social security and tax rosters and other tools to identify the vulnerable and deliver assistance. Low-income and emerging market countries that introduced targeted cash transfers had, on average, higher digitalization scores than those that did not introduce these measures (Figure 25, panel 2).

Figure 25. Asia's Policy Responses

1. Fiscal Measures and Informality
(Percent of countries implementing the policy)

2. Targeted Support and Digitalization
(Percent of countries implementing the policy)

Note: COVID-19 = coronavirus disease pandemic. AE = advanced economy; EM = emerging market; LIC = low-income country.

V. Policy Analysis: More Targeted Measures, More Lives Saved

This section compares the efficiency of various fiscal measures to alleviate the impact of the pandemic and the lockdown, focusing on targeted fiscal support. It uses a Susceptible-Infected-Recovered (SIR) macro model (Eichenbaum, Rebelo, and Trabandt, 2020) extended to include skilled and unskilled workers, redistributive fiscal policy as well as external borrowing in the form of a pandemic bond (Engler et al. 2020). Box 1 describes key model assumptions and features.

In the seminal Eichenbaum, Rebelo, and Trabandt (2020) pandemic macro model, the virus spreads through consumption, workplaces and in the general community. In response consumers and workers rationally cut their consumption and hours to reduce their probability of getting infected and possibly perishing from the virus.

We solve for optimal (consumer welfare-maximizing) fiscal policy to compare the efficiency of various fiscal measures in a lockdown[6], namely a progressive taxation with targeted fiscal transfers favoring the needy (unskilled, low income workers) vs. a uniform taxation with untargeted transfers.

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[6] Lockdown is modeled as a time-varying, Pigouvian consumption tax with all the proceeds rebated to households.

Box 1. Key Model Assumptions and Features

This paper relies on the novel SIR-macro-fiscal-inequality model by Engler, Pouokam, Rodriguez Guzman and Yakadina (EPRY, forthcoming). The EPRY model adds fiscal policy and inequality dimensions to the seminal model by Eichenbaum, Rebelo and Trabandt (ERT, 2020) to perform comparisons among different sets of—optimal and ad-hoc—fiscal policy measures in the time of a pandemic.

The original ERT model explores the behavioral response of economic agents to the pandemic and the government-imposed lockdowns. The decentralized, competitive equilibrium in the economy consists of the consumption and labor supply decisions by each type of agent: Susceptible to the virus, Infected or Recovered with a life-time immunity (SIR). The model is calibrated to weekly frequency to best match the pandemic course and focuses on the transitional dynamics, assuming that after the pandemic is over the economy returns to the original steady state.

In addition to the epidemiological SIR block that models the virus spread during consumption, work or through general community interactions, ERT study how the macroeconomy responds to changes in consumers and workers behavior who are aware of the virus channels. Their behavior causes a large drop in consumption and hours worked as infections and deaths rise to a peak at the heights of a pandemic. While the economic agents act rationally to optimize their welfare, they fail to fully internalize the externality of spreading the virus through their own behavior (work and consumption), so the government has to levy a time varying Pigouvian consumption tax that acts as a containment (lockdown) and helps tame the pandemic and save lives. The tax proceeds are transferred to the consumers who are assumed hand-to-mouth.

The EPRY model uses the key ERT features and adds two further features: first, it distinguishes between rich and poor which is modeled as unskilled and skilled workers. As single-good producing firms pay competitive wages in proportion to workers' productivity (skills), unskilled workers earn low incomes and consume less than skilled workers. Such low-income workers constitute the majority (70 percent) of the population, close to the average in Asia. The second feature is introducing a variety of fiscal policy instruments so that we can identify optimal fiscal policy of a benevolent government chooses fiscal instruments to maximize consumers welfare. Fiscal instruments consist of (i) progressive, time-varying consumption tax rates that are different for the two labor income groups (skilled and unskilled); (ii) progressive (or targeted) transfers to each consumer type; and (iv) external debt to help finance the targeted transfers during the pandemic.
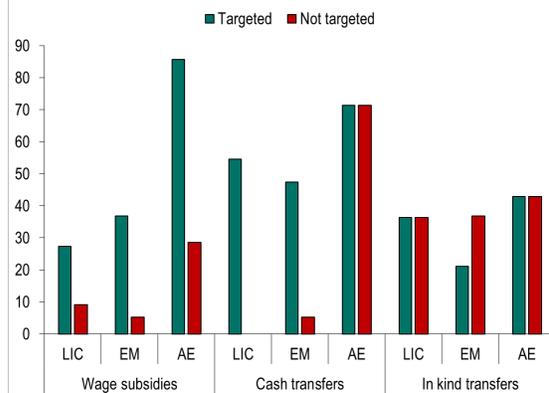
Third, Introducing short-term external borrowing is an innovative feature that helps study the optimality of using targeted fiscal policy while acknowledging the tradeoffs between a better control over the pandemic in the near term and the spike in debt-to-GDP ratios caused by both deteriorating fiscal balances and lockdown-induced deep recession. With the goal of focusing the pandemic-related effects, debt is modeled in a form of a short-term, external pandemic bond that can be rolled over for 250 weeks but has to be fully repaid thereafter, through uniform labor income taxes over the medium term. The interest rate on the pandemic bond is exogenous and assumed constant interest rate as long as debt-to-GDP ratio remains sustainable, but with a fast-rising risk premium when debt ratios became too high.

The EPRY model is used to run three sets of simulations: the baseline with no policies (without lockdown and fiscal transfers); the untargeted policy scenario in which the government sets the same containment and transfers for skilled and unskilled; and the targeted policy scenario in which higher earners are taxed more and lower earners receive more in fiscal transfers.
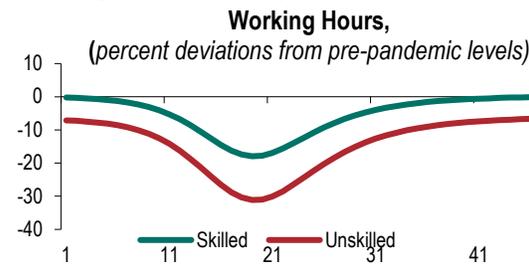
The model mimics some features of the pandemic and lockdowns: (i) consumption falls more for skilled workers with higher income and greater discretionary spending; and (ii) unskilled (low income) workers are more exposed to the pandemic through their workplace, as seen in transport, retail, production lines, and meat processing plants (Figure 26).

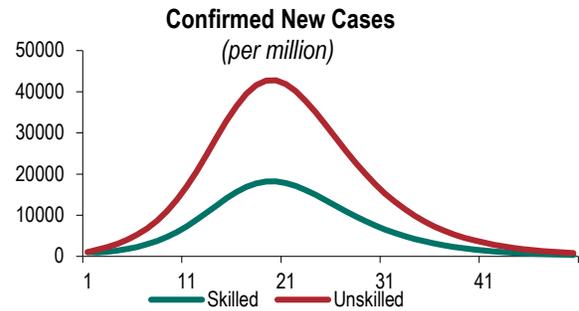**Figure 26. Matching Pandemic Behavior of Different Income Brackets**

As more countries used targeted fiscal measures, the model has targeted policies that differ for higher income skilled and lower income unskilled workers…
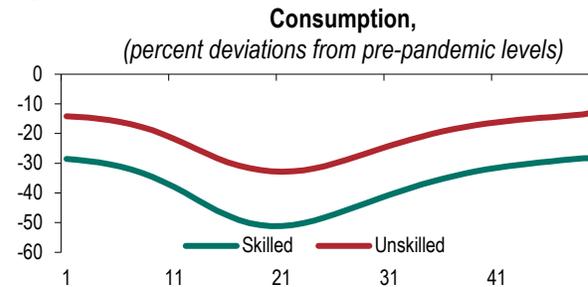
…where the unskilled are more exposed to the pandemic through their workplaces.

Lower income unskilled workers lose more hours due to as their workplaces were more affected by lockdowns…

…while consumption falls more for skilled workers with higher income.

Source: IMF Policy Tracker and Engler and others (2020).

Note: Panel 1 compares the share of countries that adopted targeted vs. untargeted fiscal support measures. Panel 2 shows additional weekly infections for skilled and unskilled workers; Panels 3 and 4 present the respective declines in weekly hours and consumption of skilled and unskilled relative to their respective pre-pandemic levels.
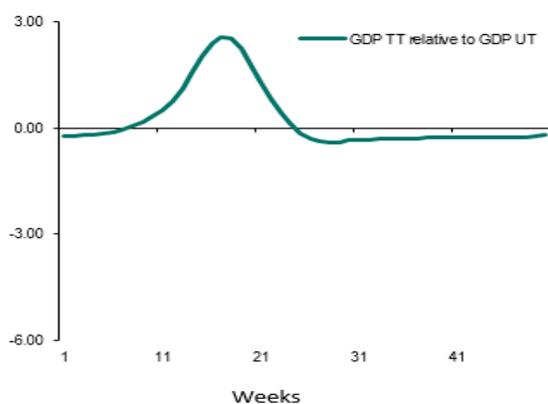
Our analysis shows that fiscal support measures not only mitigate the economic cost of the pandemic but can significantly reduce the number of infections—about one-third relative to the no-intervention baseline. By helping to protect the livelihoods of consumers and workers and increasing their disposable income, these measures make staying home more affordable and help reinforce greater social distancing.

Comparing two sets of optimal fiscal policies, we find that favorable effects from policies are larger for targeted than for untargeted measures. The former help reduce inequality in disposable income and preserve a higher consumption share of GDP for the unskilled (Figure 27). This saves more lives because unskilled workers tend to be more exposed to the health crisis. The reduction in infections and fatalities, in turn, helps reduce the depth of the recession and therefore flattens the surge in the debt-to-GDP ratio. The model suggests that, compared with untargeted transfers, targeted transfers raise GDP by some 3 percent and lower the debt-to-GDP ratio by 6 percentage points (Figure 27).
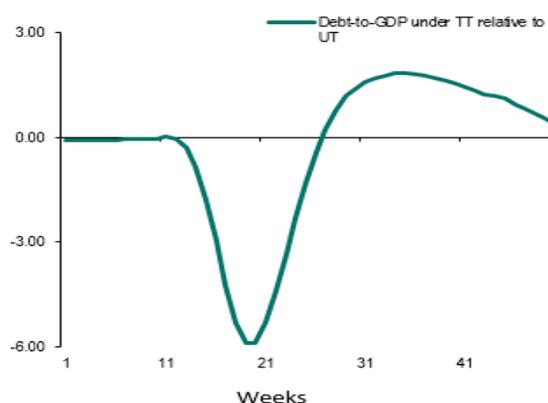
Figure 27. Targeted versus Untargeted Fiscal Support
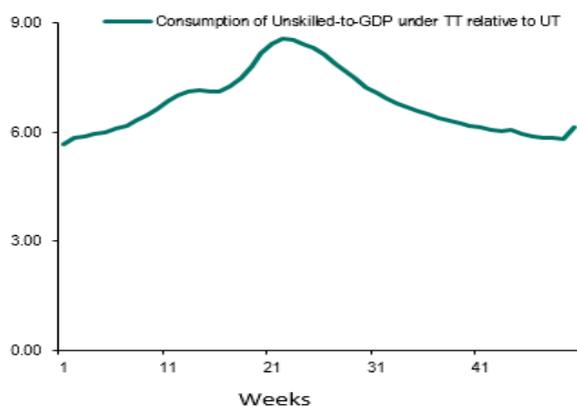*(Differences, percent of GDP)*

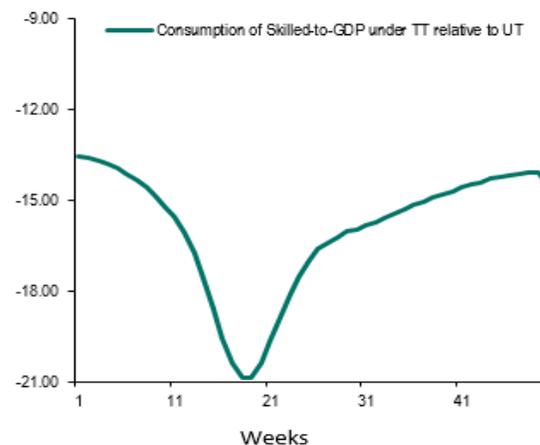*Optimal policy with targeted transfers results in a higher GDP relative to the one with untargeted transfers…*

…which leads to a lower pandemic debt accumulation.

Targeted support leads to higher consumption share of the unskilled in GDP…

…while the skilled experience a significant reduction in their consumption share because of redistributive measures.

Source: Engler and others (2020).

Note: TT = targeted transfers; UT = untargeted transfers. Panel 1 shows the weekly GDP level under the targeted fiscal support scenario (with progressive taxes and targeted transfers) in percent deviations from weekly GDP under the untargeted scenario (with uniform taxation and general transfers). The remaining three panels plot differences between the targeted and untargeted scenarios for the ratios-to-GDP of debt, consumption of unskilled, and consumption of skilled, respectively.

The analysis helps hone in on policy recommendations. Given the worsening of the underlying inequality trends exacerbated by the pandemic, it is optimal to continue targeted support measures to mitigate the pandemic and lockdown impact. Where appropriate, enhancing progressivity of taxes and transfers could help mitigate the anticipated buildup in debt that could otherwise pose medium-term debt sustainability risks.

VI.   CONCLUSIONS

In this paper we show, based on high-frequency labor surveys, that inequality is increasing further during the COVID-19 pandemic because job losses have been concentrated among low-income workers, women and youth. Information from the IMF Policy Tracker shows that many Asian governments have implemented significant fiscal policy measures to mitigate the pandemic's effect on the most vulnerable, with the impact depending on the

initial coverage of safety nets, fiscal space, and degree of informality and digitalization.

Although there is no one-size-fits-all best policy, our model-based analysis suggests that it is economically and socially beneficial to provide targeted support to the unskilled.

Countries that had a lower share of workers in the informal sector could extend support through formal channels, including wage subsidies for firms to keep workers employed, and through enhanced unemployment benefits.

As the recovery is likely to be increasingly driven by new sectors and activities, with greater focus on digitalization and green energy. Therefore, the jobs available in the recovery phase are likely to require different skills from those lost during the crisis (skill mismatches).

To minimize longer-term damage, policies should also address challenges from automation, including by revamping education curriculums to achieve more flexible skill sets and lifelong learning, as well as new training for adversely affected workers.

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