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ACRONYMS

Bappenas	*Badan Perencanaan Pembangunan Nasional* (Indonesian Ministry of National Planning and Development)
BDT	*Basis Data Terpadu* (Unified Database)
BPJS Ketenagakerjaan	*Badan Penyelenggara Jaminan Sosial Ketenagakerjaan (*Social Security Agency for Employment)
BPJS Kesehatan	*Badan Penyelenggara Jaminan Sosial* (Social Security Agency for Health)
BPNT	*Bantuan Pangan Non Tunai* (Electronic food voucher)
BPS	*Badan Pusat Statistik* (Statistics Indonesia)
BPU	*Bukan penerima upah* (non-wage recipient worker)
CPI	Consumer Price Index
GoI	Government of Indonesia
IDR	Indonesian Rupiah
INDOMOD	Indonesian tax-benefit microsimulation model
IWP	*Iuran Wajib Pegawai* (Social Insurance)
JHT	*Jaminan Hari Tua* (Social insurance – old age savings with disability benefit)
JKM	*Jaminan Kematian* (Social insurance – survivors' benefit)
JKN	*Jaminan Kesehatan Nasional* (National Health Insurance)
JKK	*Jaminan Kecelakaan Kerja* (Social insurance – casualty or work injury compensation)
JKN-PBI	*Jaminan Kesehatan Nasional - Penerima Bantuan Iuran* (Government paid National Health Insurance)
JP	*Jaminan Pensiun* (Social insurance – pension)
KIP	*Kartu Indonesia Pintar* (Education Smart Card)
KKS	*Kartu Keluarga Sejahtera* (Family Welfare Card)
KPS	*Kartu Perlindungan Sosial* (Social Protection Card)
LGST	Luxury Goods Sales Tax
MoF	Ministry of Finance
NPWP	*Nomor Pokok Wajib Pajak* (Single tax identity number)
PIP	*Program Indonesia Pintar* (Smart Indonesia Program)
PKH	*Program Keluarga Harapan* (Family Hope Program)
PKSA	*Program Kesejahteraan Sosial Anak* (Child Social Welfare Program)
PPN	*Pajak Pertambahan Nilai* (Value-added Tax)
PPP	*Pajak Penghasilan Pribadi* (Income Tax)
PPU	*Pekerja penerima upah* (wage-recipient worker)
PTKP	*Penghasilan Tidak Kena Pajak* (Annual non-taxable income)
SASPRI	Southern African Social Policy Research Insights
SUSENAS	*Survei Sosial Ekonomi Nasional* (National Socio-Economic Survey)

TNP2K	*Tim Nasional Percepatan Penanggulangan Kemiskinan* (National Team for the Acceleration of Poverty Reduction)
UNICEF	United Nations Children's Emergency Fund
VAT	Value-added tax

1 INTRODUCTION

During 2020, the COVID-19 pandemic wreaked havoc across the world, causing shockwaves that have impacted on many people's lives and financial security. In the absence of any known cures or preventative vaccines, governments quickly implemented policies to minimize its impact. In particular, public health policies were rolled out which focused on containing the spread of the virus but these measures in turn had a detrimental impact on many economies. In addition, tax and benefit policies were often either augmented or introduced from scratch, in order to mitigate the financial impact of the pandemic and associated containment measures on people's lives. The speed with which initiatives were introduced has been unprecedented: for example, the United Nations Special Rapporteur on extreme poverty and human rights observed that 1,407 new social protection measures had been adopted by 208 countries and territories by September 2020 (UN, 2020).

In this paper we explore how the COVID-19 pandemic has impacted on people's earnings in Indonesia, the extent to which the automatic stabilisers that were already built into the tax and benefit system cushioned the economic shock, and how the augmented or new tax and benefit policies that were introduced because of the pandemic served to further cushion the shock.

The analysis was conducted for each calendar month of 2020 and makes use of a tax-benefit microsimulation model for Indonesia called INDOMOD (Barnes et al., 2019), which is underpinned by the EUROMOD microsimulation software Version 3.1.8 (University of Essex, 2019).

Tax and benefit microsimulation models are particularly powerful tools for examining the separate and combined first order impact of a shock on people's earnings and employment status, and the role of the tax-benefit system in protecting people from the financial aspects of that shock. Examples of country studies that have been or are still being undertaken using the EUROMOD microsimulation software to explore the distributional impact of the COVID-19 pandemic include Ecuador (Jara et al., 2021); Ireland (Beirne et al., 2020); Italy (Figari and Fiorio, 2020); the United Kingdom (Brewer and Tasseva, 2020; Bronka et al., 2020); six countries across Africa – Ghana, Mozambique, South Africa, Tanzania, Uganda and Zambia (Adu-Abubio et al., forthcoming); and Vietnam (forthcoming). This paper is inspired methodologically by these earlier studies, as well as by studies that have applied a technique that draws from anonymized phone data on people's mobility patterns to estimate the shock which is applied to the input dataset (Carlitz and Makbura, 2020; Sampi and Jooste, 2020; Yusuf et al., 2020).

Indonesia also has the distinct advantage of having very up-to-date data with which to underpin the model: the analysis in this paper is based on a dataset derived from SUSENAS (National Socio-Economic Survey Indonesia) 2019 (BPS, 2019).

COVID-19 cases were first reported in Indonesia in March 2020 (Suryahadi et al., 2020) and as at 8th January 2021 there had been 797,723 confirmed cases of COVID-19 and 23,520 deaths (World Health Organization, 2021).

Social distancing to contain the spread of the virus was introduced in Indonesia in March 2020. Using Google mobility data, Yusuf et al. (2020) found that average mobility in Indonesia had fallen by 40 percent by the end of March 2020 compared to the first two weeks of that

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month; by treating mobility reduction as a proxy for the shock to the economy that is associated with rising levels of poverty and inequality, they conducted analysis for the period mid-February 2020 to mid-July 2020 and demonstrated that poor people had been disproportionately affected by the pandemic.

Others have also signalled their concern about the impact of the pandemic on poverty in Indonesia. For example, Suryahadi et al. (2020) estimated that between 1.3 and 19.7 million people could fall below the poverty line based on their estimated best and worst-case scenarios of the economic impact of the pandemic by the end of 2020. Aulia et al. (2020) conducted in-house simulations at the National Development Planning Agency (Bappenas) and estimated that at least 3.6 million additional people would become poor. Most recently a study by UNICEF, PROSPERA, UNDP and SMERU (2021) found that households across all income groups experienced a similar percentage fall in income, with almost a quarter of households also reporting a rise in outgoings on essentials. Furthermore, they found that half of all households had no savings, and that over a quarter of households had reported having to pawn possessions to help cover their costs.

Concerns about rising levels of poverty and especially child poverty are of course not unique to Indonesia (e.g. Sumner et al., 2020; Global Coalition to End Child Poverty, 2020), but Indonesia's size, both in terms of geographical extent and in terms of its population, make it particularly imperative to ensure that the impact of the pandemic can be monitored and mitigated.

Indonesia has a sophisticated tax and benefit system which was well established prior to the pandemic and so the country was able immediately to build on these frameworks (e.g. IPC-IG and UNICEF, 2019; Jellema et al., 2017; TNP2K, 2018; World Bank, 2017). Although Indonesia's social spending prior to the pandemic was regarded as low compared to other middle-income countries (Kim et al., 2020), it nevertheless did make an important dent on inequality. For example, the main social protection arrangements in 2016 have been shown to have reduced inequality by 3.7 percent overall, and by 5.7 percent in rural areas and are poverty-reducing (Yusuf, 2018). Jellema et al. (2017) found that Indonesia's fiscal policy reduces poverty and inequality very slightly overall (though they excluded personal income tax from the analysis). However, very little is known about the impact of the rapid response adjustments to the tax and benefit arrangements that have been made throughout 2020. The main contribution of the analysis presented here is that by using the tax-benefit microsimulation model INDOMOD, which has been especially coded to reflect the different tax and benefit policies that were in place for each month in the calendar year of 2020, it is possible to unpick in a very detailed way the role that the tax and benefit system has played in mitigating the impact of the pandemic on poverty and inequality.

In terms of the structure of the rest of this paper, Section 2 introduces the INDOMOD model, and sets out the tax and benefit policies that are simulated in the model, as well as providing baseline validation statistics for 2019. Section 3 describes the methodological approach that was taken for modelling the policies in each month of 2020, and how INDOMOD's dataset was adjusted to take into account the shocks at different timepoints in the year, and key concepts and assumptions. Two sets of results are then presented: first on the impact of the shock with no additional tax and benefits (Section 4); and second on the combined impact of the shock and the new taxes and benefits (Section 5). This is followed in Section 6 by a discussion about the findings and their implications.

2 INDOMOD

INDOMOD is a static tax-benefit microsimulation model for Indonesia which has been developed by SASPRI for use by Government in collaboration with UNICEF Indonesia (Barnes et al., 2019). It is run using the EUROMOD microsimulation software EM Version 3.1.8 (Sutherland and Figari, 2013; University of Essex, 2019). The version of the model that is used in this paper is INDOMOD V2.1 which is underpinned by a dataset that was derived from the nationally representative National Socio-Economic Survey/ *Survei Sosial Ekonomi Nasional (SUSENAS)* for March 2019 (BPS, 2019), as well as modifications of that dataset which are described in Section 3.

The 2019 SUSENAS survey contains detailed information, including data on income and expenditure, from over 315,000 households and more than 1.2 million individuals. The survey captures detailed information about households and individuals, the most relevant of which for INDOMOD's input dataset comprise information on demographics, education, labour force participation, functional impediments, health insurance, social protection, household expenditure (food and non-food), income from wage/salary, business income, property income, non-consumption income and expenditure, and financial transactions.

As part of the data preparation, a single rectangular file was constructed, comprising a row for each individual with a unique individual (and household) identifier. SUSENAS contains data about 'ordinary households'[1] which are defined as 'a person or a group of persons living in a (physical/census) building or a part of and usually shares meal. Sharing meal means that every day's common needs of the group are managed together as one unit.' (BPS, 2019: 6). Once the data preparation stages had been concluded, involving careful internal validation checks that are set out in Barnes et al. (forthcoming), the file was converted to a text file and brought into INDOMOD as the input dataset. Each of the variables in INDOMOD's dataset was constructed and named to accord with the requirements of the EUROMOD software.

In the rest of this section the main policies that are modelled in INDOMOD are described. These were translated and coded from the policy rules into instructions that can be processed by the EUROMOD software, within the INDOMOD user interface. The policies are also elaborated in more detail in Barnes et al. (forthcoming) but are summarized here.

INDOMOD's 2019 tax and benefit system contains four benefits:

- **Benefit 1** (*Basic Social Assistance*: Electronic Food Voucher/Basic Food Card, *Bantuan Pangan Non Tunai, BPNT/Kartu Sembako*): This is Indonesia's largest non-contributory scheme (TNP2K, 2018). It aims to help the poorest 15.6 million families fulfil some basic food needs and achieve more balanced nutrition. It is now payable electronically, though was previously provided in the form of an in-kind supply of rice.

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[1] The survey does not cover people living in dormitories, barracks, orphanages, prisons, jails, or any foundation or institution which manages daily needs, or people who are living in boarding houses where the number of boarders is 10 people or more.

- **Benefit 2** (*Basic Social Assistance - Conditional*: Family Hope Program, *Program Keluarga Harapan, PKH*): This is a conditional cash transfer paid to the poorest 9.2 million families in Indonesia and is the second largest non-contributory scheme (TNP2K, 2018).

- **Benefit 3** (*Basic Social Assistance*: Smart Indonesia Program, *Program Indonesia Pintar, PIP*): This is a cash transfer paid to school age children from the poorest 25 percent of families in Indonesia.

- **Benefit 4** (*Basic Social Assistance - Conditional*: Child Social Welfare Program, *Program Kesejahteraan Sosial Anak, PKSA*): This combines cash transfers with assistance from social workers and access to basic social services for children with a range of social problems. Only certain aspects of this policy are simulated in INDOMOD as some criteria cannot be identified in SUSENAS.

SUSENAS does not contain sufficient intra-household relationship data to enable families within a household to be identified and so, as an approximation, households were used rather than families in INDOMOD. A proxy means test is used to rank families in terms of predicted expenditure within the Unified Database (*Basis Data Terpadu, BDT*), and as an approximation of this step, the SUSENAS derived variable *kapita* (average monthly expenditure per capita) was used to identify the poorest households.[2] For further details about how low income families were identified in SUSENAS (which does not record whether the family is listed in the Unified Database) see Annex 1. Conditionalities are not simulated in INDOMOD and so it is assumed that eligible beneficiaries are compliant.

Indonesia's social insurance schemes are regulated by Law No. 40 of 2004 on the national social security system, and are managed by *Badan Penyelenggara Jaminan Social Ketenagakerjaan* (*BPJS Ketenagakerjaan* - the Social Security Agency for Employment)[3] and *Badan Penyelenggara Jaminan Social Kesehatan* (*BPJS Kesehatan* - the Social Security Agency for Health). In addition, there is PT Asabri (social insurance for military, police and Ministry of Defence), and PT Taspen (social insurance for all other government employees and employees of state-owned enterprises) (TNP2K 2018: 7), both of which are due to be incorporated into *BPJS Ketenagakerjaan* by 2030. INDOMOD has six policies relating to social insurance contributions:

- **Social contribution 1** (*Contributory scheme 1*: Social insurance pension scheme, *Jaminan Pensiun, JP*): This is a mandatory scheme for all wage-recipient workers, apart from civil servants, the police and the military.

- **Social contribution 2** (*Contributory scheme 2*: Casualty or work injury compensation scheme, *Jaminan Kecelakaan Kerja, JKK*): This is a mandatory scheme for all wage-recipient workers, apart from civil servants, the police and the military.

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[2] The Unified Database is an electronic database of the households in Indonesia with the lowest welfare status. It is used for targeting social assistance programmes. See http://tnp2k.go.id/data-and-indicator/unified-database.

[3] *BPJS Ketenagakerjaan* is not simulated for construction sector and Indonesian migrant workers (i.e. Indonesians working abroad) as there is not sufficient data on these groups in SUSENAS.

- **Social contribution 3** (*Contributory scheme 3*: Survivors' benefit scheme *Jaminan Kematian, JKM*): This is a mandatory scheme for all wage-recipient workers, apart from civil servants, the police and the military.

- **Social contribution 4** (*Contributory scheme 4*: Social insurance – old age savings with disability benefit, *Jaminan Hari Tua, JHT*): This is a mandatory scheme for all wage-recipient workers, apart from civil servants, the police and the military. If a non-wage-recipient worker choses to contribute to this scheme, they must additionally contribute to JKM and JKK.

- **Social contribution 5** (*Contributory scheme 5*: Social insurance for military, police and Ministry of Defence, and all other government employees and employees of state-owned enterprises, *PT Asabri* and *PT Taspen*, part of *Iuran Wajib Pegawai, IWP*).

- **Social contribution 6** (*Health insurance contributory scheme 1*: National Health Insurance, *Jaminan Kesehatan Nasional, JKN*): This is a mandatory scheme which was established in 2014 and consolidated several different health insurance schemes.[4] The government makes contributions on behalf of the poorest families in the form of *Jaminan Kesehatan Nasional - Penerima Bantuan Iuran (JKN-PBI).*

INDOMOD currently simulates two central taxes which are administered by the Directorate General of Taxation:

- **Tax 1** (Personal income tax – labour income[5], *Pajak Penghasilan Pribadi, PPP*): There are four tax bands, and the amount of tax payable takes into account the presence of a spouse and the number of dependants up to a maximum of three.[6] Income from employment is captured at the individual level in SUSENAS 2019 and is summed within a household in the policy. Everyone with income from employment or self-employment is effectively treated as a permanent employee in the model with gross income as the tax base from which deductions are made to give taxable income.[7]

- **Tax 2** (Value-Added Tax on supply of goods and services, *Pajak Pertambahan Nilai, PPN*): The standard rate of VAT is 10%. The rate of VAT on cigarettes is 9.1% and the

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[4] Contributions for non-wage recipient workers and non-workers are not simulated in INDOMOD as these contributions are optional. Government contributions for veterans and pioneers of independence and widows, widowers, or orphans of veterans or pioneers of independence are also not simulated.

[5] Personal income tax for non-labour income is not simulated in INDOMOD as this would require more detailed income data.

[6] There are separate tax rates on severance payments (ranging from 0% to 25%) and lump sum pension fund payments (either 0% or 5%), if paid within two years (PWC, 2019), but these are not simulated in INDOMOD.

[7] Regular pension payments, severance payments and lump sum pension payments should be included in taxable income for the purposes of PIT, however the data in SUSENAS 2019 is not sufficiently disaggregated to enable such income to be separated from other types of income/revenue which are non-taxable. Similarly, pension expenditure should be deducted in the calculation of personal income tax for regular pension recipients but such expenditure is only included in a broad question on household expenditure on financial transactions in SUSENAS 2019 and therefore cannot be taken into account.

rate of VAT on pilgrimage/Hajj costs is 1%, and certain goods and services are VAT-exempt. In the INDOMOD input dataset, the tax base is the amount paid for a particular item (as recorded in SUSENAS 2019) minus VAT (where applicable). VAT is simulated based on the household's expenditure on goods and services (minus VAT where applicable). A total of 258 purchasable items are listed in the income list 'ils_exp_vat01', of which 109 are standard-rated and the rest are zero-rated or VAT-exempt items. The model simulates VAT for cigarettes, and for pilgrimage/Hajj costs separately.

INDOMOD does not simulate corporate income tax as the underpinning dataset is a household survey. Other taxes that are not simulated include the Luxury Goods Sales Tax (*Pajak Penjualan atas Barang Mewah, PPnBM*), Excise duty (*Cukai*), real estate tax, stamp duty, transfer taxes for land, buildings, and shares; environmental taxes, fuel tax, vehicle tax (administered at regional level), and hotel tax (administered at district level).

Before assessing the situation in 2020, it is important to understand how closely INDOMOD simulates the taxes and benefits when compared with external validation data. Annex 2 provides results for 2019. INDOMOD simulates 16.5 million tax payers, compared to 12.6 million recorded tax payers (Table A1.1); with IDR 114.6T of PPP tax, compared to IDR 148.9T of recorded PPP tax receipt for labour income (Table A1.2). As in 2018, INDOMOD simulates 39 percent of recorded domestic VAT in 2019. Simulated expenditure on the main benefits is as follows: INDOMOD simulates 114% of reported expenditure on PKH; 96% of reported expenditure on PIP; and 73% of reported expenditure on BPNT.[8]

3 METHODOLOGY

Modelling the shock

To apply income 'shocks' to each household in INDOMOD's input dataset, quarterly data on the sector and province specific economic growth (increase in value added of specific sector and province) was used as a proxy for income growth of the household whose head works in that sector and lives in that particular region (BPS, 2020b). Although the data on economic growth for quarter 1 to quarter 3 was already available at the point when the analysis was undertaken, it had not been released for quarter 4 and so it was necessary for quarter 4 to model an estimated income shock.

Following, for example, Sampi and Jooste (2020), Google mobility data was used as the leading variable to help project future economic growth of various sectors and provinces (Google, 2020). More formally, we attempted to project future sector-province specific economic growth with the following formula:

$$g_{i,r,t+k} = \varepsilon_i m_r + g_{i,r}^b$$

Where $g_{i,r,t+k}$ is economic growth of sector *i* in region *r* at *t+k* period, $g_{i,r}^b$ is the baseline economic growth before COVID-19 pandemic, m_r is the community mobility deviation from

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[8] Although it is possible to dampen oversimulated benefits on-model, it is not possible to augment undersimulated benefits and so the on-model benefits were left unadjusted at these levels. External validation data for PKH could not be obtained.

before the COVID-19 pandemic and ε_i is the elasticity of the growth difference i.e., $g_{i,r,t+k} - g_{i,r}^b$ with respect to community mobility deviation in province r, or m_r.

We estimate the elasticity, by estimating econometrically the following equation:

$$\Delta g_{i,r,t} = \alpha_{0i} + \varepsilon_i m_{r,t} + e_{i,r,t}$$

Where $\Delta g_{i,r,t}$ is the growth difference i.e., $g_{i,r,t} - g_{i,r}^b$, $m_{r,t}$ is the deviation of community mobility and $e_{i,r,t}$ is the error terms. To estimate this relationship, we use economic growth data of ten economic sectors (see Annex 3) and 34 provinces. We use observations from two quarters to estimate the relationship. The results of the estimation can be found in Annex 4. We use three different kind of mobilities (workplace, retail and transit). We pick the type of mobility that gives the correct sign with the smallest P-values.[9]

Modifying the input dataset

As set out in Section 2, INDOMOD is currently underpinned by a dataset that was derived from the March 2019 SUSENAS dataset. As an underpinning dataset for the first quarter of March 2020, it can be expected to function quite well by simply adjusting the income data using the Consumer Price Index (CPI). However, given the large impact of the pandemic and the measures to contain it, it is not appropriate to use this input dataset for subsequent months without first additionally incorporating the 'shock' into the dataset. This enables the tax and benefit policies for each month to be applied to more appropriate input datasets that contain in-built estimates of the shock.

The macro-modelling of the shock is described in the previous sub-section. These macro-level estimates were then used to modify some of the key input variables in INDOMOD's microdataset, following the methodology applied in Adu-Ababio et al. (forthcoming). The objective is to reduce the total income derived from employment, self-employment (and farm income, for those employed in the agricultural industry), that is earned by workers in each industry by province, by a given proportion depending on the shock estimate for that industry and province. For example, it is assumed that a five percent shock in construction in a particular province would result in the labour income in construction in that province being reduced by five percent.[10] This is achieved by randomly removing labour income from workers in construction in that province, regardless of their pre-crisis income. Most of the adjustment is therefore made at the extensive margin, but at the intensive margin the remaining employees had their incomes adjusted in order that the total labour income for a given industry reflects the industry-level shock.

These steps were undertaken in STATA for each of quarters 2, 3 and 4 in 2020. Individuals whose labour income was reduced to zero had their earnings variables (*yem* and *yse,* and *yag* if employed by the agricultural sector*)* correspondingly set to zero, and their employment status variable (*les*) changed to 'unemployed'. This was applied to individuals based on their industry (*loc*) and province (*drgn1*). For each of quarters 2, 3 and 4, the starting point was the

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[9] In the case where no meaningful and significant relationship was found for certain sectors, we assume that the elasticity is zero and use the previous economic growth to carry forward for the next period (we use the lags of growth instead).

[10] See the final part of this section for a discussion of other assumptions made.

situation in quarter 1 and the relevant shock for the quarter was applied, as described above. Therefore, over the year, for example, an individual in a particular sector might have their earnings reduced to zero (and *les* changed to 'unemployed') in quarters 2 and 3, but then return to their quarter 1 situation for quarter 4 if there is a recovery in their particular industry and province.

As poverty is measured in Indonesia using consumption data, the composite consumption variable in the input dataset (*xhh*) also had to be adjusted to reflect the shock, and again the approach applied in Adu-Ababio et al. (forthcoming) was used (see also Lastunen et al., 2020). First, consumption was allocated to each earner within the household in proportion to their pre-shock earnings, and then for each earner, 25 percent of their consumption was ringfenced as a crude proxy for an undifferentiated mix of consumption achieved via home grown production, use of savings, or the incurring of debt. The remaining consumption was then reduced by a factor derived by multiplying the income shock by the proportion to which earned income had comprised their pre-shock total market income.

Modelling the tax and benefit policies for 2020

In INDOMOD and other country models that use the EUROMOD software, it is customary for a single tax-benefit system to be used for each year, usually reflecting a mid-calendar year timepoint. For INDOMOD the usual timepoint is March of each year, to match the timepoint of the underpinning dataset. The tax and benefit rules in that system primarily reflect the rules in place at that timepoint, but the EUROMOD software also has the in-built flexibility to accommodate policy changes that occur within the year; this means that any policy changes that occur can be incorporated into the single tax-benefit system so that when the simulated results are annualized any changes either side of the timepoint are still taken into account. However, given the number of policy changes that occurred in 2020 in Indonesia, a new system (that is, the set of tax and benefit rules) was created for each of the months of 2020 to aid transparency.

Accordingly, new systems were created for each of the twelve months of January through to December 2020, and monetary values were adjusted month on month using the CPI. The policy changes that were incorporated are summarized in Annex 5[11] but in brief the adjustments to the policies that were made comprised the following:

- The target number of families for **PKH** was raised from 9.2 million families (January – March) to 10 million families (April – December)
- The target number of families for **BPNT** was raised from 15.6 million families (January – March) to 19.4 million families (April – December), and the value of the benefit was increased from IDR 150,000 per month (January – March) to 200,000 per month (April – December)
- A new benefit was introduced called **Basic food assistance for Jabodetabek** for 2.2 million families, payable at IDR 600,000 per month (April – June) and IDR 300,000 per month (July – December). This is payable to families who are not in receipt of BPNT or PKH.

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[11] See also Annex 1 for an account of how the poorest households were identified in the input data for three of the new COVID benefits.

- A new benefit was introduced called **Cash transfer non-Jabodetabek** for 9.2 million families in non-Jabodetabek areas, payable at IDR 600,000 per month (April – June) and IDR 300,000 per month (July – December). This is payable to families who are not in receipt of BPNT or PKH.
- A new benefit was introduced called **Village Fund cash transfer** for 8 million families in non-Jabodetabek rural areas, payable at IDR 600,000 per month (April – June) and IDR 300,000 per month (July – December). This is payable to families who are not in receipt of BPNT or PKH.
- A **cash support expansion** was introduced for 9 million families (in receipt of BPNT but not PKH), payable as a once off payment of IDR 500,000 per household.
- A **wage subsidy** was introduced for 12.4 million individuals registered in BPJS Ketenagakerjaan with employment income of less than IDR 5 million per month, comprising two payments of IDR 1.2 million covering a four month period (between August – December).[12]
- **Pre-employment cards** were introduced for 5.6 million unemployed individuals who are not in receipt of any social assistance, payable at IDR 600,000 per month for four months (across April – December) plus an incentive payment of IDR 150,000.

Certain policies were not modelled in INDOMOD including:

- Food assistance expansion/rice subsidy of 15 kgs of rice per month (August – October) for 9 million families.
- Monthly electricity subsidy in the form of a voucher/discount from April-December that consisted of 24 million households using 450 VA category (with 100% monthly discount of electricity bill) and 7 million households using 900 VA category (50% monthly discount of electricity bill).
- Cash transfers for 10.4 million micro-level businesses. Most of the business entities are households and they were paid the same amount of cash benefit as in the wage subsidy programmes, comprising a payment of IDR 2.4 million in one-time transfer.
- In addition, there was an interest rate subsidy for 19.1 million MSMEs, a credit guarantee for 890.2 thousand MSMEs, and credit incentives for 1 million women under Mekaar Programmes.

A tax-benefit system was built for each month of 2020 in INDOMOD. Table 1 shows which datasets were used for each system.

Table 1   Modelled scenarios

Quarter of 2020	Month in 2020	System name	Model version and Dataset
1	January	ID_2020_January	INDOMOD v2.1a id_2019_a1
	February	ID_2020_February	
	March	ID_2020_March	
2	April	ID_2020_April	INDOMOD v2.1b id_2019_a1_shock_q2
	May	ID_2020_May	
	June	ID_2020_June	
3	July	ID_2020_July	INDOMOD v2.1c id_2019_a1_shock_q3
	August	ID_2020_August	
	September	ID_2020_September	

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[12] In addition, there was a target of 2 million honorary teachers under the Ministry of Education, and 620,000 honorary teachers under the Ministry of Religious Affairs but these were not simulated in INDOMOD.

4	October	ID_2020_October	INDOMOD v2.1d
	November	ID_2020_November	id_2019_a1_shock_q4
	December	ID_2020_December	

In order to generate the results, INDOMOD was run 21 times: once for each month in 2020 with the appropriate input dataset; and for Quarters 2, 3 and 4 of 2020 the systems were re-run for each month with COVID-19 benefits switched off. Results on the impact of the shock of the pandemic and the state-funded tax and benefit policies are presented below on a quarterly basis, either by averaging the simulated results for the relevant variables for the three months within a quarter, or by using the results for the month in the mid-point of the respective quarter.

Assumptions

Regarding tax and benefit payment and receipt, INDOMOD applies the 'de jure' position, whereby everyone in the underpinning dataset who is identified in the model as being eligible for benefits receives them, and there is full compliance in the payment of taxes and social insurance contributions. For this reason alone, the poverty rates generated using the simulated results will differ from those published by BPS for 2020 - the differences are summarised and discussed in the final section.

Any comparison to reported results from administrative sources needs to take into account the possibility of inclusion errors (recipients on the system who are ineligible) or exclusion errors (eligible individuals who are not registered on the system).

In addition, the accuracy of the simulations depends on the accuracy of the underpinning dataset, in terms of the extent to which it is nationally representative, the accuracy of the demographic and income and expenditure data, and the precision with which the tax or benefit policies could be modelled. Assumptions made when constructing the variables in the input dataset are described in Barnes et al. (forthcoming), along with assumptions relating to the implementation of the 2019 policy rules, many of which are relevant to the analysis presented in this paper.

The following assumptions relate specifically to the policy changes and new policies introduced in response to COVID-19:

1. The **cash support expansion** is a one-off payment which was simulated in the model in April as a monthly amount.
2. For the **wage subsidy** policy, an on-model flag for non-government wage recipient workers was used as a proxy for being registered with BPJS. The wage recipient worker (*lwr*) variable was not modified in the input datasets, so that even if someone lost all or part of their employment income they could still be identified via the *lwr* flag. This was important for the wage subsidy policy as it is paid to workers who are furloughed or whose pay is reduced rather than those who lose their jobs, and therefore membership in the social security schemes is assumed to continue.

3. The **wage subsidy** policy was applied to individuals with pre-crisis employment income (*yem00*) of less than IDR 5 million per month and shocked employment income (*yem*) that is less than pre-crisis employment income (who were also non-government wage recipient workers). This resulted in a significant over-simulation of the benefit and therefore it was necessary to apply a 'dampening' procedure on model to bring the simulation in line with the targeted number of recipients.

4. A *les* variable was created specifically for INDOMOD v2.1 and is used in the **pre-employment cards** policy where it is necessary to identify the unemployed. Anyone not recording 'working' as an activity in the last week and also without a job or business to return to was classified as unemployed. However, anyone who also met the criteria for one of the categories of student, inactive, sick/disabled or other was not classified as unemployed. This policy also required a 'dampening' procedure on model to bring the simulation in line with the targeted number of recipients.

Regarding the modelled shock on earnings, the main assumption as described above is that the income of households is adjusted using the reported or projected economic growth by sector and province. For quarter 4, economic growth is projected using community mobility data from Google. It is assumed that the household whose head has employment in a specific economic sector and certain regions will experience an income decline proportional to the economic growth of that particular sector in that particular region.

With regard to analysis of the impact of the pandemic and the tax-benefits on poverty, certain assumptions were also made. The main assumption, which underpins any analysis using consumption to measure poverty impacts, is that a simulated benefit (income into the household) adds to consumption by the amount of the benefit, while a simulated tax reduces consumption by the amount of the tax. Furthermore, all households are assumed to be liquidity constrained, that is they are unable to borrow to smooth consumption in shock scenarios (see Adu-Ababio et al., forthcoming). Consumption expenditure is therefore dependent on disposable income. However, in practice the relationship between income and expenditure may not be one-to-one for all consumption items, even in households which are liquidity constrained.

The economic shock of the pandemic was considered only with respect to labour income (employment, self-employment and agricultural income). However, it may be that inter-household transfers became an important income stream for mitigating the impact of the crisis, so a focus on tax-benefit policies alone may not give a complete picture (Jara et al., 2021).

4   RESULTS – THE MARCH 2020 BASELINE

In this section, baseline results are presented for March 2020, just at the outset of the pandemic. This provides context for Sections 5 and 6 which compare the four quarters of 2020.

As a starting point, a profile for March 2020 is given in terms of the distributional impact of the benefits that were in place at that time, using simulated results from INDOMOD V2.1. Figure 4.1 shows the situation in March 2020 with respect to mean monthly household consumption by decile, and the role that the pre-existing benefits were playing before the pandemic took hold. The green bars (mean household consumption by decile including receipt of simulated benefits) show the important role that the benefits had for those in deciles 1-3 in particular, when compared to deciles of household consumption having excluded (i.e. switched off) the simulated benefits (shown in red).

Figure 4.1   Deciles of mean monthly household consumption in Indonesia, with and without social benefits, March 2020
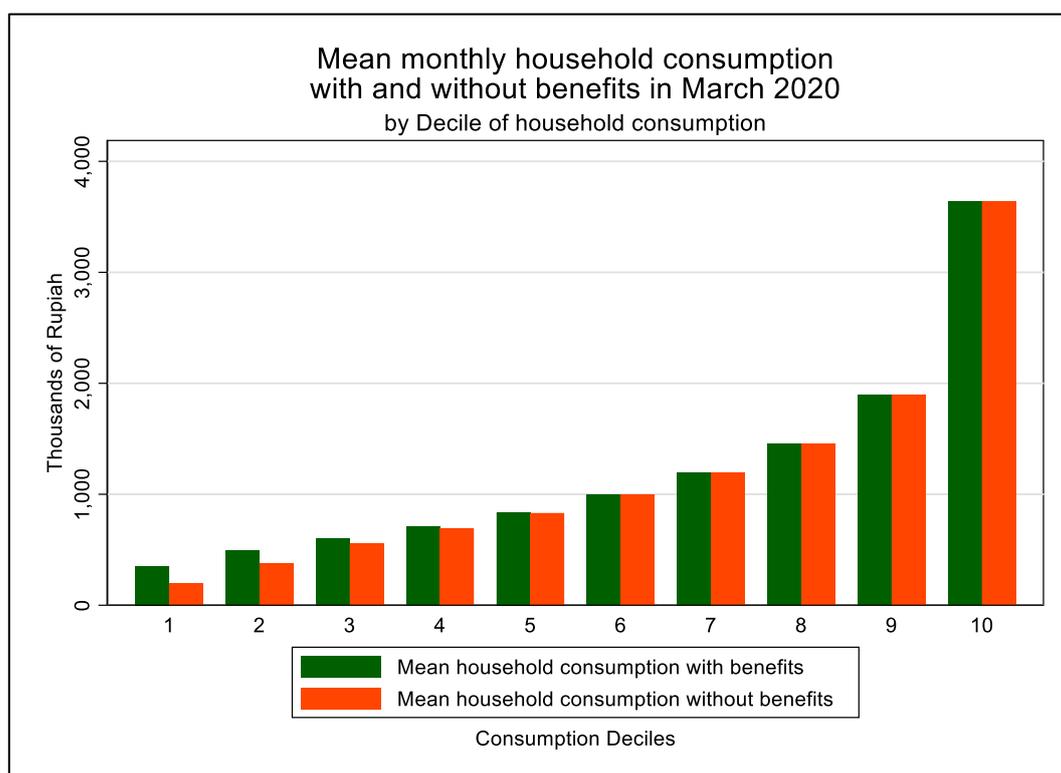
Source: Authors' analysis using INDOMOD V2.1.

Depicted another way, Figure 4.2 shows how household consumption would fall if there were no benefits in place in March 2020 (i.e. having switched off all benefits in INDOMOD for the March 2020 timepoint).

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Figure 4.2   Change in mean monthly household consumption in Indonesia by decile if there were no social benefits, March 2020
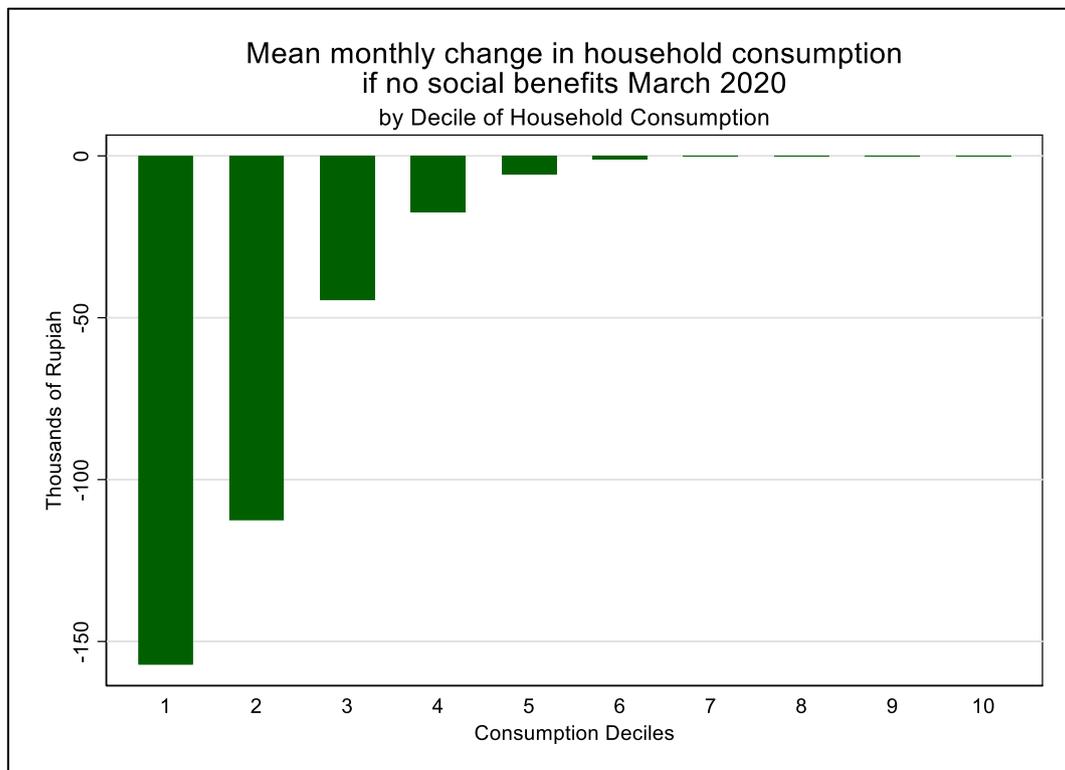
Source: Authors' analysis using INDOMOD V2.1.

The benefit system that was in place ahead of the pandemic was therefore playing an important part in supporting low income families. Indeed, in March 2020 the consumption-based poverty rate would have increased from 6.4 percent to 15.2 percent if there had been no benefits in place, a rise of almost nine percentage points (Table 4.1). The groups that would have been most adversely affected by the absence of the benefits that were in place prior to the pandemic were households containing one or more older people (their poverty rate would increase by more than 12 percentage points), followed by households containing one or more children (their poverty rate would increase by more than 10 percentage points). The depth of poverty would also have increased substantially in the absence of any benefits, with the FGT1 increasing from 0.83 to 5.15. Similarly, consumption-based inequality for March 2020 would have risen from a Gini coefficient of 0.374 to 0.403 if there had been no benefits.

Table 4.1   Consumption based poverty and inequality in Indonesia, with and without social benefits, March 2020

	March 2020 Baseline A	March 2020 with no benefits B	Difference (B-A)
Share of poor population, in %			
All	6.81	15.43	8.62
Poor households out of ...			
... male headed households	6.70	15.26	8.56
... female headed households	7.67	16.78	9.11
... households with children	7.59	17.56	9.97
... households with older persons	10.57	22.38	11.81
Poverty gap (average normalised poverty gap, FGT(1))			
All	0.89	5.33	4.44
Poor households out of ...			
... male headed households	0.88	5.19	4.31
... female headed households	1.02	6.43	5.40
... households with children	1.00	6.06	5.07
... households with older persons	1.39	8.59	7.20
Gini (household income)	0.3723	0.4035	0.0312
P80/P20	2.83	3.23	0.40
Quantiles of distribution and median	IDR		
20th	6,876,178.32	6,032,591.01	-843,587.31
40th	9,335,834.64	9,189,955.88	-145,878.76
50th	10,958,145.00	10,889,965.84	-68,179.16
60th	13,041,102.48	13,028,532.96	-12,569.52
80th	19,458,819.12	19,457,939.58	-879.54

Source: Authors' analysis using INDOMOD V2.1.

The SUSENAS dataset enables comparable baseline analysis to be undertaken by mean household disposable income, and this is presented in Annex 6. For example, Figure A6.1 in Annex 6 provides a similar to picture to that of Figure 4.1 but the impact of the benefits is discernible across more of the deciles of mean monthly household disposable income than for consumption. This is also reflected in Figure A6.2, where the change in mean monthly household income is more pronounced across more of the deciles.

5   IMPACT OF COVID-19 ON EARNINGS

In this section, results are presented on the impact of the COVID-19 pandemic and the containment measures on earnings in the labour market. The results are obtained from INDOMOD's input datasets, having applied the shocks described in Section 3, as listed in Table 1.

Figure 5.1 shows the number of workers in the four quarters of 2020 by sector.[13] Each sector saw the largest fall in the number of workers between quarter 1 and quarter 2 with the greatest reduction being for those working in the Trade, Hotel and Restaurant sector. Some recovery is evident in quarters 3 and 4, particularly in Trade, Hotel, and Restaurants; Transport; and Services.

Figure 5.1   Number of workers in Indonesia by sector by quarter in 2020
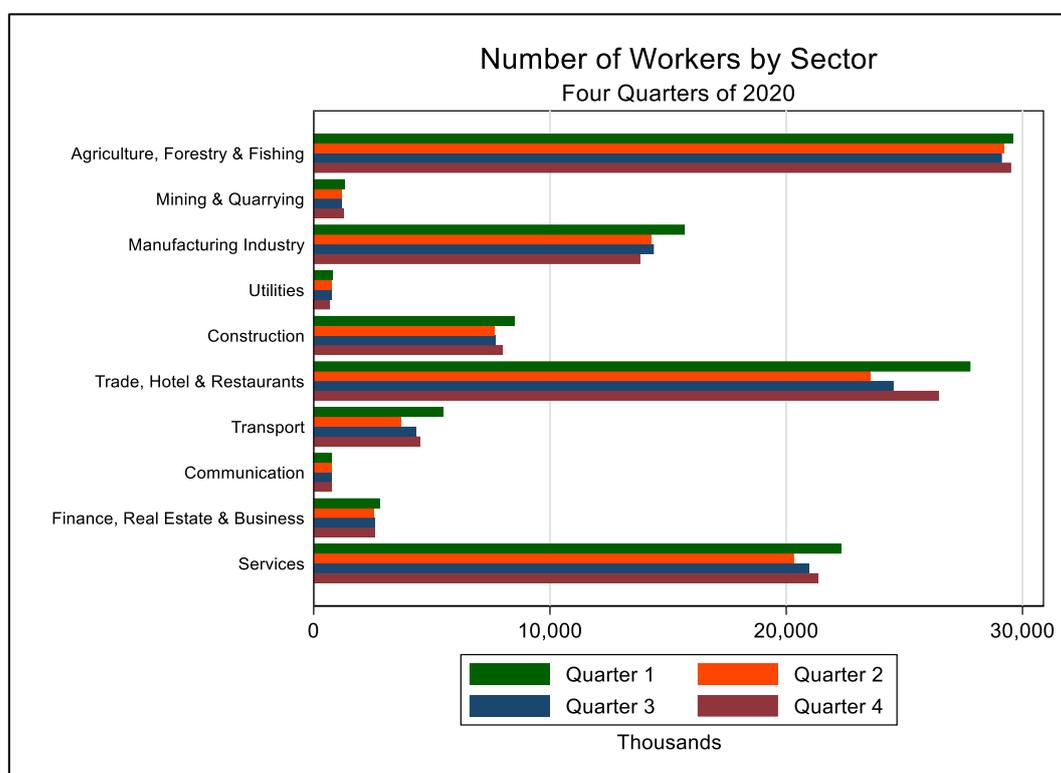

Source: Authors' analysis using the input datasets listed in Table 1.

The mean monthly employment earnings also dropped in each sector between quarter 1 and quarter 2 apart from Communication (see Figure 5.2).

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[13] Unless otherwise stated, the quarterly numbers/amounts in this and subsequent figures are obtained by averaging the key variables for the three months in that quarter.

Figure 5.2   Mean monthly earnings in Indonesia by sector by quarter in 2020
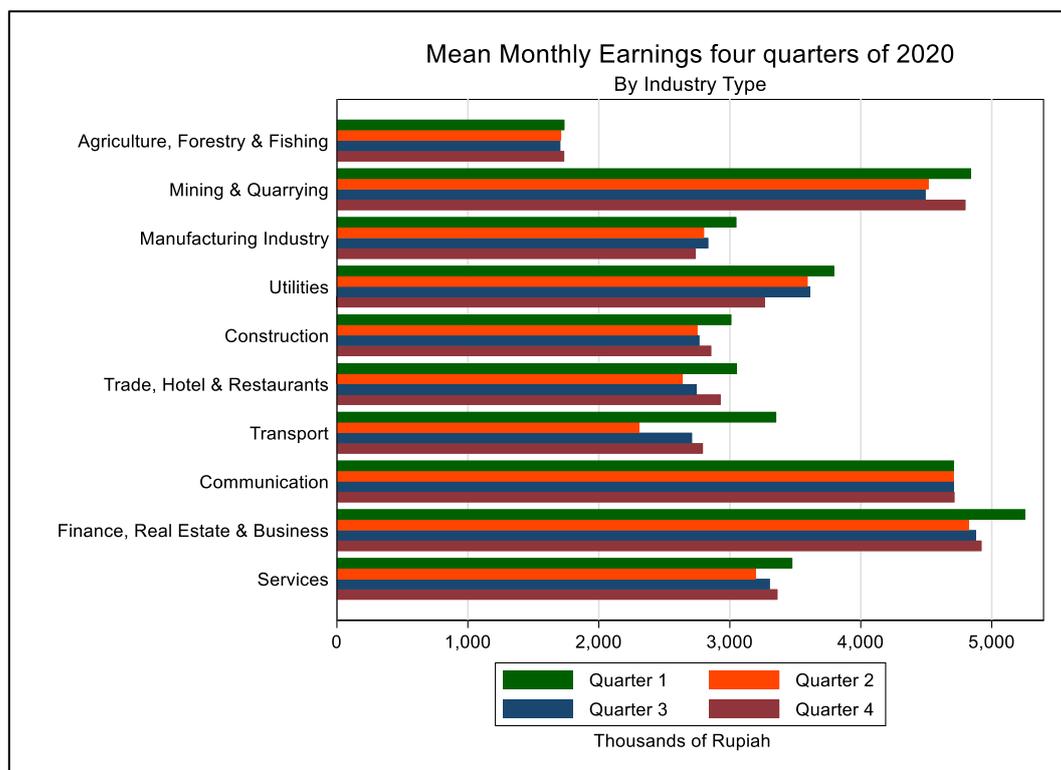
Notes: The figures for Q2, Q3 and Q4 include the zero earnings of the individuals who were in employment in Q1 but were not in employment in one or more of the subsequent quarters. Source: Authors' analysis using the input datasets listed in Table 1.

6   RESULTS - COMBINED IMPACT OF COVID-19 AND THE TAX-BENEFIT POLICIES

In this section, results on the combined impact of the shock of the pandemic and the tax and benefit policies are presented.

Results including the COVID-19 policies

Figure 6.1 shows that the mean monthly household consumption in Indonesia fell between the first two quarters of 2020, across the whole distribution. Figure 6.2 shows that in absolute terms the fall in mean monthly household consumption increases by decile, with the greatest fall in absolute terms occurring in the tenth decile. It also shows that the mean monthly household consumption levels did not recover to the levels of quarter 1 for any of the ten deciles. This means that even with the automatic stabilisers and the remedial additional benefits, consumption levels did not fully recover by quarter 4 across the whole distribution.

Figure 6.1   **Deciles of mean monthly household consumption in Indonesia by quarter in 2020**
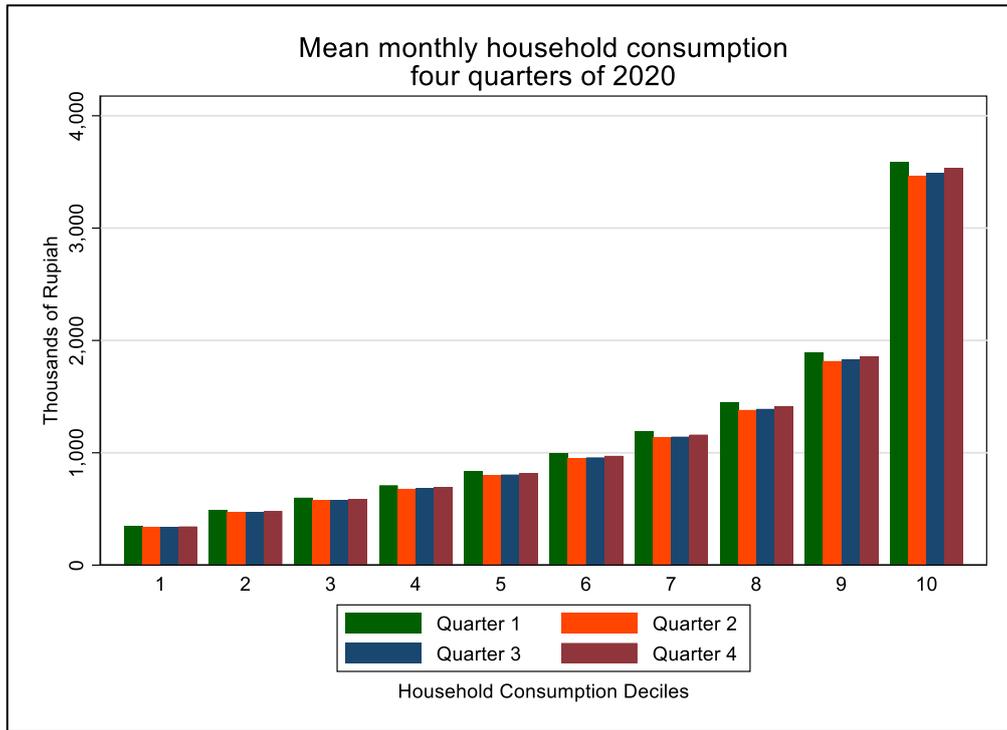
Source: Authors' analysis using INDOMOD V2.1.

Figure 6.2   **Change in mean monthly household consumption in Indonesia by quarter in 2020**
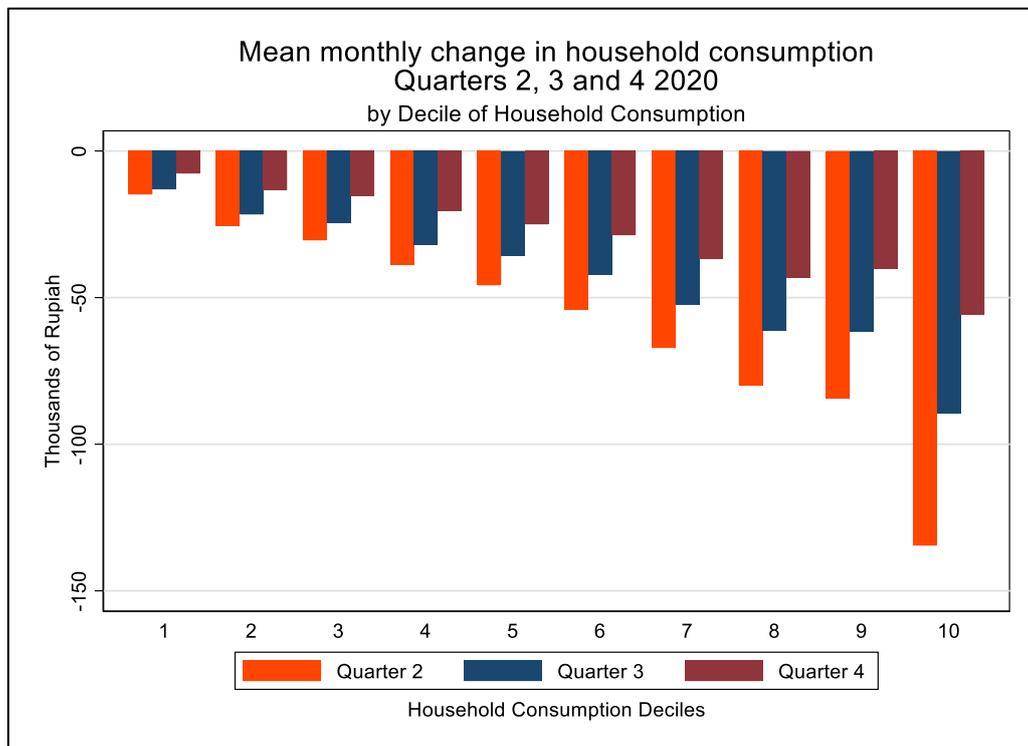
Source: Authors' analysis using INDOMOD V2.1.

Figure 6.3 shows the percentage fall in mean monthly household consumption by decile. All deciles, apart from decile 10, experienced a fall in mean monthly household consumption between quarter 1 and quarter 2 of more than 4 percent. Comparing quarter 3 with quarter 1, deciles 2 to 8 still had a mean monthly household consumption fall of more than 4 percent. By quarter 4, the mean monthly fall in household consumption had reduced to less than 2 percent for decile 10, but was still greater than 2 percent for deciles 1 to 9.

**Figure 6.3   Percentage change in mean monthly household consumption in Indonesia by quarter in 2020**
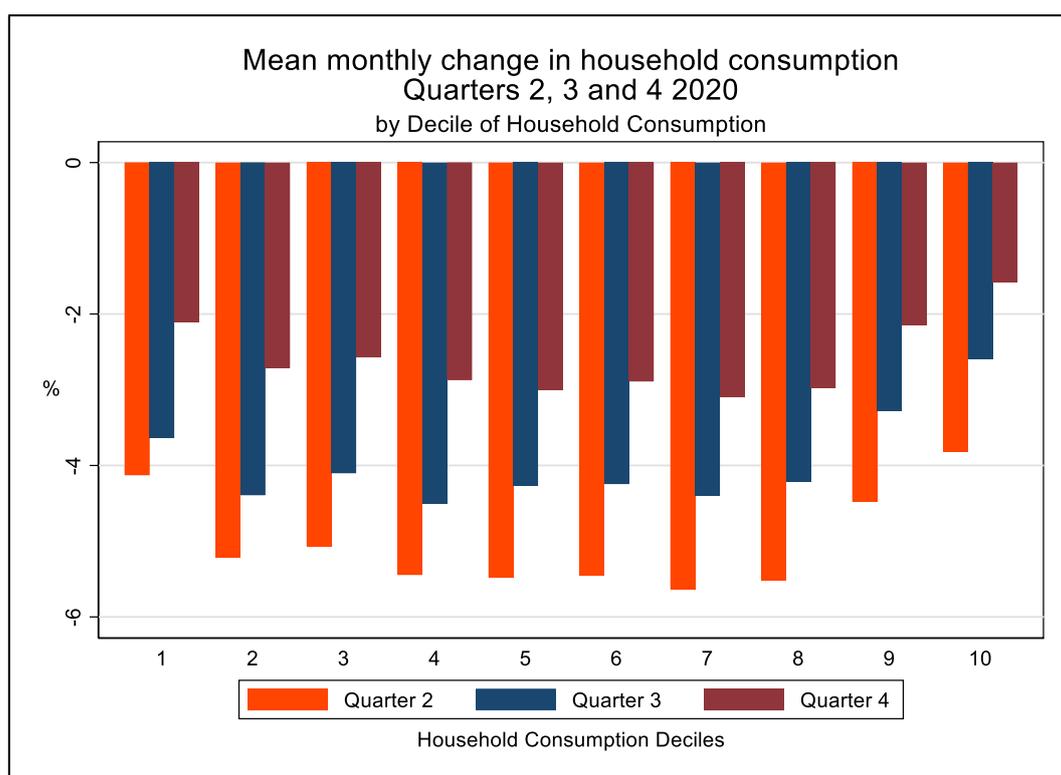
Source: Authors' analysis using INDOMOD V2.1.

Figure 6.4 shows the poverty rates for each month for all households (in red), and for households containing one or more children (in yellow), and households containing one or more older people (in purple) (these sub-groups are not mutually exclusive). Overall, household poverty rose from 6.8 percent at the start of the year to a high of 8.3 percent in May, falling by the end of the year to 6.9 percent.

This pattern is broadly repeated by the different household types. Notably, households containing one or more older people, and (to a lesser extent) containing one or more children, have higher poverty levels than the overall household poverty levels in each month. So, households containing one or more children started the year with a poverty rate of 7.6 percent, rising to a high of 9.5 percent in May; and households containing one or more older people started the year with a poverty rate of 10.6 percent, rising to a high of 11.4 percent in

May. For both sub-groups, and for the overall population, poverty increased a little between October and December 2020: this is likely to be due to the phasing out of the Pre-Employment Card and Wage Subsidy COVID-19 policies (see Annex 5).

Figure 6.4   Poverty in Indonesia by month, 2020
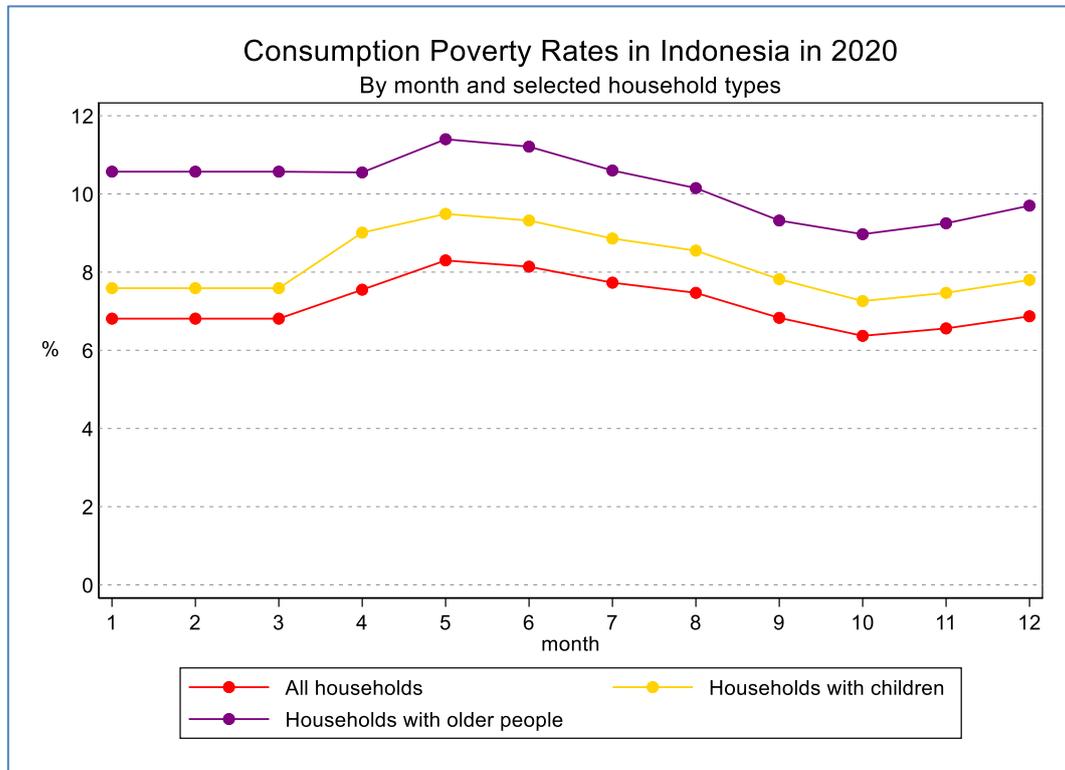
Source: Authors' analysis using INDOMOD V2.1.

A subset of these results including poverty depth and inequality measures are presented in Table 6.1 below which shows how poverty changed between the mid-points of each quarter: February, May, August and November 2020. In November, the poverty rates are slightly lower than the start of the year for the total population and all sub-groups shown, though as can be seen in Figure 6.4, overall poverty did increase further in December.

Table 6.1   Consumption-based poverty and inequality in Indonesia in February, May, August and November 2020

	February 2020 Baseline	May 2020	Difference to baseline	August 2020	Difference to baseline	November 2020	Difference to baseline
	A	B	(B-A)	C	(C-A)	D	(D-A)
Share of poor population, in %							
All	6.81	8.30	1.50	7.47	0.66	6.56	-0.25
Poor households out of …							
… male headed households	6.70	8.30	1.60	7.49	0.79	6.55	-0.15
… female headed households	7.67	8.32	0.65	7.29	-0.38	6.65	-1.02
… households with children	7.59	9.49	1.90	8.55	0.96	7.47	-0.13
… households with older persons	10.57	11.40	0.83	10.15	-0.42	9.25	-1.32
Poverty gap (average normalised poverty gap, FGT(1)) *All*	0.89	1.45	0.56	1.21	0.32	1.01	0.12
Poor households out of …	0.88	1.46	0.58	1.23	0.35	1.02	0.14
… male headed households	1.02	1.37	0.35	1.08	0.06	0.96	-0.07
… female headed households	1.00	1.67	0.68	1.40	0.41	1.16	0.16
… households with children	0	0	0	0	0	0	0
… households with older persons	6.81	8.30	1.50	7.47	0.66	6.56	-0.25
Gini (household income)	0.3723	0.3647	-0.0076	0.3663	-0.0060	0.3614	-0.0109
P80/P20	2.83	2.82	-0.01	2.78	-0.05	2.73	-0.10

Notes: The household subgroups are not mutually exclusive.

Source: Authors' analysis using INDOMOD V2.1.

Results excluding the COVID-19 policies

The question remains though – how might the situation have looked if there had not been additional remedial policies put in place? That is, to what extent would the inbuilt automatic stabilisers in the tax-benefit system have protected people from the economic shock?

In order to quantify the impact of the additional benefits that were introduced to mitigate the impact of the pandemic, scenarios were modelled in INDOMOD with the new benefits switched off but the original benefits retained. Figure 6.5 shows the overall poverty rates for each month in 2020, for scenarios without the additional COVID benefits (shown in purple), and with the additional COVID benefits (shown in red, and summarised in Annex 5).

Poverty would have risen to higher levels and would have remained higher than in the first quarter thereafter, without the introduction of the additional support. The new or augmented benefits therefore played a vital role in protecting people from the economic shock of the pandemic in 2020.

Figure 6.5   Poverty in Indonesia by month in 2020 – with and without additional COVID benefits
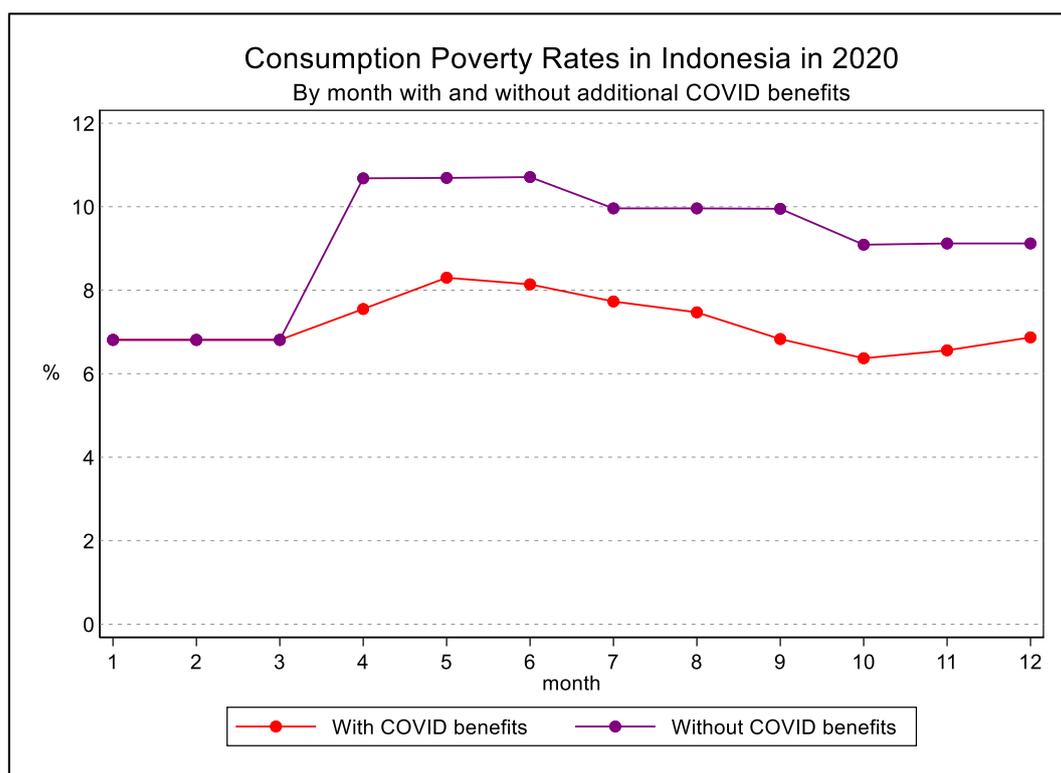
Source: Authors' analysis using INDOMOD V2.1.

To supplement Figure 6.5, Table 6.2 shows how poverty changed between February, May, August and November 2020 (the mid-points of the four quarters), for a hypothetical situation where the benefit rules that existed in February 2020 continued throughout the year. Applying the February tax-benefit rules to all four quarters, poverty would have increased

overall from 6.8 percent in February to a high of 10.7 percent in May 2020, falling to 9.1 percent in November 2020 (as seen in the purple line in Figure 6.5). The subgroups that would have been worst affected in May without the additional benefits comprise households containing one or more older people, and households containing one or more children: for these subgroups, poverty would have risen in May 2020 to 14.3 percent and 12.0 percent respectively.

Table 6.2   Consumption-based poverty in Indonesia in February, May, August and November 2020 – without the extra COVID benefits

	February 2020 Baseline	May 2020	Difference to baseline	August 2020	Difference to baseline	November 2020	Difference to baseline
	A	B	(B-A)	C	(C-A)	D	(D-A)
Share of poor population, in %							
All	6.81	10.69	3.88	9.96	3.15	9.12	2.31
Poor households out of ...							
... male headed households	6.70	10.68	3.98	9.92	3.22	9.07	2.37
... female headed households	7.67	10.79	3.12	10.24	2.56	9.51	1.84
... households with children	7.59	11.99	4.40	11.15	3.56	10.20	2.60
... households with older persons	10.57	14.25	3.68	13.52	2.95	12.75	2.18
Poverty gap (average normalised poverty gap, FGT(1))	0.89	2.07	1.18	1.86	0.97	1.56	0.67
All							
Poor households out of ...	0.88	2.08	1.21	1.87	0.99	1.57	0.69
... male headed households	1.02	1.98	0.96	1.79	0.77	1.53	0.51
... female headed households	1.00	2.34	1.34	2.10	1.11	1.76	0.76
... households with children	1.39	2.54	1.15	2.36	0.97	2.07	0.68
... households with older persons	6.81	10.69	3.88	9.96	3.15	9.12	2.31
Gini (household income)	0.3723	0.3863	0.0139	0.3844	0.0121	0.3808	0.0085
P80/P20	2.83	2.96	0.13	2.94	0.11	2.91	0.08

Notes: The household subgroups are not mutually exclusive.

Source: Authors' analysis using INDOMOD V2.1.

7 CONCLUSION AND DISCUSSION

The COVID-19 pandemic is ongoing, and there is great uncertainty about how it will impact on different countries over the next few years. However, the results presented in this paper show that in 2020, Indonesia took swift and decisive action to protect its citizens from the economic shock of the pandemic and the measures to contain the virus.

The analysis shows that consumption fell across the deciles in quarters 2, 3 and 4 when compared with quarter 1 of 2020 (Figure 6.2). In absolute terms, the declines were greater for the wealthier deciles (Figure 6.3). However, in relative terms, the declines were broadly similar across the distribution (Figure 6.4), though slightly more pronounced for deciles 2-9 than for the poorest and wealthiest deciles.

Prior to the pandemic, around 6.8 percent of people were below the poverty line. Without the introduction of the COVID-19 policies that were simulated in INDOMOD, poverty would have risen to a high in May of 10.7 percent. However, due to the introduction of the COVID-19 policies, our estimates suggest that poverty rose only to a high of 8.3 percent in May, falling by the end of the year to 6.9 percent (Figure 6.5).

The poverty estimates for 2020 in this paper are lower than those published by BPS for March and September 2020: the official poverty rate in March 2020 was 9.78 percent (BPS, 2020c: 1), and 10.19 percent in September 2020 (BPS, 2020d: 1). In contrast, the simulated results presented in this paper yielded a poverty rate of 6.81 percent for March and 6.83 percent for September 2020 (with the peak occurring in May at 8.30 percent).

There will be several reasons for the discrepancy. First, the official poverty rates were generated using the SUSENAS datasets for March and September 2020, whereas the analysis presented here was generated using a modified version of the SUSENAS 2019 dataset: the analysis was undertaken 'live', in tandem with the unfolding of the pandemic and the SUSENAS 2020 datasets were not available at the time. We estimated the impact of the pandemic and associated lockdown on people's jobs and earnings, using published economic growth data for quarters 2 and 3, and for quarter 4 the impact of the shock was modelled using open source mobility data. Second, the shock was applied to the SUSENAS 2019 dataset by sub-group (sector and province) but there will of course have been variations within each subgroup that are not taken into account. Third, we do not estimate the impact of additional shocks (such as illness or changes in material needs or expenditure patterns) which would have been captured in SUSENAS 2020. And fourth (though this is a counter point) we do not estimate the impact of the unsimulated policies such as the electricity subsidy. Lastly, we simulate the 'de jure' tax and benefit rules, rather than the 'de facto' application: by assigning benefits to the poorest households within SUSENAS, the benefits will be more precisely assigned to the poorest individuals in our simulations than could occur in practice where eligibility is often determined using the *Basis Data Terpadu* (Unified Database).

Nevertheless, for the policies that have been modelled, it is clear that they served to protect millions of people from a greater financial shock than would otherwise have been the case. Based on our results, for households containing one or more children poverty would have

risen to a high of 11.99 percent in May 2020 without the COVID-19 policies, but instead rose to 9.49 percent. Also, for households containing one or more elderly people, poverty would have risen to a high of 14.25 percent without the COVID-19 policies, but instead rose to 11.40 percent.

The Government of Indonesia (GoI) is continuing to apply countercyclical measures in 2021 to handle the Covid-19 pandemic and to mitigate the economic downturn through its 2021 State Budget. The GoI's 2021 fiscal policy direction is intended to be expansive yet consolidative, with the deficit level at 5.7% of GDP, and is expected to gradually return to its ceiling of 3% of GDP in 2023. The State Budget has been designed to support the return of Indonesia's economy to its medium-term growth trajectory while anticipating global economic recovery uncertainty.

Understanding the vital role of National Economic Recovery (*Pemulihan Ekonomi Nasional/PEN*) programmes in preserving economy and combatting pandemic, the GoI has committed to strengthen this program in 2021. The allocation for PEN programmes is IDR 699.43 Trillion to finance health measures and the social safety net, and to support the economic recovery from both the supply and demand-side. That amount is 21% higher than the PEN realization in 2020. The additional budget is intended to finance the vaccination program, protect household's consumption, and create jobs. In terms of supporting household consumption in 2021, especially for poor and vulnerable groups, the GoI will maintain the Program Keluarga Harapan (PKH) for 10 million families, BPNT/Kartu Sembako for 18.8 million families, Cash Assistance (for people not in receipt of PKH and Kartu Sembako) for 10 million families, the Village Fund Cash Transfer for 8 million families not in receipt of other programmes, Pre-employment Cards for 5.6 million unemployed people, a monthly electricity subsidy, and an internet quota subsidy for students and teachers.

These initiatives demonstrate the strong commitment of the Government to protect people from the impact of the pandemic and associated reductions in earnings using adaptive social protection. It will be important to continue to monitor the impact of these policies as the pandemic unfolds.

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Standardising the expenditure data

As the cost of living is not the same in all parts of Indonesia, the country has a total of 67 poverty lines which vary by province and urban/rural classification. There are 33 urban poverty lines and 33 rural poverty lines for each of the provinces other than Jakarta, and one urban poverty line for Jakarta. The variation in poverty lines reflects the variation in prices throughout the country, and so the poverty line variation was accordingly used to adjust per capita expenditure in INDOMOD's input dataset. A multiplier was used to convert all expenditure data to Jakarta prices, which was achieved simply by dividing the Jakarta poverty line for 2019 by the poverty lines of all other provinces (both the urban and rural poverty lines were used).

Identifying the poorest X% of households and the poorest number of households[14]

Having standardised the expenditure data, two new variables were created in INDOMOD's input dataset. These were used in INDOMOD as proxies for the household occurring within Indonesia's Unified Database which is an electronic database of the households in Indonesia with the lowest welfare status and is used for targeting social assistance programmes.[15] The first new variable, *xpe*, gives the percentile of the national standardised expenditure distribution for each household (assigned to the head of household only) in the input dataset. This allows the relevant percentage of the weighted per capita expenditure to be used as the eligibility criterion within the model, depending on the policy (e.g. the bottom 25% for PIP).

For the PKH and BPNT policies, the poorest 9.2 million households and the poorest 15.6 million households respectively are eligible, and therefore a second new variable was constructed to give each household (assigned to the head of household only) their position in the national standardised expenditure distribution. The variable *xcu* is simply a cumulative number of households ordered from low to high by weighted per capita expenditure. The households positioned in the bottom 9.2 or 15.6 million (or any other threshold desired) can be selected as eligible within the model.

Additional *xcu* variables were constructed for three of the COVID-19 benefits (summarised in Annex 5): **Basic food assistance for Jabodetabek**, **Cash transfer for non-Jabodetabek non-rural areas**, and **Village Fund cash transfer for non-Jabodetabek rural areas**. For each of these policies, the rules state that the next x million families not in receipt of PKH or BPNT would be eligible for the COVID benefit. Prior to April 2020, when these benefits commenced, the poorest 9.2 million families (households in INDOMOD) received PKH and the poorest 15.6 million families/households received BPNT/Sembako, meaning that 9.2 million households in INDOMOD will receive both PKH and BPNT/Sembako, and an extra 6.4 million households will

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[14] Although some policies are targeted at percentage or numbers of families, in INDOMOD the household unit had to be used rather than the family unit.

[15] See http://tnp2k.go.id/data-and-indicator/unified-database.

receive BPNT only. Therefore, any family/household in the poorest 15.6 million would not be eligible for the COVID benefits within INDOMOD as they would be receiving either both PKH and BPNT or just BPNT. In order to calculate the next x million families/households eligible for the COVID benefits, a new ranking of households starting at 15.6 million was calculated within each area (Jabodetabek, non-Bodetabek urban, non-Bodetabek rural) called *xcujk*, *xcunu*, *xcunr* respectively. Using the relevant *xcu* variable it was then possible to select, on model, the poorest x million not in receipt of PKH or BPNT in a particular area targeted by the benefit.

Table A2.1   Tax and benefit instruments simulated in INDOMOD: Number of recipients/payers

Tax–benefit policy	INDOMOD 2019	External 2019	Ratio 2019
	A	B	A/B
Income Tax (*Pajak Penghasilan Pribadi, PPP*)	16.5M	12.6M (a)	131%
Government subsidised National Health Insurance (*Jaminan Kesehatan Nasional Penerima Bantuan Iuran, JKN-PBI*)	121.7M individuals	96.8M individuals (b)	126%
National Health Insurance (*Jaminan Kesehatan Nasional, JKN*)	91.5M individuals	127.4M individuals (c)	72%
Social Security Contribution (*BPJS Ketenagakerjaan*)	48.1M wage recipient workers; 52.9M if include government workers for JKK and JKM	30.6M active members (d)	173% if include government workers for JKK and JKM
Social Security Contribution for civil servants (*Iuran Wajib Pegawai, IWP*)	4.8M individuals	4.2M civil servants (e)	114%
Family Hope Program (*Program Keluarga Harapan, PKH*)	8.1M households	10.0M families (f)	81%
Smart Indonesia Program (*Program Indonesia Pintar, PIP*)	17.7M children	20.1M children (g)	88%
Child Social Welfare Program (**Program Kesejahteraan Sosial Anak**, *PKSA*)	0.41M children	Not available.	/
Electronic food voucher (*Bantuan Pangan Non Tunai, BPNT*)	15.6M households	15.6M families (BPNT) (g)	100%
VAT (*Pajak Pertambahan Nilai, PPN*)	N/A	N/A	N/A

Source: Column A: INDOMOD Version 2.1. Column B: (a) Provided by Ministry of Finance for 2019; (b) https://health.detik.com/berita-detikhealth/d-4377463/kado-tahun-baru-kuota-pbi-jk-bpjs-kesehatan-tambah And https://www.beritasatu.com/timboel-siregar/opini/6029/iuran-jkn-rakyat-miskin-ditanggung-apbn; (c) https://bpjs-kesehatan.go.id/bpjs/dmdocuments/0f13488b25e3985aed51f444d6607ec7.pdf; (d) https://www.bpjsketenagakerjaan.go.id//assets/uploads/laporan_tahunan/BPJS19_LO23_FS.pdf; 30.6M contributors out of 51M workers (e) https://www.bkn.go.id/wp-content/uploads/2020/04/e-Book-Statistik-Pegawai-Negeri-Sipil-Desember-2019.pdf; (f) https://kemsos.go.id/program-keluarga-harapan-pkh; (g) PKAPBN; (h) UNICEF.

Table A2.2   Tax and benefit instruments simulated in INDOMOD: Annual amounts IDR

Tax–benefit policy	INDOMOD 2019 A	External 2019 B	Ratio 2019 A/B
Income Tax (*Pajak Penghasilan Pribadi, PPP*)	114.6T	148.9T (a)	77%
Government subsidised National Health Insurance (*Jaminan Kesehatan Nasional Penerima Bantuan Iuran, JKN-PBI*)	33.6T	26.7T (b)	126%
National Health Insurance (*Jaminan Kesehatan Nasional, JKN*)	20.9T (employee) And 64.9T (employer)	117.75T (c)	73%
Social Security Contribution (*BPJS Ketenagakerjaan*)	59.9T (employee) And 113.6T (employer)	73.4T (d)	236%
Social Security Contribution for civil servants (*Iuran Wajib Pegawai, IWP*)	21.6T	7.4T (e)	292%
Family Hope Program (*Program Keluarga Harapan, PKH*)	39.2T	34.4T (f)	114%
Smart Indonesia Program (*Program Indonesia Pintar, PIP*)	10.6T	11.0T (f)	96%
BEN: Child Social Welfare Program (**Program Kesejahteraan Sosial Anak**, *PKSA*)	0.41T	Not available	/
Electronic food voucher (*Bantuan Pangan Non Tunai, BPNT*)	20.6T	28.1T (h)	73% (f)
VAT (*Pajak Pertambahan Nilai, PPN*)	135.9T	347.3 T (a)	39%

Source: Column A: INDOMOD version 2.1. Column B: (a) Laporan Keuangan Pemerintah Pusat (LKPP) The Central Government Financial Report, Provided by Ministry of Finance for 2019; (b) https://www.beritasatu.com/timboel-siregar/opini/6029/iuran-jkn-rakyat-miskin-ditanggung-apbn; (c) https://bpjs-kesehatan.go.id/bpjs/dmdocuments/0f13488b25e3985aed51f444d6607ec7.pdf; (d) https://www.bpjsketenagakerjaan.go.id/assets/uploads/laporan_keuangan/Laporan_Keuangan_Audit_2019_-_BPJS_Ketenagakerjaan.pdf https://www.bpjsketenagakerjaan.go.id//assets/uploads/laporan_tahunan/BPJS19_LO23_FS.pdf; (e) https://www.kemenkeu.go.id/media/15858/lkpp-2019.pdf; (f) PKAPBN; (g) UNICEF; (h) https://money.kompas.com/read/2019/08/17/060200826/2020-pemerintah-anggarkan-bantuan-pangan-non-tunai-rp-28-1-triliun-

Nine sector categories were used (BPS, 2020a). Table A2.1 shows how the 26 business sector codes in SUSENAS were aggregated to BPS' nine higher level codes with one modification whereby communication and transport were split for the purposes of the analysis presented in this paper as communication and transport were very differently affected during the pandemic.

Table A3.1   Sector codes

Modified BPS sector categories	SUSENAS business sector categories
1. Agriculture, livestock, forestry and fisheries	1. Rice crop and palawija agriculture 2. Horticulture 3. Plantation 4. Fishery 5. Animal husbandry 6. Forestry and other agriculture
2. Mining and quarrying	7. Mining and excavation
3. Processing Industry	8. Processing industry
4. Electricity, gas and clean water	9. Electricity, gas, steam/hot water, and cold air procurement 10. Water management, waste water management, waste management and recycling, and remediation activities
5. Building	11. Construction
6. Trade, hotel and restaurant	12. Wholesale and retail trade, car and motorcycle maintenance 14. Accommodation and food and beverage services
7. Transport	13. Shipment and storage
8. Communication	15. Information and communication
9. Finance, rental and business services	16. Financial and insurance activities 17. Real estate 18. Professional, scientific, and technical activities
10. Services	19. Rental and lease without option rights activities, labor force, travel agent, and other business support 20. Government administration, defense, mandatory social security 21. Education 22. Human health and social activities 23. Art, entertainment and recreational 24. Other service activities 25. Household activities as employer 26. International agency activities and other international extra agencies

ANNEX 4 REGRESSION RESULT OF ESTIMATING ELASTICITY OF COMMUNITY MOBILITY TO ECONOMIC GROWTH

Table A4.1

	Agriculture			Mining			Manufacturing		
	Workplace	Transit	Retail	Workplace	Transit	Retail	Workplace	Transit	Retail
Mobility	-0.236**	-0.0660	-0.0451	-0.105	-0.0520	-0.0534	0.647**	0.292	0.0161
	(0.0937)	(0.0732)	(0.0695)	(0.233)	(0.142)	(0.239)	(0.265)	(0.295)	(0.215)
Dummy quarter-	1.610	0.782	0.318	-3.251	-3.182	-3.229	-4.946	-4.805	0.511
	(1.137)	(1.730)	(1.500)	(3.756)	(4.071)	(5.065)	(3.816)	(4.342)	(6.380)
Bali dummy	-7.970***	-5.695**	-4.631***	2.031	2.407	2.938	6.527	3.378	-4.477
	(1.825)	(2.294)	(1.429)	(4.400)	(4.445)	(4.678)	(4.399)	(7.048)	(5.198)
Papua dummy	-0.901	-1.108	-1.734*	19.87**	19.88**	19.26**	-5.241**	-5.193	-3.708
	(0.744)	(0.819)	(0.946)	(9.191)	(9.093)	(9.251)	(2.454)	(3.413)	(3.077)
Constant	-7.917***	-5.580	-3.509*	-6.759	-6.915	-5.837	9.912	9.325	-5.504
	(2.184)	(3.713)	(2.097)	(6.869)	(8.215)	(7.907)	(7.686)	(16.06)	(6.684)
Observations	68	68	68	68	68	68	68	68	68
R-squared	0.130	0.056	0.043	0.120	0.120	0.119	0.054	0.032	0.006

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

	Utility			Construction			Trade		
	Workplace	Transit	Retail	Workplace	Transit	Retail	Workplace	Transit	Retail
Mobility	0.702***	0.279***	0.219	0.170	0.290**	0.305	0.363***	0.286**	0.312***
	(0.153)	(0.0946)	(0.179)	(0.232)	(0.132)	(0.194)	(0.120)	(0.114)	(0.0922)
Dummy quarter-	-3.898*	-3.023	-1.565	-1.600	-5.644*	-5.513	-0.372	-2.631	-2.695
	(2.219)	(2.672)	(3.946)	(2.946)	(3.077)	(4.209)	(1.589)	(2.462)	(2.244)
Bali dummy	-3.950	-8.412**	-12.42***	3.248	8.347**	5.522*	-11.30***	-9.671***	-12.27***
	(3.134)	(3.465)	(4.127)	(3.731)	(3.501)	(3.008)	(2.562)	(3.585)	(2.199)
Papua dummy	-5.202***	-4.973***	-2.128	7.182**	6.195	9.688***	1.630**	1.085	4.610***
	(0.890)	(0.999)	(1.768)	(3.222)	(3.916)	(3.559)	(0.738)	(0.911)	(1.062)
Constant	13.39***	10.78**	2.906	-7.273	3.740	-2.023	-7.385**	-1.318	-6.669**
	(3.927)	(5.076)	(5.566)	(6.423)	(7.308)	(6.775)	(3.042)	(5.833)	(2.977)
Observations	68	68	68	68	68	68	68	68	68
R-squared	0.352	0.236	0.188	0.035	0.107	0.088	0.350	0.401	0.378

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

	Transportation			Community services			Finance			Other services		
	Workplace	Transit	Retail	Workplace	Transit	Retail	Workplace	Transit	Retail	Workplace	Transit	Retail
Mobility	0.232	0.727***	0.0588	-0.221	-0.141	-0.141	0.319***	0.126**	0.284*	0.0866	0.164**	0.112
	(0.274)	(0.169)	(0.250)	(0.185)	(0.0975)	(0.146)	(0.0741)	(0.0545)	(0.163)	(0.113)	(0.0620)	(0.0961)
Dummy quarter-	8.663*	-3.211	9.681	1.630	2.363	2.173	-3.523*	-3.097	-5.735	1.542	-0.838	0.311
	(4.395)	(4.460)	(5.961)	(2.238)	(2.394)	(3.097)	(2.081)	(2.397)	(4.281)	(1.367)	(1.580)	(2.242)
Bali dummy	-11.79*	4.387	-14.83**	-8.837**	-8.897***	-7.404**	1.976	-0.0935	1.282	1.426	4.486**	1.846
	(6.118)	(5.165)	(5.818)	(3.614)	(2.568)	(2.927)	(1.919)	(2.055)	(3.522)	(2.062)	(1.730)	(1.919)
Papua dummy	-25.06***	-27.96***	-24.13***	-3.526**	-3.351**	-4.997**	-4.507***	-4.396***	-1.819	0.0463	-0.535	1.024
	(2.496)	(3.957)	(2.534)	(1.666)	(1.588)	(2.020)	(0.875)	(0.975)	(1.977)	(0.837)	(0.707)	(1.064)
Constant	-29.32***	3.101	-33.21***	-2.436	-4.374	-1.357	3.070	1.807	3.991	-6.420**	0.0636	-5.074*
	(7.763)	(9.317)	(8.979)	(4.431)	(5.532)	(4.419)	(1.864)	(2.966)	(5.028)	(2.807)	(3.377)	(3.020)
Observations	68	68	68	68	68	68	68	68	68	68	68	68
R-squared	0.228	0.367	0.223	0.057	0.059	0.050	0.068	0.039	0.092	0.066	0.135	0.083

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Policy	Amount of benefit (IDR) and periodicity of distribution	Relevant months in 2020	Number of families/individuals targeted	Notes
PKH		12 (Jan-Dec)	9.2 million families (Jan-Mar); increased to 10 million families (Apr-Dec)	The distribution of PKH, which was previously per 3 months, became per month from Apr-Dec 2020.
Regular	550,000 per year			
Access	1,000,000 per year			
1. Pregnant mother	3,750,000 per year			Access part of PKH not simulated as it was not possible to obtain the necessary sub-district information for this part of PKH.
2. Baby/toddler	3,750,000 per year			
3. Child in elementary school	1,125,000 per year			
4. Child in junior high school	1,875,000 per year			
5. Child in senior high school	2,500,000 per year			
6. Disability	3,000,000 per year			
7. Elderly	3,000,000 per year			
BPNT / Sembako	150,000 per month (Jan-Mar); 200,000 per month (Apr-Dec)	12 (Jan-Dec)	15.6 million families (Jan-Mar); increased to 19.4 million families (Apr-Dec)	
Basic food assistance for Jabodetabek	Apr-Jun 600,000 per month; Jul-Dec 300,000 per month	9 (Apr-Dec)	2.2 million families	If not receiving PKH or BPNT
Cash transfer non-Jabodetabek	Apr-Jun 600,000 per month; Jul-Dec 300,000 per month	9 (Apr-Dec)	9.2 million families in non-Jabodetabek non-rural areas	If not receiving PKH or BPNT
Village fund cash transfer	Apr-Jun 600,000 per month; Jul-Dec 300,000 per month	9 (Apr-Dec)	8 million families in non-Jabodetabek rural areas	If not receiving PKH or BPNT
Cash support expansion	500,000 per household, one off payment	N/A	9 million families	If receiving BPNT but not PKH
Food assistance expansion	Aug-Oct, 15 kgs of rice per month	3 (Aug-Oct)	9 million families	If receiving PKH but not BPNT. Rice price assumption=Rp12000/kg

				Not simulated in INDOMOD
Wage subsidy	Aug-Dec, IDR 2.4 Million, payable as two payments of 1.2 Million	5 (Aug-Dec)	12.4 million employees	For individuals with employment income less than IDR 5 million per month, and registered as a BPJSTK member (in INDOMOD non-government wage recipient workers are used as proxy)
Pre-employment Cards	Apr-Dec, payable over four months at 600,000 per month plus a final incentive payment of 150,000; averaged on-model to 637,500 per month for four months.	9 (Apr-Dec)	5.6 million unemployed	For individuals who are unemployed and not receiving any social assistance. The training and survey allowances (IDR 1 Million per person) are not modelled in INDOMOD.

Notes: In INDOMOD V2.1 households are used as the unit of analysis rather than families for the policies that are targeted at families. This is because in SUSENAS it is not possible to identify multiple families within a household. Districts eligible for Jabodetabek are treated as those within DKI Jakarta, Jawa Barat and Banten Provinces, i.e. Kepulauan Seribu, Jakarta Selatan, Jakarta Timur, Jakarta Pusat, Jakarta Barat, Jakarta Utara, Kabupaten Bogor, Kabupaten Bekasi, Kota Bogor, Kota Bekasi, Kota Depok, Kabupaten Tangerang, Kota Tangerang, and Kota Tangerang Selatan.

**Figure A6.1   Deciles of mean monthly household disposable income in Indonesia, with and without benefits, March 2020**
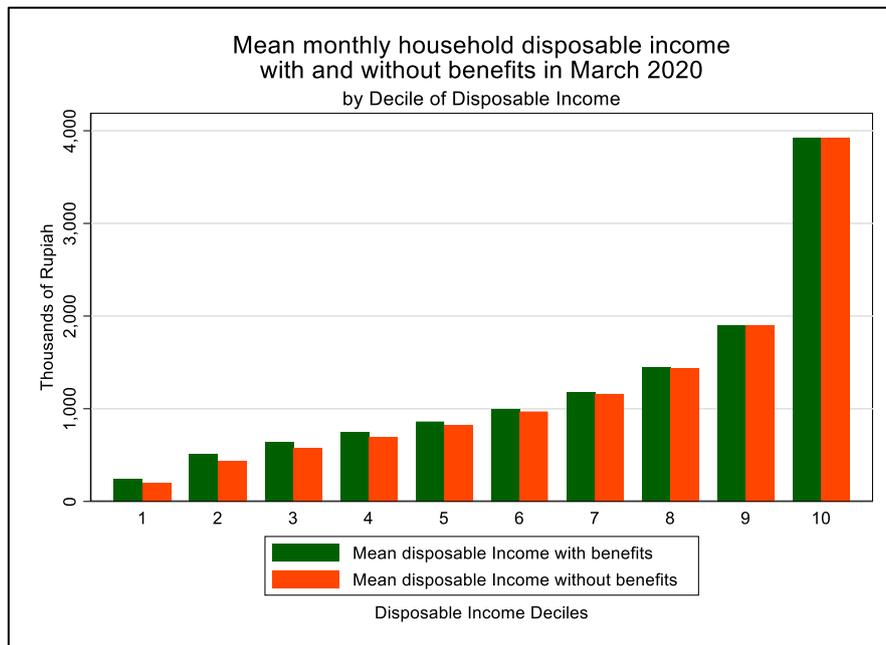
Figure A6.2   Change in mean monthly household disposable income in Indonesia by decile if there were no benefits, March 2020
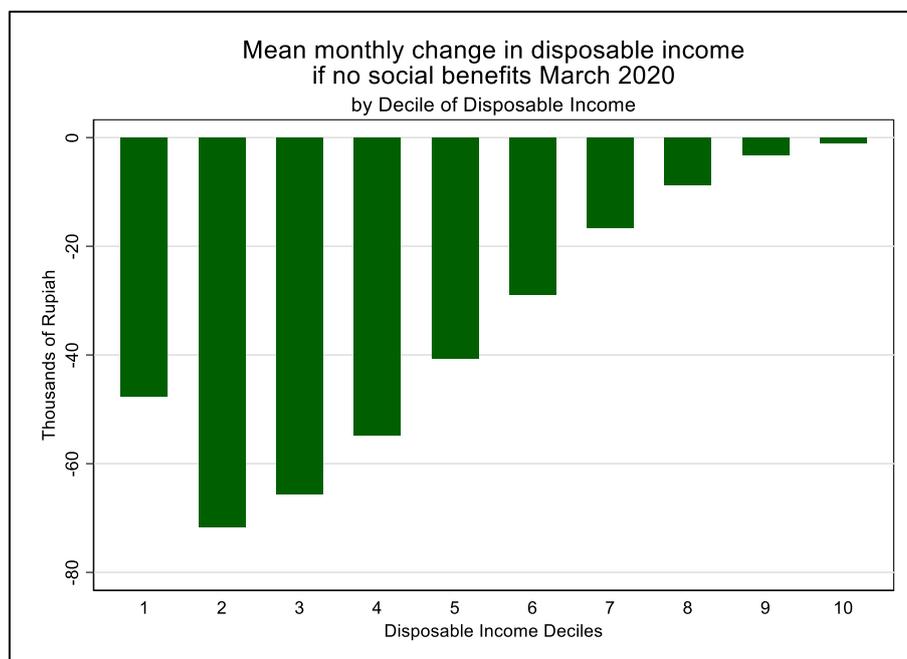
Figure A7.1   Deciles of mean monthly household disposable income in Indonesia by quarter in 2020
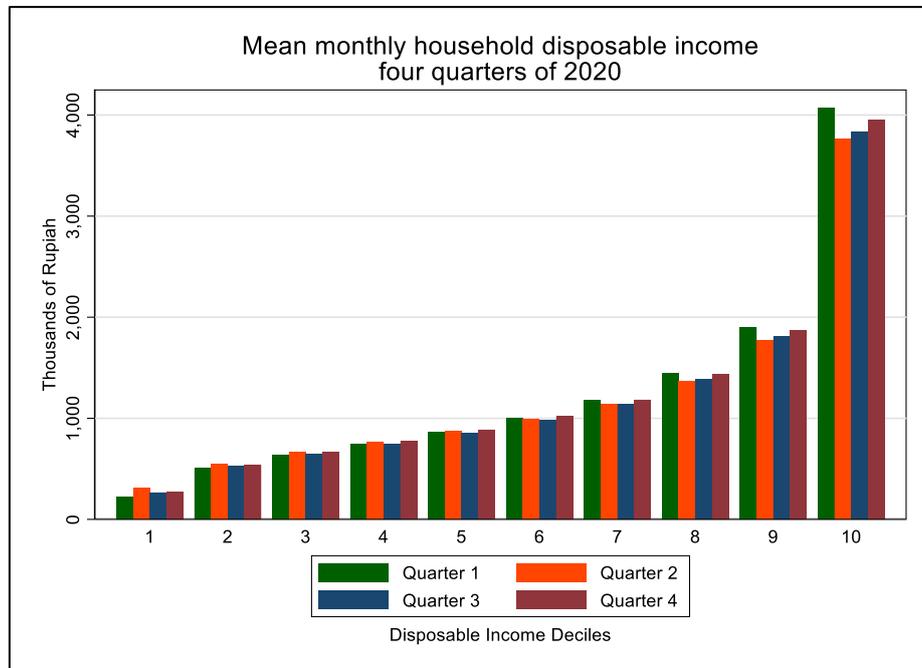

Figure A7.2   Change in mean monthly household disposable income in Indonesia by quarter in 2020