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# The Impact of COVID-19 Lockdowns on Household Income, Consumption, and Expectations: Evidence from High-frequency Data in Indonesia[1]

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## Abstract

We investigate the causal impact of COVID-19, through lockdowns, on household income, income expectations, consumption of durable goods, and budget allocation in Indonesia using high-frequency data from the monthly Bank Indonesia consumer survey with more than 176,000 respondents. We find that COVID-19 lockdowns have a large and significant adverse impact on households' income, expectations, and consumption. We also find that households try to smooth consumption in the face of declining income, resulting in a significant increase in the budget allocation for consumption while reducing the shares of debt installments and savings. The impact of lockdown on households is also heterogeneous by expenditure levels, regions, and levels of education. These findings have important policy implications to cushion the pandemic's impact on households and ensure a more inclusive recovery.

Keywords: COVID-19, lockdowns, households, income, consumption, expectations
JEL Codes: C83, D14, D84, E21, E22



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# 1. Introduction

The COVID-19 pandemic, which started in China in December 2019, caught everyone by surprise. Countries, firms, and individuals all grappled with difficulties while adjusting to a new reality where close physical interactions could invoke health hazards that may be deadly. Consequently, expectations about a rosy economic performance from 2020 onwards just before the pandemic were soon shuttered as the coronavirus outbreak continues.

Assessing the economic impact of the pandemic on countries or firms is relatively straightforward as relevant indicators are available regularly and relatively frequently, such as monthly or quarterly. Relevant indicators for households, however, are generally available less frequently. Household welfare indicators are commonly collected yearly in many countries through household surveys. Only a few developed countries conduct household surveys frequently, such as the monthly Current Population Survey in the US, the Monthly Population Survey in Australia, or the monthly Understanding Society COVID-19 survey in the UK (Crossley et al., 2021). Hence, it is generally challenging to understand the dynamics of COVID-19 impact on household welfare, especially in developing countries.

Indonesia, the world's largest archipelagic country and the fourth most populous economy, recorded the first COVID-19 positive case in early March 2020. Since then, the number of cases has escalated, reaching around 4 million cumulated positive cases by the end of August 2021, with more than 130 thousand deaths recorded.[2] Like many other countries globally, Indonesia also suffers a severe economic impact from the COVID-19 pandemic. The economy contracted by 2.1 percent in 2020, causing the unemployment rate to increase from 5.2 percent in August 2019 to 7.1 percent in August 2020. Despite the massive social protection program launched by the government to mitigate the social impact of the pandemic, the poverty rate still increased from 9.2 percent in September 2019 to 10.2 percent in September 2020, thereby implying additional 2.7 million new poor people in a year.

To contain the spread of the COVID-19 virus, the Government of Indonesia has introduced lockdown measures. These measures, along with fears of contracting COVID-19, have sharply reduced people's mobility. As a result, the economy contracted as economic activity declined significantly, following lower operations or even close-downs of factories, shops, distribution channels, transports, hotels, restaurants, and so on.

The reductions in economic activities are followed by workers losing their jobs and/or facing wage cuts. This is reflected in the increase in the unemployment and poverty rates, which imply a

[2] For further details, see: https://ourworldindata.org/covid-cases

reduction in people's welfare. However, the welfare impact of COVID-19 is heterogeneous as different groups of people are affected differently, and their ability to cope with the adverse impact is also diverse. In general, the effect is more prominent in the lower end of the social and economic strata (UNICEF et al., 2021).

This study investigates the impact of the COVID-19 pandemic, through lockdowns, on household income, expected future income, expenditures, and budget allocation in Indonesia. It utilizes unique high-frequency data from Bank Indonesia's monthly Consumer Survey[3] from January 2018 to February 2021. The survey is conducted in the major cities located in 18 out of 34 provinces in Indonesia. The data is not publicly available and has never been used for purposes other than measuring the Consumer Confidence Index in the past.[4]

The main results of this study can be summarized as follows: First, this study confirms that the COVID-19 pandemic has a large negative and significant impact on household income, leading to a significant reduction in spending for durable goods. Second, to smooth consumption amid dwindling income, households significantly increase their budget share for consumption, leaving less shares for debt installments and savings. Third, the adverse shock lowers households' expectation of future income, albeit keeping their relatively optimistic outlook about its prospects. Fourth, this study echoes the previous findings (Adams-Prassl et al., 2020; Crossley et al., 2021; UNICEF et al., 2021) on the heterogeneous impact of COVID-19 on household income and expenditure. Lower income households tend to be more severely affected than those with higher income. Similarly, households with lower education levels face a more severe impact than those with higher education levels. Fifth, the impact of the pandemic is found to be more severe in the regions outside Java than in Java, the center of population and economic activity in Indonesia. This is mainly a result of the less developed infrastructure in the regions outside Java, rendering them worse off when dealing with the pandemic and lockdowns.

The rest of the paper is organized as follows: Section two reviews studies on the social and economic impact of the COVID-19 pandemic in developed and developing countries, including Indonesia. Section three explains the data and empirical estimation strategy used in this study. Section four discusses our results and findings. Finally, section five provides the conclusion and policy implications.



[3] Bank Indonesia (BI) is the central bank of the Republic of Indonesia.

[4] For an illustration, see: https://www.bi.go.id/en/publikasi/ruang-media/news-release/Pages/sp_239121.aspx; https://www.bi.go.id/id/publikasi/laporan/Documents/SK-Maret-2021.pdf

## 2. COVID-19 and Its Social and Economic Impact

This study relates to the fast-growing investigation of the social-economic impact of COVID-19. For example, based on a survey of 500 consumers in the United States (US), Binder (2020) observes concerns about the effects of COVID-19 on the condition and well-being of the US economy. McKibbin and Fernando (2020) analyze the impact of COVID-19 on global macroeconomic outcomes and financial markets and suggest that the pandemic will hurt the global economy in the short run. The study asserts that less developed economies would be better off than the more developed ones. Using a theoretical approach, Guerrieri et al. (2020) argue that the pandemic would hurt both the demand and supply sides of the economy, and the effects of COVID-19 on different sectors of the economy would be asymmetrical due to the sector's differences in characteristics. Other studies pointed at the potential impact of the pandemic on industrial production. For instance, Ludvigson et al. (2020) projected a loss of industrial output by 20 percent in the US and reduced service sector employment by around 39 percent due to the COVID-19 shock.

Our study is also linked to the literature on the COVID-19 impact on lockdown policies and people's mobility. Askitas et al. (2020), for example, using data from 135 countries, explain the important role of differences in characteristics across places in affecting the effectiveness of lockdowns. It suggests that canceling public activities and gatherings would be more effective in limiting people's mobility than imposing workplace and school restrictions. Ferraresi et al. (2020) argue that institutional or political factors influence the decision to implement lockdowns and suggest that countries with low levels of development, lack of digital infrastructure, and significant degrees of decentralization are less likely to implement lockdowns.

This study particularly adds to the literature about the pandemic's impact on income and consumption. Based on samples of US families, Han et al. (2020) argue that COVID-19 reduces income and worsens poverty, but government policies can minimize these impacts. The effects of the pandemic on income and consumption, however, are found to be heterogeneous across different individual characteristics (Adams-Prassl et al., 2020; Crossley et al., 2021; Baker et al., 2020; Dang and Nguyen, 2021). In particular, Chetty et al. (2020) show that the pandemic reduces high-income individuals' spending in the US, especially in areas with higher intensity of COVID-19 cases. The reduction in spending is mainly associated with the loss of income and/or jobs due to the restriction policies, which is followed by falling revenues of firms that induce an economy-wide effect. Further, our study also relates to the literature on consumption smoothing behavior in the events of negative shocks to income. For example, Hirvonen et al. (2021) argue that food consumption in Addis Ababa, Ethiopia, may not be affected by job loss and/or reductions in income as consumers, at the very least, would try to maintain their consumption of food and other basic needs by way of reducing their other spending items.

Finally, our study fills the gap in the literature about the impact of the COVID-19 in Indonesia. While many studies have tried to understand the implications of COVID-19 in the country, most of these are not representative due to the lack of sample size and survey areas (UNICEF et al., 2021). Furthermore, existing studies about the impact of the pandemic on the economy, for example, Sparrow et al. (2020) and Olivia et al. (2020), are mostly descriptive with some exceptions, such as the study conducted by Suryahadi et al. (2020), which empirically investigates the pandemic impact on poverty in Indonesia. Therefore, evidence on the significance of the impact of the pandemic on household income, consumption, and expectation in Indonesia is still limited.

# 3. Data and Identification Strategy

This section describes our conceptual framework, primary data source, and the identification strategy used to estimate the impact of COVID-19 on household income, consumption, and expectation about the likely future income.

## 3.1 Conceptual Framework

Several testable implications follow from existing studies about the impact of lockdowns and COVID-19 on various economic indicators are presented in Section 2. First, we would expect the government to impose lockdowns when observing a rising number of active COVID-19 cases. This would lead to income shocks on households due to mobility restrictions and lower economic activities, which would, in turn, prompt them to respond by smoothing consumption (Dutt & Padmanabhan, 2011). Therefore, households are expected to increase their share of income spent on non-durables and postpone their consumption of durables (Browning & Crossley, 2009). Consequently, one should expect households to reduce their share of income spent on savings and debt installments. However, these responses to lockdowns may vary across different groups of households, such as based on the level of income, education, and region.

## 3.2 Data

We draw upon several data sources to analyze the association between people's mobility and COVID-19, through lockdowns, on income, consumption, and expectation. For the latter, we exploit the unique monthly data collected from the Bank Indonesia Consumer Survey (BI-CS) (Bank Indonesia, 2020) that is specifically used to measure the Consumer Confidence Index in Indonesia. The richness of this dataset allows us to gauge the extent to which our outcome variables of interest (that is, changes in household income, consumption, expectation, and budget allocations) changed due to the pandemic.

A. Bank Indonesia Consumer Survey (BI-CS)

To analyze the effects of a shock, such as the lockdowns caused by the COVID-19 outbreak, on household income, consumption, and expectation, one ideally exploits data on socio-economic indicators from household surveys. Unfortunately, such surveys in Indonesia are only conducted twice a year, with considerable lags before publication (Susenas, the national socio-economic survey). Hence, such surveys prohibit one from conducting a high-frequency (monthly) data analysis on the impact of lockdowns on our outcome variables. This is where the monthly proprietary data from BI-CS comes in handy.

BI-CS is a monthly survey conducted by BI since 1999, which aims at capturing the consumer confidence, expectation, and financial conditions that are translated into several indices published every month by BI. From 2007 onwards, around 4,600 households (represented by either the household heads, spouses, or other adult household members) were interviewed monthly.[5] The sampling is done based on stratified random sampling method in the capital and major cities across 18 provinces, namely Jakarta, Bandung, Bodebek (Bogor, Depok, and Bekasi), Semarang, Surabaya, Medan, Makassar, Bandar Lampung, Palembang, Banjarmasin, Padang, Pontianak, Samarinda, Manado, Denpasar, Mataram, Pangkal Pinang, Ambon, and Banten (see Appendix B Figure B.1 and Figure B.2 for the survey areas). Due to the fact that this sample covers only major cities, the results of our study only provide explanations specific to to urban areas. The impact of COVID-19 lockdowns in rural areas is not captured in this study. The total population in these 18 provinces in 2020 is 222.5 million, almost 83 percent of the total population in Indonesia.[6]

Due to COVID-19 outbreak considerations, BI shortened the survey questionnaire to minimize the interview time in April 2020. Only core questions required to measure Consumer Confidence Index were asked, including those on the general business condition, current income, income expectation, job availability, and consumption of durable goods. Questions on income allocations (for consumption, debt installment, and savings) were discarded between April and July 2020, except for respondents in Jakarta, West Java, and Makassar (South Sulawesi).

For the purpose of this study, we use responses to four questions from the survey for the period from January 2018 to February 2021 to create our outcome variables of interest. These include: (1) How has your income changed compared to six months ago?; (2) What is your expectation of future income six months from now?; (3) How is your consumption of durable goods today compared to six months ago?; and, (4) How many percentages of your income is allocated for consumption, debt installment/payment, and savings? Responses to the first three are ordinal,

[5] The sample in BI-CS data is different in each survey. Therefore, we only have cross-sectional variation from the dataset. The samples for each wave are statistically comparable, except for the share of high school and below. Nonetheless, the difference is not substantial.

[6] Data from Statistics Indonesia (2021). https://www.bps.go.id/indicator/12/1886/1/jumlah-penduduk-hasil-proyeksi-menurut-provinsi-dan-jenis-kelamin.html (accessed: 8 September 2021).

ranging from significantly decreased, slightly decreased, unchanged, slightly increased, and significantly increased. To construct our outcome variables, we convert these responses into discrete sequences ranging from -2 (denoting a significant decrease) to +2 (denoting a significant increase), with 0 representing the absence of changes. Respondents' characteristics such as age, income level, educational attainment, and job category are used as covariates.

Table C.1 Panel A in Appendix C shows the summary statistics of our outcome variables, divided into three sub-periods—pre-2020 (January 2018–December 2019) to represent the pre-COVID-19 period, January 2020–February 2021 to represent the COVID-19 period, and the full sample. The pre-2020 mean is 0.21 for the change in income relative to the six months before being surveyed, suggesting that households report a slight increase of income on average. During the pandemic, the mean declined to -0.43, implying households reporting a decrease in income on average. For the expected income during the six months after being surveyed, the mean is 0.50 in pre-2020 and declines to 0.26 during the pandemic period. This suggests that households remain optimistic about their income prospects during the sample but indicate fading optimism. On the consumption of durable goods (for example, electronics, furniture, vehicles, and jewelry), the mean declines from 0.16 in pre-2020 to -0.24 afterward, indicating that households cut their consumption on durables during the pandemic.

Data and the analysis for the different allocations of income were represented only by observations from Jakarta, West Java, and South Sulawesi to ensure the inclusion of observations between April and July 2020—the crucial time for COVID-19 and lockdown implementations in the country. On average, income is mostly allocated for consumption, with a share of 66.01 percent at the mean, followed by savings at 19.26 percent of income and debt installment at 14.73 percent. It is also evident that the consumption share of income increased during the pandemic relative to pre-2020, forcing downward adjustments in the allocations for savings and debt installments.

B. Google Mobility Index

To investigate how lockdowns affect people's mobility, we rely on Google mobility data (Google, 2022) to capture variations of people's mobility in different places in Indonesia. In early March 2020, Google started publishing data documenting visit frequencies of different categories of places— Retail stores, Groceries, Parks, Transit, Workplaces, and Residential. The data are reported as to how visitors spent time in each area relative to the median value from 3 January 2020 to 6 February 2020 (in percentage). To fit the purpose of this study, the daily mobility data is transformed into monthly averages for every province.

C. Indonesian COVID-19 and Lockdown Data

The Indonesian COVID-19 data used in this study are obtained from the Indonesian National Board for Disaster Management (*Badan Nasional Penanggulangan Bencana*, BNPB) (BNPB, 2021), which contains daily active, death, and recovered COVID-19 cases across provinces in Indonesia. Following the approach in Coibion et al. (2020), data on average active cases per month are considered as instruments in this study.

Lockdowns in Indonesia, commonly known as *Pembatasan Sosial Skala Besar* (PSBB) or Big Scale Social Restriction, are authorized at the province levels. For example, Jakarta was the first to implement PSBB on 10 April 2020, which was initially planned for two weeks but continued for months. Some provinces introduced a more relaxed version of lockdowns referred to as PSBB *transisi*, which is supposed to be a transition from PSBB to fully opening up. On the other hand, some other provinces (for example, Lampung) have never implemented lockdowns or PSBB at all. In early 2021, many provinces implemented the *Pemberlakuan Pembatasan Kegiatan Masyarakat* (PPKM), which is another term for PSBB implemented at the district level (See Figure B.2 in Appendix B).

As there is no official compiler of lockdowns history in Indonesia and local regulations regarding provincial lockdowns are mostly not available to the public, we compile the data for lockdowns by summarizing online news about lockdowns for each province.[7] Two variables are created from this process—a dummy that indicates whether a province is under lockdowns in a given month and the number of days a province is under lockdowns for a given month. The dummy for provincial lockdowns is used in our baseline estimation, whereas the duration of lockdowns in a month is used as an alternative in our robustness exercise.

Figure B.2 displays the variation of lockdowns across the area covered by BI-CS. Except for East Java, all provinces in Java have implemented lockdowns for, on average, between 10 and 20 days each month throughout our sample of observations. Other provinces (North Sumatra, West Sumatra, South Sumatra, Bangka Belitung, East Java, South Kalimantan, Bali, South Sulawesi, and North Sulawesi) have an average duration of lockdowns between 1 and 10 days each month. Maluku lockdowns spanned the whole sample, implying that lockdowns have never been lifted during our sample period once implemented. Several other provinces, that is, Lampung, West Kalimantan, East Kalimantan, and West Nusa Tenggara, have not implemented a lockdown since

[7] This was done by searching PSBB news for each province per month from March 2020 to February 2021, for example, "PSBB Jawa Timur Juni 2020". We also corroborate our search with the information retrieved from https://indonesien.ahk.de/en/infocenter/news/news-details/covid-19-developments-in-indonesia that compiles all the information about COVID-19 development in Indonesia.

April 2020. These variations allow for the estimation of the impact of lockdowns on our outcome variables.

Panel B in Table C.1 provides the key statistics for our main independent variables. During the span from January 2020 to February 2021, about 32 percent of the provinces sampled in this study implemented lockdowns. However, the standard deviation is rather large, suggesting considerable variations in the implementation of lockdowns across time and provinces. The average duration of lockdowns is about 7.55 days, also with a relatively large standard deviation of 11.96. The mean of the monthly active cases is 2,782.13 with a standard deviation of 5,506.01, thereby suggesting significant variations in the number of active cases, making it a relevant instrument for this study.

### 3.3. Identification Strategy

The primary research question in this study is to estimate the causal effect of the COVID-19 shock, through lockdowns, on the outcome variables of interest, namely household income, expectations, consumption, and budget allocations. To estimate the causal effect of lockdowns on the outcomes, we must satisfy several identification issues. First, lockdowns should not be endogenously determined by some other factors. For example, some local governments' decisions to implement lockdowns may be endogenous to local characteristics (such as awareness about COVID-19, health facilities, and local culture). Second, due to concerns about COVID-19, households may voluntarily self-isolate even without the government implementing lockdowns, which, in turn, may affect their income and consumption, thereby creating bias in the estimation of the impact of lockdowns on our outcome variables. If these concerns are valid, then we would have a problem of omitted variable bias and endogeneity issues.

Finally, there may also be concerns about the enforcement of lockdown policies in their implementation. Technically, the government introduced a number of lockdown policies between 2020 and 2021. The effectiveness, however, may not turn out to be what the government would expect. For example, the government instructed companies and businesses to reduce the number of workers on-site to certain proportions, but many ceased to comply with these guidelines.[8] In addition, there may also be a selection problem in the way lockdowns are proxied in our study. Thus, the practice of using lockdowns to estimate the impact of COVID-19 on our outcome variables may suffer from measurement errors.

To mitigate these identification concerns, we employ a two-stage least squares (2SLS) regression method with the following specifications:

[8] The Jakarta Post reports that almost half of the manufacturers did not comply with the COVID-19 regulations. https://www.thejakartapost.com/news/2020/11/05/only-half-of-manufacturers-comply-with-covid-19-reporting-requirement.html

$$Lockdown_{ipt} = \alpha + \beta_1 ActiveCase_{ipt} + X'_{ipt} + \theta_p + \gamma_t + \epsilon_{ipt} \quad (1)$$

$$Y_{ipt} = \alpha + \beta_1 Lockdown_{ipt} + X'_{ipt} + \theta_p + \gamma_t + \epsilon_{ipt} \quad (2)$$

Where *i* index households in province *p* and month *t*. *Y* is the outcome variable. Our main variable of interest is $Lockdown_{ipt}$, a dummy variable that takes the value of one if a province *p*, where household *i* resides, is being in a lockdown at any time *t*, and zero otherwise.[9] $ActiveCase_{ipt}$ is the number of active COVID-19 cases in province *p* at time *t*, which is used as the instrumental variable in this study, following the approach in the study conducted by Coibion et al. (2020). The vector *X* includes a range of households' characteristics known to influence our outcome variables, such as expected future economic condition, sex, expenditure, age, level of education, and sector dummies (that is, formal versus informal) where the respondents' works might affect our dependent variable. We include $\theta_p$ to control for unobserved time-invariant province characteristics that might affect the implementation of lockdowns and $\gamma_t$ to account for the time effect.[10] As the variation in lockdown policies is at the province level, we also cluster the standard errors at this level. Due to the characteristics of the consumer survey used in this study, where different household respondents were included in each wave of the survey, we can only estimate equations (1) and (2) using repeated cross-sectional data, thereby implying that the results of our estimations are purely cross-sectional variations.

To cope with the potential identification issues, *a lockdown* policy is instrumented by $ActiveCase$, following the approach in Coibion et al. (2020). For $ActiveCase$ to be a good instrument, we need to ensure that it is statistically important in explaining changes in the probability of lockdown implementations. Health authorities in Indonesia and many other countries have used the number of active cases as a primary indicator to decide whether to implement lockdowns or not (Atalan, 2020; Coibion et al., 2020). Thus, the number of active cases is expected to have a positive association with lockdowns, whereby a higher incidence of active cases increases the probability of adopting lockdown measures.

Further, the number of active cases should affect the outcomes only through lockdowns to satisfy the exclusion restriction assumption. First, the number of active cases might not directly affect people's mobility and business activity as the two would tend to behave normally before the implementation of lockdowns. Therefore, the number of active cases would only affect the economy due to the lockdowns it invokes. Second, the number of active cases itself is mainly

[9] In our robustness analysis, we also use the length of lockdown (in days) as an alternative independent variable. The results for the alternative independent variable suggest a similar finding to what we obtained from using dummy lockdown. See Table C.3 for further information.

[10] The inclusion of time fixed effects mitigates the potential supply side disruptions that occurred in all provinces in Indonesia due to the implementation of lockdown policies.

random or determined by the spread of coronavirus, which we assume as exogenous. In addition, we also control for a province dummy and a battery of control variables in equation (1) to account for the province-specific characteristics (for example, unobserved province testing capacity) and other factors that may explain the dynamics in lockdown policies to ensure the validity of the number of active cases as an instrument for lockdown policies.

Table C.2 in Appendix C provides the results from our first stage regression following equation (1), which validates the use of the number of active cases as an instrument for our main independent variable. We can see the relationship from the first stage is positive and statistically significant at $\alpha = 1$ percent. An increase in the number of active cases by a thousand increases the probability of lockdown policies by 4.4 percent. Adding relevant covariates and sector dummies (the last column of Table C.2) increases the adjusted R-squared in our first stage. This adequately suggests statistical evidence for the number of active cases as a good instrument for the variation of lockdowns in Indonesia. We also explore the validity of the exclusion restriction assumption in our estimation strategy. As active cases might potentially affect outcomes through other channels in addition to lockdowns, it may violate the exclusion restriction assumption. To ensure that active cases only affect our outcome variables through the variation of lockdown policies, we select the sample that never implemented lockdowns (for example, Lampung, West Kalimantan, and East Kalimantan). We then test the correlation between active cases and our dependent variable. We expect that active cases in areas that had never implemented lockdowns would not affect our dependent variable. Therefore, if this is true, then we can say that our exclusion restriction assumption is satisfied. Table C.3 in Appendix C depicts the results of our test. We can see that none of our dependent variables are affected by the variation in the active cases in areas that had never implemented lockdowns. Therefore, we can argue that active cases can only affect our dependent variable solely through the implementation of lockdowns.

# 4. The Impact of COVID-19 on Households in Indonesia

This section discusses the relationships between our outcome variables and lockdowns due to COVID-19 outbreaks. The section begins by qualitatively discussing the dynamics of household reactions to lockdowns in terms of their earnings, consumption, expectations, and budget allocations. We then continue to analyze the impact more formally based on regression analysis.

## 4.1. The Dynamics of COVID-19 Impact on Households

As discussed in the data section, the BI-CS allows for examining households' reactions to mobility restrictions due to the COVID-19 pandemic. As Indonesia implemented its first massive lockdown measures, Figure 1 shows that the average household income dropped relative to six months before. The decline in income is more prominent in lower income households, with an average

income below five million rupiahs (about USD 357) a month. Higher income households—those with monthly earnings over five million rupiahs—tend to be less severely affected. However, those earning over eight million rupiahs (USD 571) a month seem to have started to see their income declining even since January 2020. This drop in income persists as households surveyed continued to report income losses relative to what they earned six months before being surveyed. Although the decrease in income has been plateauing over time, it still has yet to reach its bottom in early 2021.

Despite the actual decreasing income, households remained optimistic about their prospects. Figure 2 shows that expected income has never fallen into the negative territory even after the implementation of the massive lockdown measures in April 2020. The initial mobility restrictions brought down the expected increase in income quite significantly, but confidence remained and restored in the second half of the year, albeit with somewhat slower expected increases. After the initial lockdown, households earning less than five million rupiahs a month suffered more severe reductions in confidence than those with higher income. But the perception of future earnings among the different income levels converged in the second half of 2020 when the expectation of a longer lasting pandemic became more widely accepted.

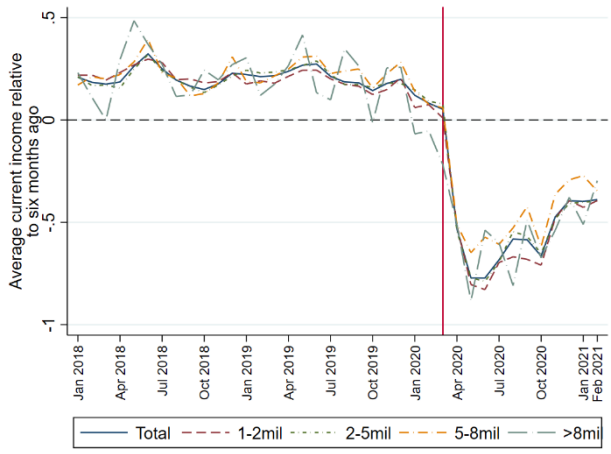


Figure 1. Current income relative to six months ago.
Source: Authors' calculation

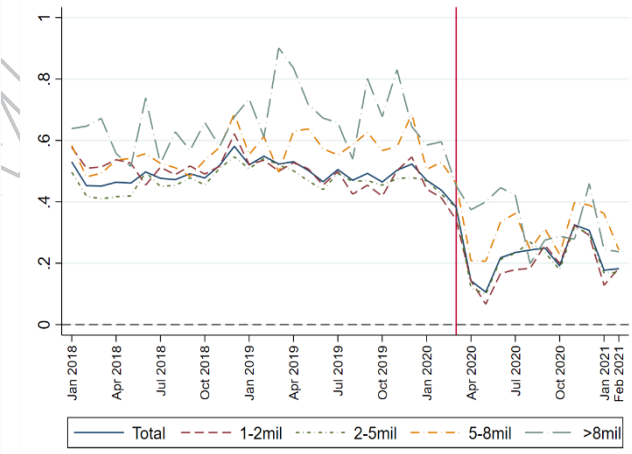


Figure 2. Expected income in six months from now relative to the current
Source: Authors' calculation

In general, the dynamics of the consumption of durable goods closely follow the dynamics in income. Figure 3 shows that, as household earnings dropped following the lockdown measures, household consumption of durable goods also declined substantially. Since April 2020, household consumption of durables has dipped below the average amount spent six months before being surveyed. Unlike income, however, the decline in durables spending is more prominent in higher income households, in particular, in those households with an average earning above eight million rupiahs a month. In fact, durable goods consumption for high-income households has dropped since March, following the reduction of their income since January. As expected, the impact on lower income households—those with monthly earnings of less than eight million rupiahs—is not as severe as they spend less on durables relative to the higher incomes. Consumption of durable

goods continued to decrease throughout the year due to the fall in income, though at a decelerating pace, particularly in early 2021.

In terms of budget allocations, the average household share of consumption increases as income decreases. The average share of income allocated on debt installment remained largely constant throughout 2020, whereas savings declined to compensate for the increase in consumption share. Figure 4 shows that the rising share of consumption is evident at all income levels with steeper slopes in those earning above five million rupiahs a month. The steeper rise in the consumption share of higher income households suggests a smoothing motive to retain their consumption levels given the falling income. This rise in consumption share accelerated from October onwards, following a continuous decrease in income since April.

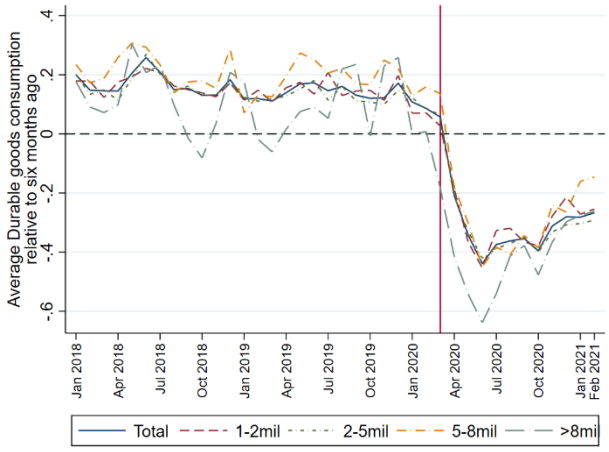


Figure 3. Durable goods consumption relative to six months ago
Source: Authors' calculation

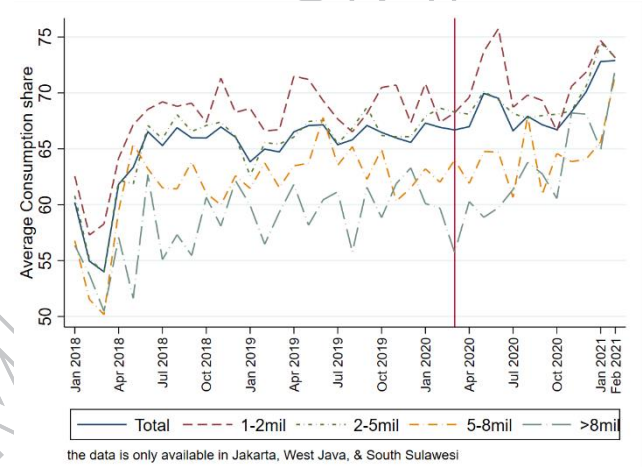


Figure 4. Household income allocations*:* Consumption share
Source: Authors' calculation

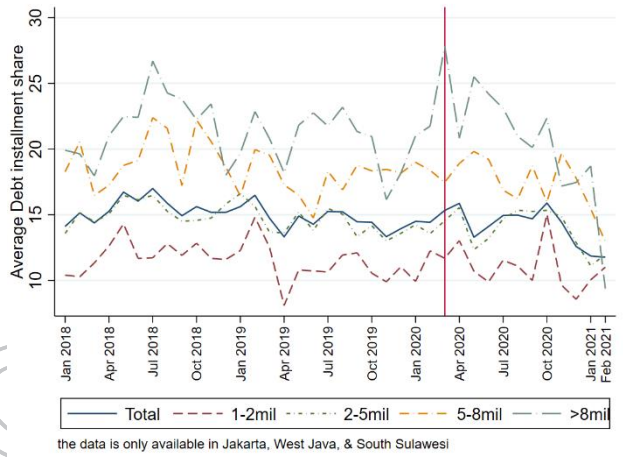


Figure 5. Debt installment share
Source: Authors' calculation

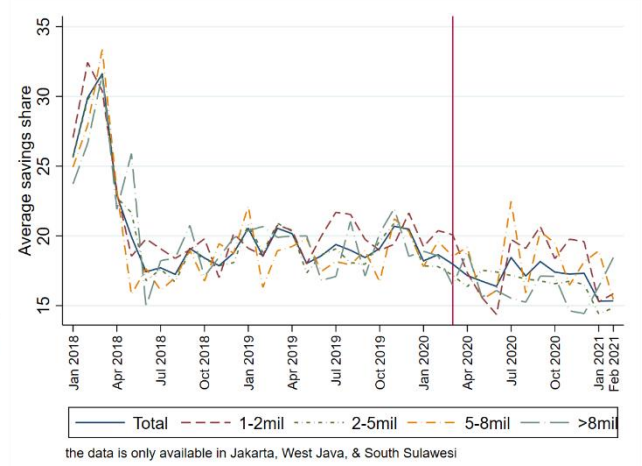


Figure 6. Savings Share
Source: Authors' calculation

Figure 5 indicates that, during the first six months of the pandemic, the share allocated for debt installment does not seem to be affected much except for those earning more than eight million

rupiahs a month. However, households seem to start defaulting on debts from October onwards as more and more income is redirected for consumption. Meanwhile, Figure 6 shows that the share allocated to savings declined consistently since the COVID-19 outbreak began as households forgo savings to retain consumption. After a steep decline initially, the share of savings jumped up by roughly 5 percent of income for the lowest income households with a monthly earning of two million rupiahs or less, partly, if not mostly, reflecting the positive impact of the targeted social assistance programs from the government.

## 4.2. Quantifying the Impact of COVID-19 on Households

This section discusses the estimated impact of COVID-19, through lockdowns, on households' income, the expectation of future income, consumption of durable goods, and budget or income allocations. Some heterogeneity analyses also complement the results to reveal how the effects of lockdowns vary across different household characteristics.

*Income*

Table 1 shows the estimation results for the impact of lockdowns on income change. The dependent variable in Table 1 is the perception of the change in income relative to six months before. All results are estimated using month and province fixed effects to control for unobserved characteristics across time and cross-section units. Columns (1) and (2) are the results for both OLS and 2SLS without including covariates and sector dummies. Columns (3) and (4) are estimated by having a battery of control variables, including expectations of future business conditions, gender, total expenditure, age, education level, and the dummy for economic sectors. These controls ensure that the identified impact of lockdown policies on the outcome variable is not confounded by factors that might affect the policies.[11] Reassuringly, our findings suggest that the estimation results are not sensitive to the inclusion of these controls.

[11] Our preferred model is always the 2SLS with covariates throughout the analyses due to the endogeneity concerns in our main independent variable.

Table 1. The Impact of Lockdown on Income

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | OLS | 2SLS | OLS | 2SLS |
| Dependent variable: Change in Income | | | | |
| Dummy Lockdown | -0.746*** | -1.015*** | -0.608*** | -0.829*** |
| | (0.059) | (0.156) | (0.058) | (0.144) |
| Sector Dummies | No | No | Yes | Yes |
| Month Dummies | Yes | Yes | Yes | Yes |
| Province Dummies | Yes | Yes | Yes | Yes |
| Covariates | No | No | Yes | Yes |
| Observation | 176,951 | 176,951 | 176,951 | 176,951 |
| Adjusted R-squared | 0.084 | | 0.178 | |
| Kleibergen-Paap First-stage F-Stats | | 14.039 | | 13.840 |

Note: Robust standard errors clustered at the province level in parentheses. The dependent variable here is the change in income compared to the previous six months. The value of the dependent variable is between -2 and +2. The set of covariates are the expectation of business conditions in the future, sex, total expenditure, age, education level, and the dummy for the formal sector. Dummy lockdown is instrumented by the number of active cases (in 000). ** $p < 0.05$, *** $p < 0.01$

The point estimate for all specifications suggests that lockdowns reduce the changes in income relative to six months before. All estimation results from both OLS and 2SLS specifications are robust and exhibit a statistically significant negative effect of our explanatory variable of interest on the outcome. Using the active COVID-19 cases as an instrumental variable for lockdowns, the dummy also passes the robustness check for weak instruments. Our preferred model in column (4) suggests that an incident of lockdown lowers income by 0.83 points. Compared to the mean of the outcome variable, -0.03, the magnitude of the lockdowns' coefficient suggests that the impact of lockdowns on the changes in income is substantially negative.

This finding is the first study that estimates the causal impact of lockdowns and, therefore, COVID-19 on household income in Indonesia. The results, however, reflect only the impact of lockdowns on self-assessed changes in the income of the surveyed households and not the actual amount of income changes. This said, a lockdown would decrease households' income slightly relative to its pre-2020 average, but the decline in income would tend to be significant if seen relative to the average of the first two months of 2020.[12] This is consistent with previous findings of how the pandemic decreases income levels in the US (see, for example, Han et al., 2020).

[12] An index of change in income of -0.62 relative to the pre-2020 average versus -1.26 relative to the average between Jan and Feb 2020 (see Table C.1 for the averages).

*Expectations for Future Income*

Have lockdowns as responses to COVID-19 outbreaks affected households' expectations of their future income? Expectations of future income are important in shaping current households' decisions, including their consumption decisions. Table 2 shows that lockdowns lower expected income in the coming six months. The estimated coefficients for the lockdown dummy in columns (1) and (2) are almost double the size of those in (3) and (4), thereby suggesting some confounding effects that bias the estimate upward when the covariates are excluded. The preferred model in column (4) suggests that lockdowns lower the expected future income by -0.386. Comparing the point estimate with the mean value of our outcome variable, at 0.41, suggests that the impact of lockdowns on the change of expectation about household future income is sizable but not to the extent of pushing households to be substantially pessimistic about their future.

Table 2. The Impact of Lockdown on Expectation for Future Income

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | OLS | 2SLS | OLS | 2SLS |
| Dependent variable: Expected Future Income | | | | |
| Dummy Lockdown | -0.410*** | -0.618*** | -0.231*** | -0.386*** |
| | (0.060) | (0.107) | (0.041) | (0.083) |
| Sector Dummies | No | No | Yes | Yes |
| Month Dummies | Yes | Yes | Yes | Yes |
| Province Dummies | Yes | Yes | Yes | Yes |
| Covariates | No | No | Yes | Yes |
| Observation | 176,951 | 176,951 | 176,951 | 176,951 |
| Adjusted R-squared | 0.084 | | 0.261 | |
| Kleibergen-Paap First-stage F-Stats | | 14.039 | | 13.840 |

Note: Robust standard errors clustered at the province level in parentheses. The dependent variable here is the expected income in the next six months. The value of the dependent variable is between -2 and +2. The set of covariates are the expectation of business conditions in the future, sex, total expenditure, age, education level, and the dummy for the formal sector. Dummy lockdown is instrumented by the number of active cases (in 000). ** $p < 0.05$, *** $p < 0.01$

Our finding is consistent with that reported by Coibion et al. (2020), which uses some proxy variables, such as expected unemployment rates, to gauge expectations. They argue that the expected unemployment rate will remain the same in the next 12 months before improving in the longer horizon. The result from Table 2 also suggests that households' expectations of their future income are lowered by lockdowns, which may have to do with uncertainty in economic prospects due to the pandemic. This is consistent with the relatively slow and sluggish economic recovery in Indonesia, where GDP is still contracting within 12 months after the health crisis began—growing at -0.74 percent (y-o-y) in Q1-2021.[13]

[13] BPS (2021). Economic Growth of Indonesia First Quarter 2021 descended 0.74 percent (y-on-y). https://www.bps.go.id/pressrelease/2021/05/05/1812/ekonomi-indonesia-triwulan-i-2021-turun-0-74-persen--y-on-y-.html

*Consumption of Durable Goods*

We further investigate the effect of lockdowns on the consumption of durable goods. Purchases for durable goods are cyclical because they tend to increase during good times and decrease during crises when households are financially constrained and tend to reallocate their spending to other types of consumption.

Table 3. The Impact of Lockdown on the Consumption of Durable Goods

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | OLS | 2SLS | OLS | 2SLS |
| Dependent variable: Consumption of Durable Goods | | | | |
| Dummy Lockdown | -0.534*** | -0.726*** | -0.449*** | -0.609*** |
| | (0.070) | (0.130) | (0.062) | (0.126) |
| Sector Dummies | No | No | Yes | Yes |
| Month Dummies | Yes | Yes | Yes | Yes |
| Province Dummies | Yes | Yes | Yes | Yes |
| Covariates | No | No | Yes | Yes |
| Observation | 176,951 | 176,951 | 176,951 | 176,951 |
| Adjusted R-squared | 0.069 | | 0.107 | |
| Kleibergen-Paap First-stage F-Stats | | 14.039 | | 13.840 |

Note: Robust standard errors clustered at the province level in parentheses. The dependent variable here is the change in the consumption of durable goods. The value of the dependent variable is between -2 and +2. The set of covariates are the expectation of business conditions in the future, sex, total expenditure, age, education level, and the dummy for the formal sector. Dummy lockdown is instrumented by the number of active cases (in 000). ** $p < 0.05$, *** $p < 0.01$

The results in Table 3 shows that lockdowns lower household consumption of durable goods relative to six months before. Our preferred result (in column 4), which controls for all relevant covariates, suggests that a lockdown reduced the outcome variable by 0.609 points. Relative to the mean of our dependent variable (0.01), this decrease is quite substantial and suggests that durable goods consumption is reduced along with dwindling income. This finding is consistent with the findings of the study conducted by Coibion et al. (2020) that consumption of durable goods in the US is reduced following lockdowns, and Baker et al. (2020) identify lower consumption in the US after the implementation of shelter in place policies.

*Household Budget Allocation: Consumption, Debt Installments, and Savings*

As households tend to smooth consumption when faced with financial distress, adjustments in the way their income is allocated would be required. Here, we examine how lockdowns affect the share of consumption, debt installment, and savings relative to household income. Before we proceed, it is worth noting that the sample used for this analysis is adjusted down from 176,951 to 37,306 due to data limitations discussed previously. Nevertheless, the estimation results remain meaningful.

We begin by examining the effects of lockdowns on the share of income allocated for consumption, which is expected to increase as households retain and smooth their consumption, particularly on foods and other non-durables. Our estimation results suggest the share of income allocated for consumption is larger in households affected by lockdowns than in those with the same characteristics but not affected by lockdowns.

Table 4a. The Impact of Lockdown on the Share of Consumption Relative to the Total Income

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | OLS | 2SLS | OLS | 2SLS |
| Dependent variable: The Share of Consumption Relative to Income | | | | |
| Dummy Lockdown | 3.312*** | 6.135*** | 2.590 | 4.388*** |
| | (0.314) | (0.773) | (0.823) | (0.913) |
| Sector Dummies | No | No | Yes | Yes |
| Month Dummies | Yes | Yes | Yes | Yes |
| Province Dummies | Yes | Yes | Yes | Yes |
| Covariates | No | No | Yes | Yes |
| Observation | 37,306 | 37,306 | 37,306 | 37,306 |
| Adjusted R-squared | 0.009 | | 0.055 | |
| Kleibergen-Paap First-stage F-Stats | | 44.985 | | 41.315 |

Note: Robust standard errors clustered at the province level in parentheses. Here, the dependent variable is the share of consumption relative to income (in percent). The set of covariates are the expectation of business conditions in the future, sex, total expenditure, age, education level, and the dummy for the formal sector. Dummy lockdown is instrumented by the number of active cases (in 000). The total number of observations drops because the sample for this question is only in Jakarta, West Java, and South Sulawesi.
** $p < 0.05$, *** $p < 0.01$

Table 4 shows that lockdowns increase the consumption share of income by 4.38 percentage points, based on our preferred estimate in column (4), which controls for relevant covariates. Comparing this point estimate with the dependent variable's mean implies that lockdowns increase the consumption share by about 6.63 percent (~4.38/66.01). This confirms our hypothesis on household consumption smoothing behavior in Indonesia, whereby as lockdowns decrease household income (see Table 1), its share spent on consumption increases. Household consumption of non-durables would not be decreased substantially, especially those related to fulfilling their basic needs. Therefore, the drop in consumption (if any) would tend to be less than the drop in income, increasing the consumption share relative to income.

A natural follow-up from the above would be questions about what households sacrificed when trying to maintain their consumption intact. We begin by examining how the share of income spent on debt installment is affected by lockdowns. Table 4b suggests that households facing lockdowns responded by lowering the share of their income spent on debt installments. This is in line with the findings of Coibion et al. (2020), which argue that COVID-19 pushes households in the US into financial difficulties, which could even force them to default on debt payments. Our 2SLS result in column (4), controlling for a battery of covariates, suggests that an incidence of lockdown reduces the share of debt installment in income by 1.89 percentage points. Relative to the mean of the income share for debt installments, this point estimate implies a substantial shrinkage in the

share under lockdowns by about 12.83 percent (~-1.89/14.73). An important implication of this finding is a need to consider less conventional measures for households under financial distress, such as debt restructuring, rescheduling, and alike.

Table 4b. The Impact of Lockdown on the Share of Debt Installment Relative to the Total Income

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | OLS | 2SLS | OLS | 2SLS |
| Dependent variable: The Share of Debt Installment Relative to Income | | | | |
| Dummy Lockdown | -0.796 | -1.643*** | -1.067 | -1.892*** |
| | (0.387) | (0.272) | (0.330) | (0.386) |
| Sector Dummies | No | No | Yes | Yes |
| Month Dummies | Yes | Yes | Yes | Yes |
| Province Dummies | Yes | Yes | Yes | Yes |
| Covariates | No | No | Yes | Yes |
| Observation | 37,306 | 37,306 | 37,306 | 37,306 |
| Adjusted R-squared | 0.001 | | 0.040 | |
| Kleibergen-Paap First-stage F-Stats | | 44.985 | | 41.315 |

Note: Robust standard errors clustered at the province level in parentheses. Here, the dependent variable is the share of debt installment relative to income (in percent). The set of covariates are the expectation of business conditions in the future, sex, total expenditure, age, education level, and the dummy for the formal sector. Dummy lockdown is instrumented by the number of active cases (in 000). The total number of observations decreases because the sample for this question is only in Jakarta, West Java, and South Sulawesi. ** p < 0.05, *** p < 0.01

Next, we examine the impact of lockdowns on household savings. Table 4c suggests that households facing lockdowns decrease their savings share of income. All specifications from columns (1) to (4) suggest a robust negative and statistically significant relationship, at $\alpha = 1$ percent, between lockdowns and the savings share. In terms of the magnitude, our preferred estimate in column (4) suggests that the share of savings in income decreased by 2.50 percentage points in the event of lockdowns. Compared to the dependent variable's mean (19.26 percent), the impact is quite substantial, implying a 12.96 percent reduction of the share of savings from its mean (~-2.50/19.26). This is qualitatively similar to Coibion et al. (2020), which found that households are reducing their portfolio holdings (that is, gold and foreign assets) due to the pandemic. On the contrary, based on data from a quick survey in six countries in April 2020, Dang and Ngunyen (2021) argue that women tend to reduce their consumption and increase savings amidst falling income because of the pandemic. This snapshot, however, may not persist over time when the decrease in income continues due to lockdowns.

Table 4c. The Impact of Lockdown on the Share of Savings Relative to the Total Income

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | OLS | 2SLS | OLS | 2SLS |
| Dependent variable: The Share of Savings Relative to Income | | | | |
| Dummy Lockdown | -2.517*** | -4.491*** | -1.524 | -2.496*** |
| | (0.237) | (1.009) | (0.603) | (0.881) |
| Sector Dummies | No | No | Yes | Yes |
| Month Dummies | Yes | Yes | Yes | Yes |
| Province Dummies | Yes | Yes | Yes | Yes |
| Covariates | No | No | Yes | Yes |
| Observation | 37,306 | 37,306 | 37,306 | 37,306 |
| Adjusted R-squared | 0.001 | | 0.040 | |
| Kleibergen-Paap First-stage F-Stats | | 44.985 | | 41.315 |

Note: Robust standard errors clustered at the province level in parentheses. Here, the dependent variable is the share of savings relative to income (in percent). The set of covariates is the expectation of business conditions in the future, sex, total expenditure, age, education level, and the dummy for the formal sector. Dummy lockdown is instrumented by the number of active cases (in 000). The total number of observations drops because the sample for this question is only in Jakarta, West Java, and South Sulawesi. ** $p < 0.05$, *** $p < 0.01$

Our results support the hypothesis of households smoothing consumption as income dwindles due to lockdowns by reducing other expenditures. Households increase their consumption share of income by 4.39 percentage points, which is fully compensated by an equal reduction in the share of debt installment and savings. This highlights two important points with regard to provisions of social assistance to households during the pandemic: (i) direct financial support is essential to assist households in the lower income bracket in maintaining at least their consumption of necessities; and (ii) the needs for debt restructuring and rescheduling to avoid potential ballooning of non-performing loans.

*Heterogeneity Analysis*

Many previous studies have indicated the heterogeneous effects of COVID-19 across groups with different characteristics (see, for example, Adams-Prassl et al., 2020; Crossley et al., 2021; UNICEF et al., 2021). After establishing the substantial effects of lockdowns on several outcomes, we go on to analyze the possible heterogeneous impact of lockdowns across households' levels of monthly expenditures, education, and regions.

- Expenditure Level

First, we examine the heterogeneous impact of lockdowns based on the household level of expenditures, which is often used as a proxy of income. Table 5 presents the estimation results for the impact of lockdowns on outcomes considered in this study for two expenditure groups,

households with monthly expenditure up to Rp5 million between columns (1) and (4) and those with above Rp5 million between columns (5) and (8).[14]

Household spending is divided at Rp5 million a month for two reasons: (i) the mean of Indonesia's monthly income per capita based on the World Bank data is around Rp4.6 million;[15] and (ii) non-taxable income in Indonesia is about Rp4.5 million per month. We repeat the estimation procedures applied in the previous analysis for both expenditure or income groups, where all specifications include the month and province dummies. Columns (3) – (4) and columns (7) – (8) control for a battery of covariates used in our previous estimations.

Panel A in Table 5 depicts the impact of lockdowns on the change in income. The results from our 2SLS model in columns (4) and (8) suggest that lockdowns induce more income reduction in the lower income households than in the higher-income ones. The point estimate for households with lower monthly expenditure is -0.883 compared to -0.608 for those with higher expenditure levels. Both results are statistically significant at $\alpha = 1$ percent and qualitatively maintained across the alternative specifications. The difference in how lockdowns affect income may be explained by the difference in job characteristics between the two groups. Jobs for most of the lower income households tend to be more manual than those for the higher incomes. Consequently, the lower incomes would tend to be furloughed—if not laid-off—during lockdowns and experience larger cuts in income, whereas the higher incomes may continue working remotely from home and retain most of their earnings.

Similar patterns persist in the other outcome variables. Panel B shows that households with lower monthly expenditure become more pessimistic about their expected income than those with higher monthly spending during lockdowns. Expected income in six months after being surveyed is down by -0.40 [Panel B column (4)] for the lower income households compared to -0.32 [Panel B, column (8)]. Both are significant at $\alpha = 1$ percent. Panel C shows that, under lockdowns, reductions in durable consumptions relative to six months before being surveyed is larger for the lower income households ( $\hat{\beta}$ = -0.649) than for the higher-incomes ( $\hat{\beta}$ = -0.453). Panels A, B, and C suggest that lower income households are facing more substantial hardships due to lockdowns than those with higher incomes.

Panel D, E, and F of Table 5 present the estimation results on the share of income allocated for consumption, debt installment, and savings, respectively. To smooth consumption, lower income households tend to increase their consumption share of income to a greater degree than those with the higher incomes (by 4.64 percentage points against 3.89 percentage points, respectively). Panels E and F, however, show the different impacts of lockdowns on the share of income spent on debt

[14] USD 1 roughly equals Rp14,500 on average in 2020.

[15] https://blogs.worldbank.org/opendata/new-world-bank-country-classifications-income-level-2021-2022

installment and savings for the two household categories, which enrich our understanding of how different households finance their desire to smooth consumption. Higher income households reduce their debt installment share of income much more than the lower income households (by 3.41 percentage points versus 1.60 percentage points, respectively), but they sacrifice much less of their savings share of income relative to the lower income households (by 0.49 percentage points versus 3.04 percentage points, respectively). All these suggest that, when trying to smooth their consumption, higher income households sacrifice less of their savings and choose to backtrack on their debt obligations instead. In contrast, the lower income households, which may not have similar financial access as the higher income households, do not have the luxury to do the same and hence are forced to deplete more of their savings to smooth consumption.

The results in Table 5 confirm the heterogeneous impact of lockdowns, based on income groups, proxied by expenditure, on our dependent variables. Our analysis highlights that lower income households tend to face more substantial negative impacts than higher income households. This, therefore, implies the importance of providing targeted assistance to the more vulnerable households during the pandemic.

Table 5. Heterogeneity Impact of Lockdowns Based on Level of Expenditure

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| | OLS | 2SLS | OLS | 2SLS | OLS | 2SLS | OLS | 2SLS |
| | Expenditure < Rp5 million | | | | Expenditure > Rp5 million | | | |
| **Panel A**<br>**Dependent variable: Change in Income** | | | | | | | | |
| Dummy Lockdown | -0.763*** | -1.083*** | -0.618*** | -0.883*** | -0.635*** | -0.732*** | -0.556*** | -0.608*** |
| | (0.066) | (0.172) | (0.061) | (0.154) | (0.056) | (0.067) | (0.056) | (0.057) |
| Observation | 154,310 | 154,310 | 154,310 | 154,310 | 22,641 | 22,641 | 22,641 | 22,641 |
| Adjusted R-squared | 0.087 | | 0.179 | | 0.080 | | 0.175 | |
| Kleibergen-Paap First-stage F-Stats | | 15.733 | | 15.419 | | 9.548 | | 9.729 |
| **Panel B**<br>**Dependent variable: Expected Future Income** | | | | | | | | |
| Dummy Lockdown | -0.421*** | -0.650*** | -0.234*** | -0.402*** | -0.331*** | -0.481*** | -0.210*** | -0.319*** |
| | (0.067) | (0.121) | (0.044) | (0.097) | (0.036) | (0.037) | (0.036) | (0.026) |
| Observation | 154,310 | 154,310 | 154,310 | 154,310 | 22,641 | 22,641 | 22,641 | 22,641 |
| Adjusted R-squared | 0.087 | | 0.179 | | 0.063 | | 0.260 | |
| Kleibergen-Paap First-stage F-Stats | | 15.733 | | 15.419 | | 9.548 | | 9.729 |
| **Panel C**<br>**Dependent variable: Consumption of Durable Goods** | | | | | | | | |
| Dummy Lockdown | -0.538*** | -0.770*** | -0.453*** | -0.649*** | -0.486*** | -0.543*** | -0.423*** | -0.453*** |
| | (0.073) | (0.133) | (0.064) | (0.130) | (0.063) | (0.130) | (0.063) | (0.135) |
| Observation | 154,310 | 154,310 | 154,310 | 154,310 | 22,641 | 22,641 | 22,641 | 22,641 |
| Adjusted R-squared | 0.074 | | 0.110 | | 0.061 | | 0.100 | |
| Kleibergen-Paap First-stage F-Stats | | 15.733 | | 15.419 | | 9.548 | | 9.729 |
| **Panel D**<br>**Dependent variable: The Share of Consumption Relative to Income** | | | | | | | | |
| Dummy Lockdown | 3.311*** | 6.169*** | 2.773 | 4.641*** | 2.986** | 5.576*** | 2.228** | 3.893*** |
| | (0.329) | (0.816) | (0.913) | (1.141) | (0.642) | (0.067) | (0.472) | (0.237) |
| Observation | 29,681 | 29,681 | 29,681 | 29,681 | 7,625 | 7,625 | 7,625 | 7,625 |
| Adjusted R-squared | 0.009 | | 0.039 | | 0.012 | | 0.056 | |
| Kleibergen-Paap First-stage F-Stats | | 43.034 | | 39.455 | | 92.978 | | 80.550 |
| **Panel E**<br>**Dependent variable: The Share of Debt Instalment Relative to Income** | | | | | | | | |
| Dummy Lockdown | -0.558 | -1.103*** | -0.957 | -1.601*** | -1.353*** | -3.057*** | -1.883*** | -3.407*** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (0.524) | (0.347) | (0.426) | (0.37) | (0.046) | (0.170) | (0.146) | (0.217) |
| Observation | 29,681 | 29,681 | 29,681 | 29,681 | 7,625 | 7,625 | 7,625 | 7,625 |
| Adjusted R-squared | 0.001 | | 0.017 | | 0.007 | | 0.028 | |
| Kleibergen-Paap First-stage F-Stats | | 43.034 | | 39.455 | | 92.978 | | 80.550 |
| **Panel F**<br>**Dependent variable: The Share of Savings Relative to Income** | | | | | | | | |
| Dummy Lockdown | -2.754** | -5.067*** | -1.816 | -3.040*** | -1.633 | -2.519*** | -0.346 | -0.487 |
| | (0.385) | (1.111) | (0.612) | (0.9481) | (0.607) | (0.222) | (0.589) | (0.270) |
| Observation | 29,681 | 29,681 | 29,681 | 29,681 | 7,625 | 7,625 | 7,625 | 7,625 |
| Adjusted R-squared | 0.010 | | 0.047 | | 0.012 | | 0.046 | |
| Kleibergen-Paap First-stage F-Stats | | 43.034 | | 39.455 | | 92.978 | | 80.550 |
| Sector Dummies | No | No | Yes | Yes | No | No | Yes | Yes |
| Month Dummies | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Province Dummies | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Covariates | No | No | Yes | Yes | No | No | Yes | Yes |

Note: Robust standard errors clustered at province level in parentheses. The sample in Columns (1)-(4) are households with monthly expenditure below Rp 5 million. In columns (5)-(8), the samples are households with monthly expenditure above Rp 5 million. The set of covariates are the expectation of business conditions in the future, sex, total expenditure, age, education level, and the dummy for the formal sector. Dummy lockdown is instrumented by the number of active cases (in 000). The total number of observations drops in Panels D, E, and F because the sample for this question is only in Jakarta, West Java, and South Sulawesi. ** p < 0.05, *** p < 0.01

- Education Level

Next, we consider if the impact of lockdowns varies across education levels. Columns (1)–(4) in Table 6 show the estimated effects of lockdowns on households with high school education or lower educational levels, and columns (5)–(8) present the effects to those with tertiary education. Although they may not hold on a per case basis, the average households with tertiary education are expected to earn more than those with a high school education or lower. This average assessment seems to hold as the results in Panels A, B, and C qualitatively echo the findings reported in Table 5 for the different income groups. The reduction in the change in income, expected income, and consumption of durable goods are less for households with tertiary education than those with lower levels of education.

Under lockdowns, the change in income for households with tertiary education would decrease further by -0.77 points against -0.86 for those with lower levels of educational background (both estimates are statistically significant at $\alpha = 1$ percent). However, the difference in the estimated coefficient between the two groups is not as striking as in the case for the different income groups, suggesting that the difference in the educational background does not directly explain the difference in income. Similar results are also applicable to the expected income and consumption of durables. Panel B suggests that income expectations under lockdowns dropped more in households with lower education than those with higher education ($\hat{\beta} = $-0.42 against -0.33, respectively). Panel C shows that the point estimate for the lockdowns' coefficient for households with lower educational backgrounds is -0.62 versus -0.60 for households with tertiary degrees.

Lockdowns' impact on the allocation of income for consumption, debt installment, and savings in Panels D, E, and F suggest slightly different heterogeneous effects than those found for the different income groups. To cope with lockdowns, the consumption share of income for lower educated households increases more than those of higher educated households by 5.27 percentage points versus 2.92 percentage points, respectively. However, reductions in the income share spent

on debt installment and savings are somewhat different from those reported in Table 6. Households with lower levels of education reduce their income allocation for debt installment by -1.92 percentage points, at par with the higher-educated households who cut their allocation by -1.88 percentage points. However, the lower educated households reduce their share of savings due to lockdowns by -3.35 percentage points against -1.04 percentage points for the higher educated ones. These suggest that, unlike the lower incomes, the lower educated households have similar financial access as the higher educated ones. Regardless, the lower educated households are still the ones who ended up sacrificing more of their savings to smooth their consumption.

Our findings here highlight the differential impact of lockdowns on households based on their level of education. Higher educated households, which mostly work in formal sectors, are less impacted by lockdowns as they can still work digitally from home. In contrast, lower educated households are worse affected as they are most vulnerable to the restrictions on social mobility.

Table 6. Heterogeneity Impact of Lockdown Based on Level of Education

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| | OLS | 2SLS | OLS | 2SLS | OLS | 2SLS | OLS | 2SLS |
| | Education: High School or below | | | | Education: University or Graduate Education | | | |
| **Panel A**<br>**Dependent variable: Change in Income** | | | | | | | | |
| Dummy Lockdown | -0.791*** | -1.084*** | -0.628*** | -0.862*** | -0.666*** | -0.889*** | -0.572*** | -0.770*** |
| | (0.064) | (0.181) | (0.055) | (0.172) | (0.054) | (0.113) | (0.067) | (0.103) |
| Observation | 115,994 | 115,994 | 115,994 | 115,994 | 60,957 | 60,957 | 60,957 | 60,957 |
| Adjusted R-squared | 0.086 | | 0.180 | | 0.078 | | 0.158 | |
| Kleibergen-Paap First-stage F-Stats | | 19.776 | | 19.625 | | 8.661 | | 8.647 |
| **Panel B**<br>**Dependent variable: Expected Future Income** | | | | | | | | |
| Dummy Lockdown | -0.437*** | -0.689*** | -0.236*** | -0.420*** | -0.350*** | -0.497*** | -0.211*** | -0.328*** |
| | (0.070) | (0.130) | (0.044) | (0.102) | (0.042) | (0.062) | (0.041) | (0.052) |
| Observation | 115,994 | 115,994 | 115,994 | 115,994 | 60,957 | 60,957 | 60,957 | 60,957 |
| Adjusted R-squared | 0.090 | | 0.274 | | 0.065 | 0.062 | 0.229 | 0.227 |
| Kleibergen-Paap First-stage F-Stats | | 19.776 | | 19.625 | | 8.661 | | 8.647 |
| **Panel C**<br>**Dependent variable: Consumption of Durable Goods** | | | | | | | | |
| Dummy Lockdown | -0.538*** | -0.749*** | -0.449*** | -0.624*** | -0.515*** | -0.685*** | -0.442*** | -0.595*** |
| | (0.075) | (0.139) | (0.063) | (0.137) | (0.063) | (0.120) | (0.065) | (0.116) |
| Observation | 115,994 | 115,994 | 115,994 | 115,994 | 60,957 | 60,957 | 60,957 | 60,957 |
| Adjusted R-squared | 0.076 | | 0.111 | | 0.061 | | 0.101 | |
| Kleibergen-Paap First-stage F-Stats | | 19.776 | | 19.625 | | 8.661 | | 8.647 |
| **Panel D**<br>**Dependent variable: The Share of Consumption Relative to Income** | | | | | | | | |
| Dummy Lockdown | 4.515*** | 7.180*** | 3.643 | 5.274*** | 1.688 | 3.960*** | 1.117 | 2.923*** |
| | (0.414) | (0.852) | (1.233) | (1.413) | (0.808) | (0.159) | (0.659) | (0.274) |
| Observation | 21,869 | 21,869 | 21,869 | 21,869 | 15,437 | 15,437 | 15,437 | 15,437 |
| Adjusted R-squared | 0.013 | | 0.046 | | 0.004 | | 0.049 | |
| Kleibergen-Paap First-stage F-Stats | | 36.576 | | 33.103 | | 123.809 | | 103.818 |
| **Panel E**<br>**Dependent variable: The Share of Debt Instalment Relative to Income** | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Dummy Lockdown | -0.889 | -1.531*** | -1.267* | -1.925*** | -0.610 | -1.574*** | -0.754 | -1.882*** |
| | (0.245) | (0.233) | (0.303) | (0.455) | (0.665) | (0.610) | (0.481) | (0.584) |
| Observation | 21,869 | 21,869 | 21,869 | 21,869 | 15,437 | 15,437 | 15,437 | 15,437 |
| Adjusted R-squared | 0.001 | | 0.034 | | 0.001 | | 0.044 | |
| Kleibergen-Paap First-stage F-Stats | | 36.576 | | 33.103 | | 123.809 | | 103.818 |
| **Panel F**<br>**Dependent variable: The Share of Savings Relative to Income** | | | | | | | | |
| Dummy Lockdown | -3.626** | -5.650*** | -2.377 | -3.348*** | -1.078** | -2.387*** | -0.363 | -1.042*** |
| | (0.443) | (1.056) | (0.999) | (1.151) | (0.246) | (0.501) | (0.182) | (0.350) |
| Observation | 21,869 | 21,869 | 21,869 | 21,869 | 15,437 | 15,437 | 15,437 | 15,437 |
| Adjusted R-squared | 0.015 | | 0.045 | | 0.008 | | 0.043 | |
| Kleibergen-Paap First-stage F-Stats | | 36.576 | | 33.103 | | 123.809 | | 103.818 |
| Sector Dummies | No | No | Yes | Yes | No | No | Yes | Yes |
| Month Dummies | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Province Dummies | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Covariates | No | No | Yes | Yes | No | No | Yes | Yes |

Note: Robust standard errors clustered at province level in parentheses. The sample in Columns (1)-(4) are households where households' heads have a high school degree or below. In columns (5)-(8), the samples are households where the households' heads have a university degree or higher. The set of covariates are the expectation of business conditions in the future, sex, total expenditure, age, education level, and the dummy for the formal sector. Dummy lockdown is instrumented by the number of active cases (in 000). The total number of observations drops in Panels D, E, and F because the sample for this question is only in Jakarta, West Java, and South Sulawesi. ** p < 0.05, *** p < 0.01

Regions

We also estimate the impact of lockdown policies based on regions. The first COVID-19 case in Indonesia was detected in Java, and lockdown policies in provinces within Java are mostly initiated before those outside Java. In terms of economic structures and characteristics, the regions in Java and outside Java differ quite substantially, leading to heterogeneous impacts of lockdowns.

Table 7 depicts our heterogeneity analysis by differentiating the sample into the regions located in Java and outside Java. The table reports only results for three main dependent variables as complete observations for the share of consumption, debt installment, and savings relative to income were only available for Jakarta, West Java, and South Sulawesi. Another important aspect that needs to be noted here is that we may have weak instrument issues for the regions outside Java as suggested by the Kleibergen-Paap First-stage F-Stats that are consistently lower than 10. This may be caused by the very small variations in the number of active COVID-19 cases outside Java, which affected the results for our first-stage F-stats. Therefore, this issue needs to be considered when interpreting the results.

Panel A suggests a heterogeneous impact of lockdowns on the change in household income between Java and outside Java. Household income outside Java decreased substantially due to lockdowns ($\hat{\beta} =$ -2.83), much steeper than those residing in Java ($\hat{\beta} =$ -0.68). This implies that the impact of lockdowns on income outside Java is about four times as severe as in Java. Panel B suggests that the impact of lockdowns on expected income, after controlling for the covariates, are only statistically significant for households in Java but not for those living outside Java, thereby suggesting the household expectations in the latter area are insensitive towards lockdowns. Parallel to the drop in income, Panel C shows the drop in household consumption on durable goods in Java

is much less than outside Java, with lockdowns coefficients appearing to be statistically significant at $\alpha = 1$ percent, having been estimated at -0.53 and -1.68, respectively.

These results suggest that the impact of lockdowns is more substantial outside Java than in Java. This is mainly because of the lower levels of development and infrastructure (transportation, logistics, health infrastructure, and so on) outside Java. In addition, lockdowns also disrupt the distribution of goods and services (including medical supplies) outside Java and, in turn, their economic activity due to their high dependence on supplies from Java (see the discussion in, for example, Ridhwan, 2021). Thus, the impact would be substantial even though the size of the pandemic itself was not as big as in Java. This suggests a need for better policy coordination between core and peripheral regions with regard to the implementation of lockdowns by taking regional variations in economic structures and characteristics into consideration.

Table 7. Heterogeneity Impact of Lockdown Based on Java versus Non-Java

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| | OLS | 2SLS | OLS | 2SLS | OLS | 2SLS | OLS | 2SLS |
| | Non-Java | | | | Java | | | |
| **Panel A** | | | | | | | | |
| **Dep. Var.: Change in Income** | | | | | | | | |
| Dummy Lockdown | -0.568*** | -3.139*** | -0.431*** | -2.827*** | -0.854*** | -0.848*** | -0.716*** | -0.683*** |
| | -0.054 | -0.711 | -0.043 | -0.643 | -0.063 | -0.119 | -0.054 | -0.113 |
| Observation | 108,540 | 108,540 | 108,540 | 108,540 | 68,411 | 68,411 | 68,411 | 68,411 |
| Adjusted R-squared | 0.065 | | 0.16 | | 0.112 | | 0.206 | |
| Kleibergen-Paap First-stage F-Stats | | 6.071 | | 5.991 | | 12.101 | | 11.959 |
| **Panel B** | | | | | | | | |
| **Dep. Var.: Expected Future Income** | | | | | | | | |
| Dummy Lockdown | -0.254** | -0.638*** | -0.089 | -0.144 | -0.497*** | -0.584*** | -0.300*** | -0.369*** |
| | -0.086 | -0.146 | -0.053 | -0.205 | -0.08 | -0.115 | -0.044 | -0.091 |
| Observation | 108,540 | 108,540 | 108,540 | 108,540 | 68,411 | 68,411 | 68,411 | 68,411 |
| Adjusted R-squared | 0.061 | | 0.233 | | 0.064 | | 0.257 | |
| Kleibergen-Paap First-stage F-Stats | | 6.071 | | 5.991 | | 12.101 | | 11.959 |
| **Panel C** | | | | | | | | |
| **Dep. Var.: Consumption of Durable Goods** | | | | | | | | |
| Dummy Lockdown | -0.366*** | -1.835*** | -0.287*** | -1.675*** | -0.630*** | -0.643*** | -0.537*** | -0.529*** |
| | -0.086 | -0.369 | -0.067 | -0.336 | -0.088 | -0.118 | -0.075 | -0.12 |
| Observation | 108,540 | 108,540 | 108,540 | 108,540 | 68,411 | 68,411 | 68,411 | 68,411 |
| Adjusted R-squared | 0.061 | | 0.099 | | 0.082 | | 0.122 | |
| Kleibergen-Paap First-stage F-Stats | | 6.071 | | 5.991 | | 12.101 | | 11.959 |
| Sector Dummies | No | No | Yes | Yes | No | No | Yes | Yes |
| Month Dummies | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Province Dummies | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Covariates | No | No | Yes | Yes | No | No | Yes | Yes |

Note: Robust standard errors clustered at province level in parentheses. The sample in Columns (1)-(4) are households located outside Java. In columns (5)-(8), the samples are households located in Java. The set of covariates are expectations of business conditions in the future, sex, total expenditure, age, education level, and the dummy for the formal sector. Dummy lockdown is instrumented by the number of active cases (in 000).
** p < 0.05, *** p < 0.01

Finally, we also perform further heterogeneity analysis based on gender and formal and informal sectors. Table C.5 shows the estimation results from differentiating the male and female respondents of the BI-CS. In general, there is no significant difference in the impact of gender differences on our outcome variables. This is mainly because the sample unit in BI-CS is household and not individual. In the survey, households are represented by a respondent who is either the household head, spouse, or any other adult household member. Therefore, gender differences in the sample do not necessarily represent heterogeneity as they simply act as a household representative. Table C.6 shows the results of heterogeneity analysis based on whether the respondent is employed in the formal or informal sector. The results indicate that there is also no indication of substantial differences in the negative impact of lockdowns on our outcome variables for the different employment sectors.

*Robustness Test*

To check for robustness, we substitute the lockdown dummy by measuring lockdown duration (in average days per month) as an alternative independent variable of interest. Unlike the lockdown dummy which captures only the incidence of lockdown implementations, the lockdown duration captures the length of time spent on lockdowns, which may also affect people's behavior. Baker et al. (2020) conclude that the duration of lockdowns and the adoption of the "shelter-in-place orders" in the US have a significant negative impact on individuals' spending.

Table C.4 in Appendix C depicts the impact of the length of lockdown policies on our main dependent variables. We employ the same estimation strategy used in our baseline results. The columns show the results from either an OLS or 2SLS estimation, instrumented by the number of active cases. The F-tests from our first stage estimation, ranging from 13.07 and 16.49, suggest that the number of active cases is a useful instrument for the new independent variable in our model.

The results suggest that the negative impact of lockdowns on income, expected income, and consumption of durable goods worsen as the duration extends. The duration of lockdowns also positively affects the consumption share of income, which gets larger as the lockdown period expands. Consequently, longer lockdowns would force households to increasingly reduce their income allocation for debt installment and savings to smooth consumption as income dwindles. These all are consistent with the results from our main estimation model and confirm the robustness of our findings.

We also perform a robustness test by transforming the scale of our outcome variables from a range of value of -2 to +2 into a binary variable that takes a value of 1 if a significant decrease in our

dependent variable was observed, and zero otherwise. This approach is used only as a robustness test since this transformation removes much of the variations in our main dependent variables. The results for this alternative approach (See Table C.7.) largely supports our baseline findings where lockdown policies lead to decreases in households' income, expectations, and consumption on durable goods.

Although our test for weak instrumental variables suggests no issues with the use of our instrumental variables, there are still possibilities for alternative instrumental variables. For example, using active cases per population instead of the absolute number of active cases as an instrument. In our main estimation, the number of absolute cases is used as an instrument since this variable is the parameter used to make lockdown decisions based on the government regulation. However, the use of this indicator may introduce bias as the virus transmission may be quicker in more densely populated areas. There is also a possibility that lockdowns in a province took place in response to a lockdown implementation in other neighbouring provinces. That is, lockdowns in neighbouring provinces may invoke the government of a province to implement the same policy in order to avoid possibilities of large scale virus spread in its region. To check on these concerns, we re-estimated our 2SLS using the mentioned alternative instruments.

The re-estimation using active cases per population as an instrument is shown in Table C.8. of the appendix. Columns (1)-(6) of the table show results from using absolute active cases as an instrument, while columns (7)-(12) show those using active cases per population. The Kleibergen Papp F-statistics ranges between 17.38 and 33.95, suggesting no presence of a weak instrument issue in the estimates. In terms of the second stage results, the use of this alternative instrumental variable retains our baseline results in terms of magnitudes, signs and statistical significance.

Table C.9 shows the results of adding a lockdown dummy of the neighbouring provinces into our set of instrumental variables along with the total number of active cases. Both the F-statistics and the *p*-value of the Hansen's J-test suggest that the two variables are valid instruments. The second stage estimation results suggest that the use of both instruments do not alter the findings in our baseline model. The impact of lockdowns on income, expectations, durable goods, debt repayment, and saving allocations are found to be negative and statistically significant at the 1% levels.

## 5. Conclusion

This study investigates the impact of COVID-19, through lockdown policies, on household conditions in Indonesian major cities using monthly consumer survey data collected by Bank Indonesia. The findings confirm that lockdowns have significantly reduced household income, income expectations, and consumption of durable goods. We also find that lockdowns significantly increase the share of consumption in household budgets and reduce the shares of debt installments and savings. These results are in general consistent with those from other countries. Our study is

the first to establish the empirical causal impact of lockdowns on household conditions in Indonesia.

We also find heterogeneous impacts across different groups of households. First, lower income households face greater hardships than higher income households. Second, the impact of lockdowns is more significant for households with lower levels of education because they work in sectors that are more adversely affected by the restrictions on mobility and activities. Third, the impact of lockdowns is more significant outside Java than in Java due to the differences in their levels of development and economic structures.

Our findings have important implications for policies during both the pandemic and post-pandemic recovery periods. The finding that lockdowns have caused a substantial reduction in household income and consumption of durable goods indicates that lockdowns have significantly reduced business activities. As a consequence, people lost jobs or faced a reduction in work hours, causing a reduction in income for both workers and self-employed people. This implies that the regular social assistance, which focuses on the poor population, needs to be expanded substantially to cover workers who lost jobs or were furloughed.

Furthermore, since lower expectations of future income will negatively affect the current consumption, they can have an adverse effect on economic recovery. Therefore, the recovery policy should focus on assisting businesses to resume operations and achieve their normal business activities while still protecting workers health and safety. This will allow workers to regain employment and recover their income, which in turn will boost household expectations about their future income.

Finally, the findings that households reallocate their budget from debt installments and savings to consumption suggest a potential need for households' debt restructuring. Following the declines in income, households will have to use their savings to finance their expenditure and increase their arrears on the debt at the same time. Debt restructuring will enable households to postpone the repayments of their debts until they regain their income after recovering from the crisis.

The focus of this study is limited only on the direct impact of COVID-19 lockdowns on household financial conditions, and hence neglecting other potential channels for the effects of lockdowns. For example, lockdowns may affect mental health, which will also affect individual's ability to work (Banks and Xu, 2020). In addition, lockdowns may also affect economic outcomes through disruptions in international trade (Hayakawa and Mukunoki, 2021; Pei et al., 2022). These potential channels are beyond the scope of our analysis and would require further studies for the case of Indonesia.

Another potential future study is investigating the impact of lockdowns on several indicators in a panel data setting using provincial or district level data. Our study only relies on the cross-sectional variations, hence we could not capture the dynamic effects of lockdown policies. Finally, since the data in our study came only from major cities, we could not investigate the impact in rural areas. Therefore, a specific study on the impact of COVID-19 in rural areas is another avenue for future research.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have influenced the work reported in this paper.

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Appendix A.1. The Dynamics of COVID-19 Impact on Households

Indonesia was still considered safe when the first COVID-19 infection was detected in early March 2020. Along with the government policy to promote tourism in the country, the people's mobility index outside residential areas briefly increased above its January 2020 level (Figure 1). The mobility index started to dip below its pre-pandemic level in mid-March after the total number of infections crossed the 100 mark and reached its lowest level in April as the government implemented a large-scale social restriction (PSBB)—the lockdown in short. Since then, different degrees and intensities of lockdowns or mobility restrictions have been observed, depending on how the number of active cases evolves in different areas of the country. Several fiscal and monetary policies have been implemented as tools to stabilize the economy (Rizvi et al., 2021). As a result, the level of people's mobility outside residential areas has hardly ever reverted to where it was before the COVID-19 crisis started.

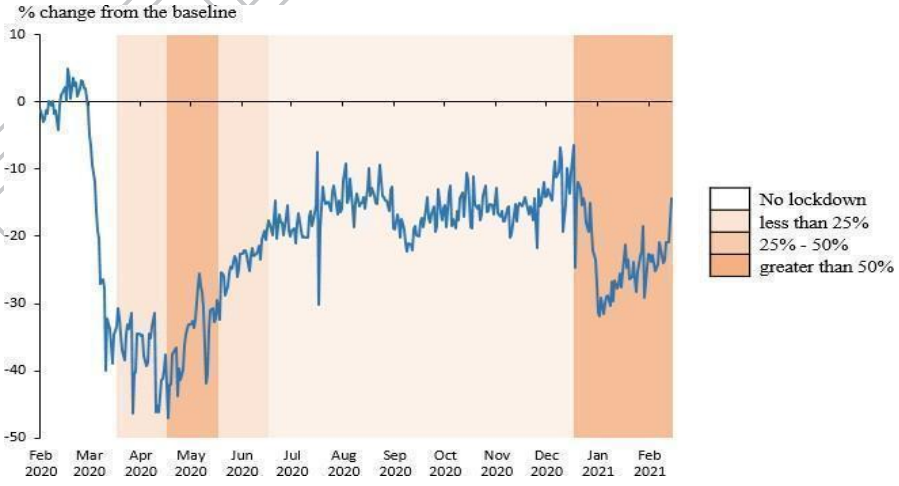


Figure 1. Average mobility outside the residential areas

Note: The colors indicate the monthly intensity of lockdowns implemented in the country. Starting from less than 25 percent of the provinces declaring lockdown implementation, between 25 and 50 percent of the provinces implementing lockdowns, to more than 50 percent of provinces in lockdowns.

Source: Authors' calculation

To get a better gauge of the dynamics in people's mobility outside residential areas, we conduct an event analysis to see how mobility evolves around lockdown implementations (see Appendix A). The number of active COVID-19 cases is the main determinant for people's mobility. Mobility also varies across provinces and time due to region-specific factors and seasonalities. In addition, we also detect changes in the dynamics of people's movements before and after the implementation of lockdowns. Figure 2 below shows how mobility tends to be higher in pre-lockdown months and returns to become more active in a month or two post-lockdown. Beyond the two months after lockdown, the mobility restriction effect dissipates as they become statistically insignificant, and people's movements are again primarily driven by the number of active COVID-19 cases in their area as well as their location and time-specific factors.

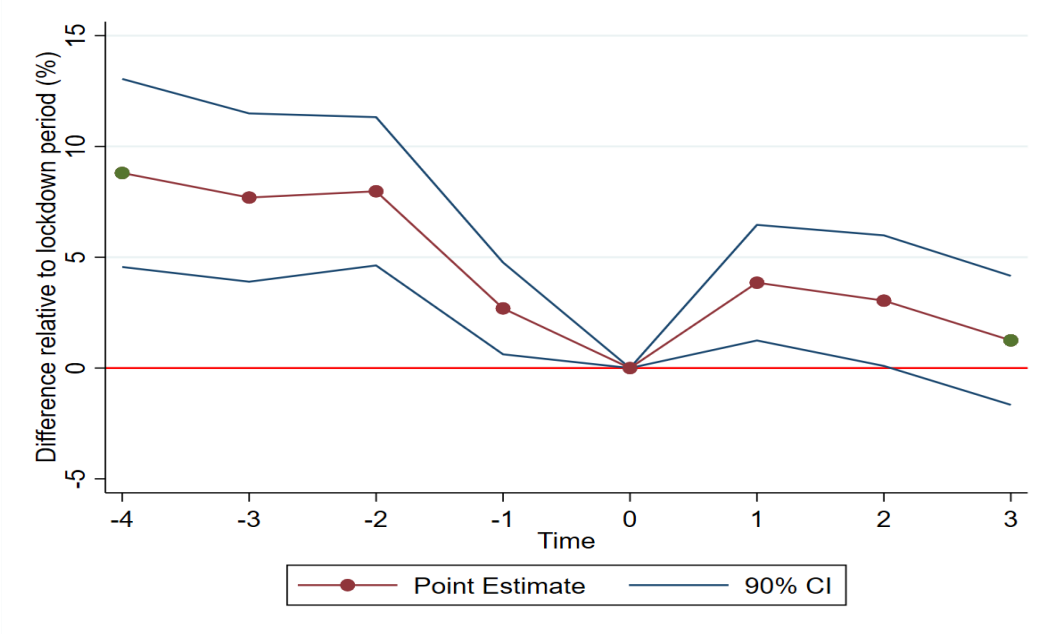


Figure 2. Pre and post-lockdown effect on mobility outside the residential areas
Source: Authors' calculation

## Appendix A.2. The Impact of COVID-19 on Mobility

To evaluate the impact of lockdowns on people's mobility, we conduct an event analysis following that of Clarke and Schythe (2020), with the following specification:

$$Mobility_{pt} = \alpha + \sum_{j=1}^{J} j_{pt} + \sum_{k=1}^{K} k_{pt} + \mu_p + \lambda_t + \delta X_{pt} + \varepsilon_{pt} \qquad (3)$$

$Mobility_{pt}$ is the monthly average of Google's Mobility index outside residential areas, which includes mobility in retail, grocery, parks, transit, and workplaces, in province *p* and month *t*. This is a slight modification from, for example, the study conducted by Coibion et al. (2020), which focuses on the impact of COVID-19 on retail mobility only. Variables of interest are $Lag\ j$ and $Lead\ k$, which indicate dummies for months before and after a lockdown in a province. For each $j$, $Lag\ j$ indicates a value of 1 for each $j^{th}$ month before a lockdown begins, and zero otherwise. For each $k$, $Lead\ k$ indicates a value of 1 for each $k^{th}$ month after a lockdown is completed, and zero otherwise. The coefficients for each of these dummies, all the $\beta_j$ and $\gamma_k$, show how much people's mobility in the period before or after lockdowns differ from their mobility during the lockdown. Province $\mu_p$ and month $\lambda_t$ are the fixed effects included to capture the province and time-specific characteristics in the sample. Finally, $X_{pt}$ is a covariate representing the number of active cases for province *p* at time *t*, which serves as a determinant of people's mobility outside residential areas.

The determination of the maximum for both *j* and *k* is done through an iterative process, where the estimation is done repeatedly and stopped once the estimated $\beta_j$ and $\gamma_k$ ceases to become statistically different between $j = J$ and $j = J$-1, and $k = K$ and $k = K$-1. The values of $Lag\ J$ are at 1 up to *J* month before a lockdown, and 0 otherwise. Similarly, $Lead\ K$ values are set at 0 before month *K* after a lockdown is completed, and 1 otherwise. With these, $Lag\ J$ captures the possible effects of the months before *J*-1, and $Lead\ K$ represents the effects of months after *K*-1. The model is estimated using 234 observations for 18 provinces from February 2020 to February 2021. The iterative process is truncated at J = 4 and K = 3.

The results are shown in the table below. On average, the mobility within our sample is slightly less than 20 percent ($\alpha$) below the pre-pandemic level in February 2020. The level of mobility falls with the number of active cases ($\delta$), where the level of mobility is reduced further by about 0.5 percentage points for each additional active case observed. In the provinces where lockdowns were observed, the level of mobility tended to be higher by about 9 percent in four months before the lockdown, and the rate gradually dropped to only 2.7 percent above in a month before the lockdown. After completing a lockdown, additional mobility is observed for the first two months. Beyond the two months post-lockdown, the additional effect subsides, and the mobility outside residential areas is again determined only by the number of active cases.

Table A.1. Event Study Results

| **Dependent Variable: Mobility outside residential** | | | |
|---|---|---|---|
| δ | -0.476*** | γ1 | 3.852* |
| | (-4.54) | | (2.57) |
| β4 | 8.803** | γ2 | 3.041 |
| | (3.61) | | (1.80) |
| β3 | 7.693** | γ3 | 1.249 |

| | | | |
|---|---|---|---|
| | (3.53) | | (0.75) |
| β2 | 7.976*** | α | -19.94*** |
| | (4.15) | | (-14.20) |
| β1 | 2.692* | | |
| | (2.26) | | |
| Month Dummies | | | Yes |
| Province Dummies | | | Yes |
| Observation | | | 234 |
| Adjusted R-squared | | | 0.76 |

Notes: Robust standard errors clustered at the province level in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01

# Appendix B. List of Figures


Figure B.1. Survey Areas

Source: Authors' compilation

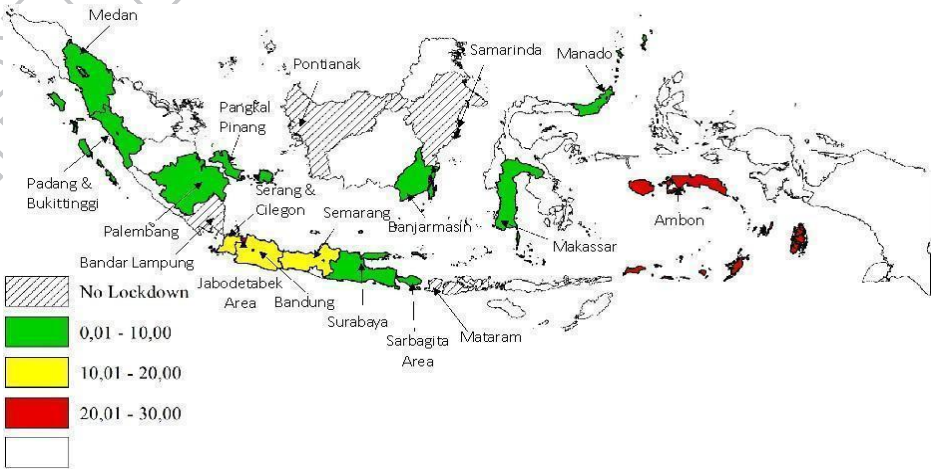


Figure B.2. Lockdown Policies Across Survey Areas

Source: Authors' compilation

Appendix C. List of Tables

Table C.1. Descriptive Statistics

| | Before 2020 | | | | Jan 2020 - Feb 2021 | | | | Full Period | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Panel A: Outcome Statistics** | mean | sd | min | max | mean | sd | min | max | mean | sd | min | max |
| Change in Income | 0.21 | 0.82 | -2.00 | 2.00 | -0.43 | 1.01 | -2.00 | 2.00 | -0.03 | 0.95 | -2.00 | 2.00 |
| Expected Future Income | 0.50 | 0.74 | -2.00 | 2.00 | 0.26 | 0.86 | -2.00 | 2.00 | 0.41 | 0.80 | -2.00 | 2.00 |
| Consumption for Durable Goods | 0.16 | 0.81 | -2.00 | 2.00 | -0.24 | 0.90 | -2.00 | 2.00 | 0.01 | 0.86 | -2.00 | 2.00 |
| Percentage of Consumption relative to Income (%) | 64.55 | 21.12 | 5.00 | 100.00 | 68.51 | 21.80 | 0.00 | 100.00 | 66.01 | 21.46 | 0.00 | 100.00 |
| Percentage of Debt Instalment relative to Income (%) | 15.03 | 17.74 | 0.00 | 90.00 | 14.23 | 18.30 | 0.00 | 90.00 | 14.73 | 17.96 | 0.00 | 90.00 |
| Percentage of Savings relative to Income (%) | 20.43 | 17.96 | 0.00 | 80.00 | 17.26 | 17.57 | 0.00 | 85.00 | 19.26 | 17.88 | 0.00 | 85.00 |
| | | | | | | | | | | | | |
| **Panel B: Main Independent Variable** | | | | | | | | | | | | |
| Dummy Lockdown | 0.00 | 0.00 | 0.00 | 0.00 | 0.32 | 0.47 | 0.00 | 1.00 | 0.12 | 0.32 | 0.00 | 1.00 |
| Length of Lockdown (days) | 0.00 | 0.00 | 0.00 | 0.00 | 7.55 | 11.96 | 0.00 | 31.00 | 2.78 | 8.12 | 0.00 | 31.00 |
| Number of Active Cases | 0.00 | 0.00 | 0.00 | 0.00 | 2782.13 | 5506.01 | 0.00 | 44527.54 | 1024.81 | 3601.11 | 0.00 | 44527.54 |
| | | | | | | | | | | | | |
| **Panel C: Control Variables** | | | | | | | | | | | | |
| Expected Future Economic Condition | 0.41 | 0.87 | -2.00 | 2.00 | 0.12 | 1.04 | -2.00 | 2.00 | 0.30 | 0.95 | -2.00 | 2.00 |
| Female | 0.54 | 0.50 | 0.00 | 1.00 | 0.55 | 0.50 | 0.00 | 1.00 | 0.54 | 0.50 | 0.00 | 1.00 |
| Expenditure | 3.26 | 1.68 | 1.50 | 8.50 | 3.20 | 1.63 | 1.50 | 8.50 | 3.24 | 1.66 | 1.50 | 8.50 |
| Age | 36.48 | 11.08 | 25.00 | 65.00 | 36.61 | 11.39 | 25.00 | 65.00 | 36.53 | 11.20 | 25.00 | 65.00 |
| High School | 0.65 | 0.48 | 0.00 | 1.00 | 0.66 | 0.47 | 0.00 | 1.00 | 0.66 | 0.48 | 0.00 | 1.00 |
| Diploma/Bachelor | 0.33 | 0.47 | 0.00 | 1.00 | 0.32 | 0.47 | 0.00 | 1.00 | 0.32 | 0.47 | 0.00 | 1.00 |
| Informal | 0.64 | 0.48 | 0.00 | 1.00 | 0.65 | 0.48 | 0.00 | 1.00 | 0.64 | 0.48 | 0.00 | 1.00 |
| | | | | | | | | | | | | |
| Observations | 111,770 | | | | 65,181 | | | | 176,951 | | | |

Note: Percentage of consumption relative to income, percentage of debt installment relative to income, and percentage of savings relative to income responses only use data in Jakarta, Jawa Barat, and Makassar

Table C.2. First Stage Regression

| | (1) | (2) |
|---|---|---|
| Dependent Variable: | Dummy Lockdown | Dummy Lockdown |
| Number of Active Cases | 0.044*** | 0.043*** |
| (in 1000) | (0.012) | (0.012) |
| Sector Dummies | No | Yes |
| Month Dummies | Yes | Yes |
| Province Dummies | Yes | Yes |
| Observation | 176,951 | 176,951 |
| Adj. R-squared | 0.351 | 0.363 |

Notes: Robust standard errors clustered at the province level in parentheses. The instrument here is the number of active cases (in 000). The set of covariates are the expectations of business conditions in the future, sex, total expenditure, age, education level, and the dummy for the formal sector. ** p < 0.05, *** p < 0.01

Table C.3. Exclusion Restriction Checks

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Dependent Variable: | Income | Expected Income | Durable Goods | Consumption Share | Debt Share | Savings Share |
| Number of Active | -0.115 | 0.010 | -0.033 | -3.384 | -1.082 | 4.467 |
| Cases (in 000) | (0.039) | (0.014) | (0.030) | (1.415) | (0.369) | (1.049) |
| Sector Dummies | Yes | Yes | Yes | Yes | Yes | Yes |
| Month Dummies | Yes | Yes | Yes | Yes | Yes | Yes |
| Province Dummies | Yes | Yes | Yes | Yes | Yes | Yes |
| Observation | 22,799 | 22,799 | 22,799 | 20,399 | 20,399 | 20,399 |
| Adj. R-squared | 0.028 | 0.028 | 0.010 | 0.067 | 0.058 | 0.149 |

Notes: Robust standard errors clustered at the province level in parentheses. The independent variable is the number of active cases (in 000). The set of covariates are the expectations of business conditions in the future, sex, total expenditure, age, education level, and the dummy for the formal sector. Samples are only areas that never had lockdown policies throughout the study, namely Lampung, West Kalimantan, and East Kalimantan. The average active cases in these provinces between January 2020 and February 2021: 818.8. ** p < 0.05, *** p < 0.01

Table C.4. Robustness Test using the Length of Lockdown as an Alternative Independent Variable

| Dependent Variable | Change in Income | | Expected Future Income | | Consumption of Durable Goods | | The Share of Consumption Relative to Income | | The Share of Debt Instalment Relative to Income | | The Share of Savings Relative to Income | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| | OLS | 2SLS | OLS | 2SLS | OLS | 2SLS | OLS | 2SLS | OLS | 2SLS | OLS | 2SLS |
| Length of | -0.023** | -0.033** | -0.009** | -0.016** | -0.018** | -0.024** | 0.095* | 0.168** | -0.043** | -0.072** | -0.051 | -0.096** |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lockdown | (0.002) | (0.006) | (0.001) | (0.004) | (0.002) | (0.005) | (0.030) | (0.035) | (0.008) | (0.009) | (0.024) | (0.038) |
| Sector Dummies | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Month Dummies | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Province Dummies | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Covariates | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | | | | | | | | | | | | |
| Observation | 176,951 | 176,951 | 176,951 | 176,951 | 176,951 | 176,951 | 37,306 | 37,306 | 37,306 | 37,306 | 37,306 | 37,306 |
| Adjusted R-squared | 0.174 | | 0.174 | | 0.106 | | 0.055 | | 0.040 | | 0.046 | |
| Kleibergen-Paap First-stage F-Stats | | 13.073 | | 13.073 | | 13.073 | | 16.497 | | 16.497 | | 16.497 |

Note: Robust standard errors clustered at province level in parentheses. The dependent variables here are change in income (columns 1 and 2), expected future income (columns 3 and 4), consumption of durable goods (columns 5 and 6), the share of consumption relative to income (columns 7 and 8), the share of debt installment relative to income (columns 9 and 10), and the share of savings relative to income (columns 11 and 12). The main independent variable is the length of lockdown in days. The set of covariates are expectations of business conditions in the future, sex, total expenditure, age, education level, and the dummy for the formal sector. Length of lockdown is instrumented by the number of active cases (in 000). The total number of observations drops in columns 7-12 because the sample for this question is only in Jakarta, West Java, and South Sulawesi. ** $p < 0.05$, *** $p < 0.01$

Table C.5. Heterogeneity Impact of Lockdown Based on Gender

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| | OLS | 2SLS | OLS | 2SLS | OLS | 2SLS | OLS | 2SLS |
| | Male | | | | Female | | | |
| **Panel A**<br>**Dependent variable: Change in Income** | | | | | | | | |
| Dummy Lockdown | -0.758*** | -0.961*** | -0.640*** | -0.796*** | -0.735*** | -1.104*** | -0.577*** | -0.882*** |
| | (0.058) | (0.150) | (0.061) | (0.132) | (0.068) | (0.161) | (0.058) | (0.158) |
| Observation | 80,910 | 80,910 | 80,910 | 80,910 | 96,041 | 96,041 | 96,041 | 96,041 |
| Adjusted R-squared | 0.081 | | 0.176 | | 0.091 | | 0.182 | |
| Kleibergen-Paap First-stage F-Stats | | 13.485 | | 13.273 | | 15.271 | | 15.424 |
| **Panel B**<br>**Dependent variable: Expected Future Income** | | | | | | | | |
| Dummy Lockdown | -0.385*** | -0.538*** | -0.224*** | -0.325*** | -0.433*** | -0.719*** | -0.239*** | -0.462*** |
| | (0.049) | (0.102) | (0.033) | (0.071) | (0.073) | (0.119) | (0.049) | (0.100) |
| Observation | 80,910 | 80,910 | 80,910 | 80,910 | 96,041 | 96,041 | 96,041 | 96,041 |
| Adjusted R-squared | 0.084 | | 0.272 | | 0.083 | | 0.249 | |
| Kleibergen-Paap First-stage F-Stats | | 13.485 | | 13.273 | | 15.271 | | 15.424 |
| **Panel C**<br>**Dependent variable: Consumption of Durable Goods** | | | | | | | | |
| Dummy Lockdown | -0.539*** | -0.679*** | -0.463*** | -0.571*** | -0.526*** | -0.783*** | -0.435*** | -0.658*** |
| | (0.070) | (0.120) | (0.068) | (0.110) | (0.080) | (0.137) | (0.064) | (0.141) |
| Observation | 80,910 | 80,910 | 80,910 | 80,910 | 96,041 | 96,041 | 96,041 | 96,041 |
| Adjusted R-squared | 0.059 | | 0.099 | | 0.083 | | 0.118 | |
| Kleibergen-Paap First-stage F-Stats | | 13.485 | | 13.273 | | 15.271 | | 15.424 |
| **Panel D** | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Dependent variable: The Share of Consumption Relative to Income** | | | | | | | | |
| Dummy Lockdown | 2.857** | 4.973*** | 2.344 | 3.621*** | 3.674*** | 7.581*** | 3.109 | 6.081*** |
| | (0.324) | (0.743) | (0.642) | (0.554) | (0.301) | (0.956) | (1.002) | (1.649) |
| Observation | 25,985 | 25,985 | 25,985 | 25,985 | 11,321 | 11,321 | 11,321 | 11,321 |
| Adjusted R-squared | 0.009 | | 0.058 | | 0.009 | | 0.052 | |
| Kleibergen-Paap First-stage F-Stats | | 51.195 | | 46.752 | | 42.314 | | 41.971 |
| **Panel E**<br>**Dependent variable: The Share of Debt Instalment Relative to Income** | | | | | | | | |
| Dummy Lockdown | -0.404 | -1.122*** | -1.091 | -1.959*** | -0.886 | -1.575** | -0.947 | -1.702 |
| | (0.476) | (0.032) | (0.381) | (0.152) | (0.362) | (0.787) | (0.323) | (0.997) |
| Observation | 25,985 | 25,985 | 25,985 | 25,985 | 11,321 | 11,321 | 11,321 | 11,321 |
| Adjusted R-squared | 0.000 | | 0.038 | | 0.003 | | 0.045 | |
| Kleibergen-Paap First-stage F-Stats | | 51.195 | | 46.752 | | 42.314 | | 41.971 |
| **Panel F**<br>**Dependent variable: The Share of Savings Relative to Income** | | | | | | | | |
| Dummy Lockdown | -2.454*** | -3.851*** | -1.254** | -1.662*** | -2.788** | -6.006*** | -2.162 | -4.379*** |
| | (0.164) | (0.753) | (0.273) | (0.412) | (0.463) | (1.385) | (0.992) | (1.516) |
| Observation | 25,985 | 25,985 | 25,985 | 25,985 | 11,321 | 11,321 | 11,321 | 11,321 |
| Adjusted R-squared | 0.012 | | 0.052 | | 0.010 | | 0.043 | |
| Kleibergen-Paap First-stage F-Stats | | 51.195 | | 46.752 | | 42.314 | | 41.971 |
| Sector Dummies | No | No | Yes | Yes | No | No | Yes | Yes |
| Month Dummies | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Province Dummies | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Covariates | No | No | Yes | Yes | No | No | Yes | Yes |

Note: Robust standard errors clustered at province level in parentheses. The sample in Columns (1)-(4) are households where the households' head is male. In columns (5)-(8), the samples are households where the households' head is female. The set of covariates are the expectation of business conditions in the future, sex, total expenditure, age, education level, and the dummy for the formal sector. Dummy lockdown is instrumented by the number of active cases (in 000). The total number of observations drops in Panels D, E, and F because the sample for this question is only in Jakarta, West Java, and South Sulawesi. ** $p < 0.05$, *** $p < 0.01$

Table C.6. Heterogeneity Impact of Lockdown Based on Job Type

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| | OLS | 2SLS | OLS | 2SLS | OLS | 2SLS | OLS | 2SLS |
| | Formal | | | | Informal | | | |
| **Panel A**<br>**Dependent variable: Change in Income** | | | | | | | | |
| Dummy Lockdown | -0.693*** | -0.880*** | -0.597*** | -0.761*** | -0.778*** | -1.098*** | -0.611*** | -0.878*** |
| | (0.069) | (0.093) | (0.073) | (0.091) | (0.070) | (0.194) | (0.059) | (0.184) |
| Observation | 63,078 | 63,078 | 63,078 | 63,078 | 113,873 | 113,873 | 113,873 | 113,873 |
| Adjusted R-squared | 0.090 | 0.086 | 0.162 | 0.159 | 0.081 | 0.072 | 0.173 | 0.167 |
| Kleibergen-Paap First-stage F-Stats | | 12.056 | | 11.725 | | 15.984 | | 16.029 |
| **Panel B**<br>**Dependent variable: Expected Future Income** | | | | | | | | |
| Dummy Lockdown | -0.372*** | -0.567*** | -0.235*** | -0.393*** | -0.429*** | -0.652*** | -0.223*** | -0.381*** |
| | (0.049) | (0.089) | (0.041) | (0.072) | (0.072) | (0.119) | (0.043) | (0.095) |
| Observation | 63,078 | 63,078 | 63,078 | 63,078 | 113,873 | 113,873 | 113,873 | 113,873 |
| Adjusted R-squared | 0.068 | 0.062 | 0.223 | 0.219 | 0.087 | 0.081 | 0.278 | 0.275 |
| Kleibergen-Paap First-stage F-Stats | | 12.056 | | 11.725 | | 15.984 | | 16.029 |
| **Panel C**<br>**Dependent variable: Consumption of Durable Goods** | | | | | | | | |
| Dummy Lockdown | -0.549*** | -0.685*** | -0.479*** | -0.597*** | -0.517*** | -0.746*** | -0.423*** | -0.618*** |
| | (0.068) | (0.122) | (0.067) | (0.119) | (0.079) | (0.135) | (0.065) | (0.136) |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Observation | 63,078 | 63,078 | 63,078 | 63,078 | 113,873 | 113,873 | 113,873 | 113,873 |
| Adjusted R-squared | 0.067 | 0.065 | 0.102 | 0.100 | 0.074 | 0.068 | 0.111 | 0.106 |
| Kleibergen-Paap First-stage F-Stats | | 12.056 | | 11.725 | | 15.984 | | 16.029 |
| **Panel D**<br>**Dependent variable: The Share of Consumption Relative to Income** | | | | | | | | |
| Dummy Lockdown | 3.983*** | 6.089*** | 3.050** | 4.667*** | 3.787** | 6.647*** | 2.378 | 4.178*** |
| | (0.313) | (0.604) | (0.339) | (0.131) | (0.564) | (0.896) | (1.563) | (1.561) |
| Observation | 16,665 | 16,665 | 16,665 | 16,665 | 20,641 | 20,641 | 20,641 | 20,641 |
| Adjusted R-squared | 0.011 | 0.009 | 0.051 | 0.050 | 0.014 | 0.011 | 0.046 | 0.045 |
| Kleibergen-Paap First-stage F-Stats | | 49.713 | | 49.766 | | 46.464 | | 41.344 |
| **Panel E**<br>**Dependent variable: The Share of Debt Instalment Relative to Income** | | | | | | | | |
| Dummy Lockdown | -0.969** | -1.855*** | -1.030 | -2.038*** | -1.520 | -1.806*** | -1.232 | -1.634*** |
| | (0.213) | (0.214) | (0.285) | (0.335) | (0.391) | (0.372) | (0.366) | (0.347) |
| Observation | 16,665 | 16,665 | 16,665 | 16,665 | 20,641 | 20,641 | 20,641 | 20,641 |
| Adjusted R-squared | 0.002 | 0.001 | 0.029 | 0.028 | 0.004 | 0.004 | 0.030 | 0.030 |
| Kleibergen-Paap First-stage F-Stats | | 49.713 | | 49.766 | | 46.464 | | 41.344 |
| **Panel F**<br>**Dependent variable: The Share of Savings Relative to Income** | | | | | | | | |
| Dummy Lockdown | -3.014** | -4.233*** | -2.020** | -2.628*** | -2.267 | -4.841*** | -1.146 | -2.544 |
| | (0.403) | (0.816) | (0.255) | (0.462) | (0.694) | (1.213) | (1.352) | (1.430) |
| Observation | 16,665 | 16,665 | 16,665 | 16,665 | 20,641 | 20,641 | 20,641 | 20,641 |
| Adjusted R-squared | 0.011 | 0.010 | 0.053 | 0.053 | 0.011 | 0.008 | 0.044 | 0.043 |
| Kleibergen-Paap First-stage F-Stats | | 49.713 | | 49.766 | | 46.464 | | 41.344 |
| Sector Dummies | No | No | Yes | Yes | No | No | Yes | Yes |
| Month Dummies | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Province Dummies | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Covariates | No | No | Yes | Yes | No | No | Yes | Yes |

Note: Robust standard errors clustered at province level in parentheses. The sample in Columns (1)-(4) are households where the households' head's job is formal. In columns (5)-(8), the samples are households where the households' head's job is informal. The set of covariates are the expectation of business conditions in the future, sex, total expenditure, age, education level, and the dummy for the formal sector. Dummy lockdown is instrumented by the number of active cases (in 000). The total number of observations drops in Panels D, E, and F because the sample for this question is only in Jakarta, West Java, and South Sulawesi. ** $p < 0.05$, *** $p < 0.0$



## Table C.7. Alternative Outcome Measure

| | OLS | 2SLS | OLS | 2SLS | OLS | 2SLS | OLS | 2SLS | OLS | 2SLS | OLS | 2SLS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dependent variable: | Income | Income | Income | Income | Expectations | Expectations | Expectations | Expectations | Durable goods | Durable goods | Durable goods | Durable goods |
| Dummy Lockdown | 0.173*** | 0.194*** | 0.153*** | 0.166*** | 0.049*** | 0.050*** | 0.035*** | 0.031*** | 0.120*** | 0.117*** | 0.106*** | 0.097*** |
| | (0.026) | (0.033) | (0.023) | (0.033) | (0.013) | (0.013) | (0.010) | (0.011) | (0.029) | (0.029) | (0.025) | (0.029) |
| Sector Dummies | No | No | Yes | Yes | No | No | Yes | Yes | No | No | Yes | Yes |
| Month Dummies | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Province Dummies | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Covariates | No | No | Yes | Yes | No | No | Yes | Yes | No | No | Yes | Yes |
| Observation | 176,951 | 176,951 | 176,951 | 176,951 | 176,951 | 176,951 | 176,951 | 176,951 | 176,951 | 176,951 | 176,951 | 176,951 |
| Adj. R-squared | 0.081 | | 0.109 | | 0.024 | | 0.066 | | 0.066 | | 0.079 | |
| Kleibergen-Paap First-stage F-Stats | | 14.039 | | 13.840 | | 14.039 | | 13.840 | | 14.039 | | 13.840 |

Note: Robust standard errors clustered at province level in parentheses ** p < 0.05, *** p < 0.01. The dependent variable will be equal to 1 if households face a significant decrease and 0 otherwise.

## Table C.8. Robustness Test using Active Cases per Population as the Instrumental Variable

| | IV = Active Cases | | | | | | IV = Active Cases per population | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Income | Expected income | Durable goods | Consumption | Debt instalment | Savings | Income | Expected income | Durable goods | Consumption | Debt instalment | Savings |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| Dummy Lockdown | -0.829** | -0.386*** | -0.609** | 4.388*** | -1.892*** | -2.496*** | -1.006** | -0.258*** | -0.630** | 4.486*** | -2.496*** | -1.990** |
| | (0.144) | (0.083) | (0.126) | (0.913) | (0.386) | (0.881) | (0.248) | (0.054) | (0.172) | (1.240) | (0.326) | (0.961) |
| Constant | -0.687** | -0.747*** | -0.520** | 67.497*** | 7.400*** | 25.104** | -0.640** | -0.781*** | -0.515** | 67.444*** | 7.723*** | 24.832** |
| | (0.100) | (0.059) | (0.096) | (2.689) | (1.160) | (1.629) | (0.109) | (0.056) | (0.100) | (2.566) | (1.221) | (1.545) |
| Sector Dummies | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Month Dummies | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Province Dummies | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Covariates | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observation | 176,951 | 176,951 | 176,951 | 37,306 | 37,306 | 37,306 | 176,951 | 176,951 | 176,951 | 37,306 | 37,306 | 37,306 |
| Kleibergen-Paap First-stage F-Stats | 13.840 | 13.840 | 13.840 | 41.315 | 41.315 | 41.315 | 17.382 | 17.382 | 17.382 | 33.953 | 33.953 | 33.953 |

Note: Robust standard errors clustered at province level in parentheses ** p < 0.05, *** p < 0.01. The instrumental variable in this table is active case in columns (1) – (6) and active case per population in columns (7) - (12).

## Table C.9. Robustness Test using Active Cases and Neighboring Lockdown as the Instrumental Variable

| | 2SLS | 2SLS | 2SLS | 2SLS | 2SLS | 2SLS |
|---|---|---|---|---|---|---|
| | Income | Expectations | Durable Goods | Consumption | Debt | Saving |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Dummy Lockdown | -1.018*** | -0.348*** | -0.681*** | 3.131*** | -1.376*** | -1.755*** |
| | (0.149) | (0.066) | (0.100) | (0.795) | (0.369) | (0.569) |
| Sector Dummies | Yes | Yes | Yes | Yes | Yes | Yes |
| Month Dummies | Yes | Yes | Yes | Yes | Yes | Yes |

| | | | | | | |
|---|---|---|---|---|---|---|
| Province Dummies | Yes | Yes | Yes | Yes | Yes | Yes |
| Covariates | Yes | Yes | Yes | Yes | Yes | Yes |
| Observation | 176,951 | 176,951 | 176,951 | 37,306 | 37,306 | 37,306 |
| Adj. R-squared | | | | | 0.039 | |
| Kleibergen-Paap First-stage F-Stats | 28.310 | 28.310 | 28.310 | 382.220 | 382.220 | 382.220 |
| Hansen's J-test: P-value | 0.210 | 0.230 | 0.470 | 0.184 | 0.142 | 0.273 |

Robust standard errors clustered at province level in parentheses ** $p < 0.05$, *** $p < 0.01$