



Available Online

Journal of Economic Impact

ISSN: 2664-9764 (Online), 2664-9756 (Print)

<http://www.scienceimpactpub.com/jei>

ASSESSING THE INCOME DISTRIBUTIONAL EFFECT OF LOCKDOWNS IN MALAYSIA

Mohd Yusof Saari ^{a,b}, Ibrahim Kabiru Maji ^{a,c,*}, Muzafar Shah Habibullah ^d

^a EIS-UPMCS Centre for Future Labour Market Studies, Malaysia

^b School of Business and Economics, Universiti Putra Malaysia

^c Department of Economics, Nigerian Army University Biu, Nigeria

^d Putra Business School, Malaysia

ARTICLE INFO

Article history

Received: February 25, 2022

Revised: April 05, 2022

Accepted: April 12, 2022

Keywords

Loss of income

COVID-19

Lockdown measures

ABSTRACT

This paper examines the distributional effect of lockdown measures on the loss of income. The significance of the study relates to the use of daily data on loss of income and lockdown measures arising from the unprecedented COVID-19 pandemic. A conditional variable of the total loss of income was evaluated using hypothesized variables of international restrictions, domestic movement restrictions, public events closure, restriction on gathering, stay at home restrictions, school closure, and workplace closure. For a robust result, the study applied four variants of regression such as Ordinary Least Squares (OLS), Fully Modified OLS, Dynamic OLS, and Autoregressive Distributed Lag (ARDL) as the empirical methods. The findings revealed that loss of income during the COVID-19 period has a positive and significant relationship with the lockdown measures in Malaysia. This implies that as the government strengthens the international and domestic movement restrictions to reduce the impact of COVID-19, the most vulnerable income groups lose their income. This finding is relevant to policymakers regarding plans to rebuild a resilient economy to withstand future pandemics. Policy strategies to reduce restriction measures and allow for opening up the economy to enable the vulnerable income groups to regain their jobs and hence the lost income was discussed.

*Email: keibimaji@gmail.com

<https://doi.org/10.52223/jei4012215>

© The Author(s) 2022.

This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

INTRODUCTION

The COVID-19 pandemic has tremendously affected human health and economic activities with a disproportionate effect on employment and income of the most vulnerable groups worldwide (Stella et al., 2021). As Measures are put in place to curtail new cases and deaths, it is obvious that there are indirect economic and social consequences. Besides the health implication which affects both mental and physical health (UNDP, 2020), income vulnerability has increased at an alarming rate across regions of the world. Thus, several governments have resorted to various measures which include social distancing, a ban on public gatherings and travel restrictions among others (Kim and Kim, 2021; Asfaw, 2021). Importantly, the lockdown measures put in place to contain COVID-19 pandemic have increased unemployment, income loss and a sharp decrease in the welfare of citizens worldwide (WHO, 2020). For instance, the Malaysian unemployment rate has increased from 4.5% in May to 4.8% in June (DOS, 2021). This has translated to income loss and vulnerability, especially among those whose income is earned on a weekly and daily basis. The losses in the income of households have further led to a 5% fall in private consumption. Thus, income distribution has widened against the low-income and most vulnerable

groups (WBG, 2021). Figure 1 presents the quarterly percentage of the total loss of income for the period under consideration in this study.

This study is motivated by five main reasons notably: the disproportionate impact of the COVID-19 pandemic on Malaysian economic activities; job loss arising from the measures put in place to contain the pandemic and the subsequent uneven income vulnerability among different income groups; the health challenges arising from COVID-19 pandemic; the need to create new jobs from the new normal and to build a resilient economy that will withstand future pandemics; and the gap in the literature on studies that measure the impact of COVID-19 on job loss and income distribution, especially for the case of Malaysia.

First, the fight against the pandemic has contracted growth rates in developed, emerging and developing countries. This has confronted the Malaysian government with tough policy choices. The nationwide movement control order (MCO) that was put in place to curtail the spread of the virus has led to an initial contraction of economic activities by about 5.6% during 2020. This was evidenced by a 35% closure in the operation of large businesses that subsequently led to about a 25% drop in

their revenues during the MCO (COVID-19 Business Pulse Surveys Round 1, 2020).

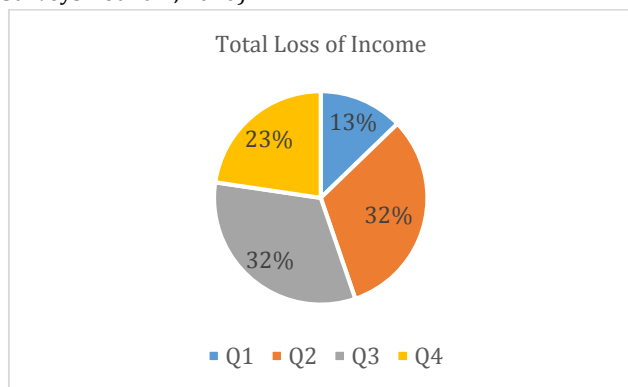


Figure 1. Total loss of income (%) 19/01/2021 to 31/12/2021.

Second, the measure put in place (Figure 2 for the average effects of lockdowns) has led to job losses which affected the income of several household groups ranging from the rich to

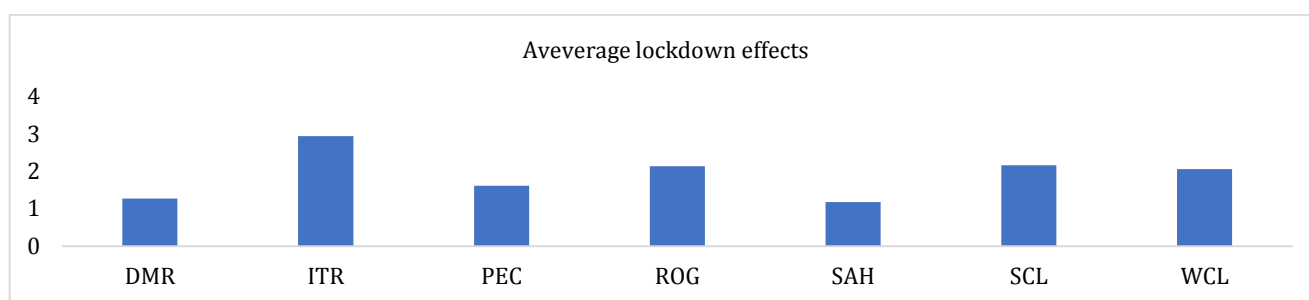


Figure 2. (Effects of various lockdown - 19/01/2021 to 31/12/2021). *ITR, DMR, PEC, ROG, SAH, SCL, WCL* represent international restrictions, domestic movement restrictions, public events closure, restrictions on gathering, stay at home restrictions, school closure and workplace closure, respectively.

Fourth, to revamp the economy from the impact of the pandemic, one of the policy strategies is to give income support through expanding social insurance programmes. The Malaysian government announces three stimulus packages amounting to 5.5% of the Gross Domestic Product (GDP) as one of the strategies to rebuild the economy, it is expected that the economic condition of the most vulnerable age and income groups will be improved (WBG, 2021). However, this short-term measure increased the fiscal deficit of the Malaysian government to 6% in 2021, higher than the earlier projected 5.4%. A stimulus program can lead to efficiency loss due to a reduction in job search and the supply of labour (Asfaw, 2021). Therefore, there is the need to create new jobs from the new normal to further mitigate the impacts of government fiscal deficits.

Fifth, there is a huge gap in the literature on investigating the nexus between income distribution, job loss and lockdown measures imposed due to the ravaging impact of the COVID-19 pandemic. Recent studies (Stella et al., 2021; Kim and Kim, 2021; Asfaw, 2021; Ohri-Vachaspati et al., 2021; Picchioni et al., 2021; Hertz-palmor et al., 2021; WBG, 2021; Arndt et al., 2020) have investigated related areas such as income inequality and emotional anxiety; COVID-19 lockdown and food security; income inequality and motility during COVID-19; low-income household, food security and COVID-19; the

the poor, with the low-income groups being the most vulnerable. There was a significant effect on employment which began by reducing the working hours of workers, wage cuts and subsequently led to about 35% of job losses in weekly and daily income earned. Equally, the vulnerabilities are not equal among different income and age groups of the society. For instance, the unemployment rate is higher for the age group of 15-24. Thus, economic policy is needed to balance the impact, particularly on low-income earners and households (Arndt et al., 2020).

Third, there has been a dramatic resurgence of COVID-19 since its advent in Malaysia over a year now. As the daily cases of contraction and number of deaths increase in 2021, it became obvious that the economy requires a resilient strategy in the new normal. Between April to May, new cases of the contraction climbed by more than 85%, while the cumulative number of deaths in the early weeks of June has doubled. This implies that three to four months of health workers' intervention is required to flatten the curve of the COVID-19 pandemic (MMOH, 2021).

experience of low and high income American during COVID-19; job search and income support programmes; socioeconomic vulnerability, low income and distress in COVID-19 among others. However, to the best of our knowledge, we have not come across any specific study that assessed the distributional effect of lockdown on the Malaysian economy.

Recent studies have emerged in the era of the COVID-19 pandemic with a focus of the studies on the global economy. Some of the studies have investigated the impact of COVID-19 on the economic and health conditions of specific nations. Others have given attention to the grass-root effects of the pandemic. Among these are studies on the impact of the COVID-19 pandemic on employment, income, and consumption of the vulnerable groups. It equally includes studies on the effect of the several lockdown measures such as place of work closure, school closure, airport and seaport closure, social distancing and stay at home policies and restrictions on less essential goods and services.

Again, recent studies (Arndt et al., 2020; Beck et al., 2020; Qian and Fan, 2020; Mikolai et al., 2020; Martin et al., 2020) have investigated the unprecedented COVID-19 pandemic on health and socioeconomic progress of various countries. For example, Qian and Fan (2020) investigate households and businesses that lose income during the COVID-19 outbreak in China. The findings revealed that the level of education, the economic

status of households, membership of state parties and sector of employment reduce adverse impacts of the COVID-19 epidemic on individuals' income losses. Additionally, individuals and households that live in the region that are highly infected by COVID-19 are more likely to experience income problems.

The input-output analysis and Social Accounting Matrix (SAM) were employed to assess the effect of COVID-19 pandemic on the distribution of income and food security in South Africa (Arndt et al., 2020). The findings show that the social distancing measures implemented in South Africa have led to high economic costs and a negative effect on income distribution in the country. Findings further revealed that the income of workers with a low level of education was more impacted compared to the income of workers with a higher level of education. Therefore, households with low levels of educational achievement and high dependence on salaries witness more income shocks.

The use of nationally representative cross-sectional analysis to examine how COVID-19-related health and socioeconomic vulnerabilities occur at the household level in the United Kingdom was examined (Mikolai et al., 2020). The study gives attention to the health and economic challenges across the household and geographical settings in the COVID-19 period. The finding suggests that health risks are more visible in retirement-age households. Also, different categories of households exhibit different vulnerabilities, but working-age households are more likely to face financial and housing crises, while retirement-age households are likely to face health and digital vulnerabilities.

The impact of COVID-19 on household travel and other economic activities in Australia has been assessed using a survey method (Beck et al., 2020). During the period under consideration, it was revealed that travel activity has begun to slowly return, especially by private car for shopping and recreational activities. Moreso, work from home has been generally a positive experience and hence several of employees have shown interest to continue working from home henceforth. Thus, this study is exceptional among its contemporaries and contributes to knowledge in the following respect: (i) the study contributes to the existing body of study by employing unique and indebt daily datasets of loss of income and lockdown measures in Malaysia; (ii) econometric analysis with several robustness tests are integrated into the study; (iii) the study will be of immense importance to policymakers regarding strategies to reduce government fiscal deficits and to rebuild a resilient economy to withstand future pandemic. To the best of our knowledge, there is a paucity of studies that investigates the impact of COVID-19 on income loss in Malaysia. Thus, this study collects daily data on household income and lockdown measures to empirically contribute to the existing body of knowledge. The rest of the study is structured as follows. Section 2 focuses on the methodology of the study; section 3 handles the results and analysis, while section 4 concludes and provides some policy implications.

METHODOLOGY

The modeling approach begins with the need to first conduct of unit root test to ascertain the level of stationarity of the variables. Thus, the unit root test of Dickey and Fuller (1981)

and that of Phillips and Perron (1988) is employed. This is important in order to avoid spurious and erratic regressions. Despite that the ADF may suffice to identify the degree of stationarity of the variable, we have included the PP to improve the robustness of the results.

The next stage in the modeling method is the conduct of the cointegration test. The cointegration test is important to ascertain the long-run and equilibrium connection among the variables. This is because proceeding with the regression analysis will generate spurious results if cointegration is not ascertained. To ascertain the cointegration of the variables, first, we employed the Engle and Granger (1987) two-step method by saving the residual of the main regression model and then testing the residual for unit root following the Dickey and Fuller (1981) unit root test approach. Two, we further estimated the bounds test for cointegration using the Pesaran et al. (2001) approach to cointegration.

We then proceed with the estimation strategy by employing three variants of the Ordinary Least Squares (OLS) method of regression namely: OLS with robust standard error, Fully Modified OLS and Dynamic OLS. In addition, the Pesaran et al. (2001) Autoregressive Distribute Lag (ARDL) was used as an additional robustness estimation strategy. The OLS strictly selects the parameters of a linear regression function utilizing the principle of least squares, which entails minimizing the sum of squares of the differences between the dependent variable and the independent variable of a regression model (Stock and Watson, 1993). While the ARDL, on the other hand, is efficient for small sample selection, can simultaneously estimate the long-run and short-run model and use a combination of variable integration at a level and first difference.

Thus, this research paper modifies and adopts the model of Habibullah et al. (2021) by replacing loss of employment with total loss of income. The justification for this replacement is to add to the literature gap in this respect. The initial step of vulnerability that is associated with COVID-19 is the loss of employment. However, the trickling aspect of vulnerability is the loss of income that hinders the ability of vulnerable income groups to be able to purchase goods and services. Therefore, the general functional form equation and the specific econometric equation for the OLS are respectively specified in Equations 1 and 2 as follows.

$$TLOY = f(ITR, DMR, PEC, ROG, SAH, SCL, WCL) \quad (1)$$

$$\ln TLOY_t = a_0 + a_1 \ln ITR_t + a_2 \ln DMR_t + a_3 \ln PEC_t + a_4 \ln ROG_t + a_5 \ln SAH_t + a_6 \ln SCL_t + a_7 \ln WCL_t + \mu_t \quad (2)$$

Where, *TLOY*, *ITR*, *DMR*, *PEC*, *ROG*, *SAH*, *SCL* and *WCL* respectively represent a total loss of income, international restrictions, domestic movement restrictions, public events closure, restriction on gathering, stay at home restrictions, school closure, and workplace closure. We anticipate that $a_1 - a_7 > 0$. However, if the lockdown measures are negatively connected with loss of income, then $a_1 - a_7 < 0$.

Once the model is well specified, the sourced data for the variables can then be cleaned and estimated. In this study, the dependent variable is measured by total loss of income, while the independent variables of lockdown indicators are measured by international restrictions, domestic movement restrictions, public

events closure, restriction on gathering, stay at home restrictions, school closure and workplace closure. The daily data on loss of income is sourced from the Employment Insurance System (EIS) of the Social Security Organisation (SOCSO) of Malaysia. Including daily data is one aspect of the study that differentiates this work from existing studies on the impact of COVID-19 lockdown measures on the economy. Similarly, the daily data for the lockdown measures were obtained from COVID-19 policy track that reported daily restriction measures of countries around the world. The collected data for both the dependent and independent variables are for the period of 19/01/2021 to 31/12/2021.

RESULTS AND DISCUSSIONS

The result presentation commences with the descriptive statistics and correlation matrix. These preliminary statistical

tests were conducted on the variables, and the outcome is presented in Table 1. On the descriptive statistics, the total loss of income has the mean with the highest value while stay at home restrictions possesses the least mean value, suggesting that other variables' means are clustered around the means of the total loss of income and stay at home restrictions. Similarly, total loss of income has the highest deviation from the mean value, while public events closure appeared as the variable with the least standard deviation. This suggests that other variable standard deviation clustered around the total loss of income and public events closure. The correlation matrix is equally presented in the lower part of Table 1. With the exception of one, all the variables are not correlated with each other; as a result, there are fewer problems of multicollinearity in the regression model estimated.

Table 1. Descriptive statistics and correlation matrix.

<i>Statistics</i>	<i>tloy</i>	<i>itr</i>	<i>dmr</i>	<i>pec</i>	<i>rog</i>	<i>sah</i>	<i>scl</i>	<i>wcl</i>
Mean	994253.4	2.939	1.272	1.614	2.137	1.178	2.163	2.060
Median	842256.7	3.000	2.000	2.000	2.000	1.000	3.000	2.000
Maximum	6539947.	4.000	2.000	2.000	4.000	3.000	3.000	3.000
Minimum	33606.77	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Std. Dev.	749385.1	0.795	0.928	0.725	1.213	1.058	1.128	1.054
Skewness	2.471	-1.678	-0.566	-1.540	-0.120	0.136	-1.012	-1.021
Kurtosis	14.746	7.7945	1.403	3.668	2.662	1.595	2.486	2.831
Jarque-Bera	2354.9	496.80	55.54	144.1	2.491	29.68	63.23	60.95
Probability	0.000	0.000	0.000	0.000	0.287	0.0000	0.000	0.000
Observations	348	348	348	348	348	348	348	348

<i>tloy</i>	1							
<i>itr</i>	0.186	1						
<i>dmr</i>	-0.139	0.174	1					
<i>pec</i>	0.265	0.349	0.631	1				
<i>rog</i>	0.067	0.479	0.534	0.597	1			
<i>sah</i>	-0.1873	0.221	0.739	0.420	0.541	1		
<i>scl</i>	0.136	0.415	0.639	0.736	0.778	0.638	1	
<i>wcl</i>	0.093	0.303	0.763	0.867	0.6374	0.651	0.728	1

Note: *tloy*, *itr*, *dmr*, *pec*, *rog*, *sah*, *shc* and *wpc* represent total loss of income, international restrictions, domestic movement restrictions, public events closure, restriction on gathering, stay at home restrictions, school closure and workplace closure respectively.

Multicollinearity exists when there is a strong correlation in a model with a correlation coefficient exceeding 0.8 (Maji and Adamu, 2021). In the absence of a strong correlation among the variables, we proceed to conduct unit root tests.

The result presentation continued with unit root tests to find out the level of integration of the variables. The variables whose level of integration was ascertained include total loss of income, international movement restriction, domestic movement restrictions, public events closure, restriction on gathering, stay at home restriction, school closure, and workplace closure. Ascertaining the level of integration of these variables is important to avoid spurious results and to identify the appropriate estimation method. The Dickey and Fuller and Phillips Perron unit root tests were applied by including both trend and intercepts. The outcome suggests that no variable is stationary at the level. However, all the variables are stationary at first difference as presented in Table 2. The strength of stationarity of each variable can be identified by the value of its

test statistics. After ensuring that all variables are stationary, we proceed to conduct a cointegration test. This is to ascertain the equilibrium and long-run relationship among the variables. Proceeding with regression analysis will generate spurious results if variables are not cointegrated. Thus, we test for the cointegration of the variables by employing the Pesaran et al. (2001) bounds test method. As presented in Table 4, the results suggest that the variables are cointegrated. This is evidenced by the fact that the value of F-statistics of the bound test estimated is greater than the values of the upper critical upper bounds at 1% level of significance.

Establishing cointegration and long-run equilibrium relationship among the variables pave the way for estimating regression results to ascertain the distributional effect of lockdown measures on the loss of income. This was achieved using the three-variant s of Ordinary Least Squares (OLS), notably OLS with robust standard error, Fully Modified OLS and Dynamic OLS. In comparison, the Pesaran

et al. (2001) Autoregressive Distribute Lag (ARDL) is employed for additional robustness. The regression results

are presented in Table 3. Interesting long-run results for all the estimation methods are presented in Table 3.

Table 2. Unit root tests.

Variables	ADF Tests		PP Tests	
	Level	1 st Difference	Level	1 st Difference
<i>ltloy</i>	-2.134 (0.232)	-10.131*** (0.000)	-2.310 (0.2411)	-37.386*** (0.000)
<i>litr</i>	-2.889 (0.167)	-19.066*** (0.000)	-2.900 (0.163)	-19.066*** (0.000)
<i>ldmr</i>	-2.049 (0.572)	-19.002*** (0.000)	-2.110 (0.537)	-19.002*** (0.000)
<i>lpec</i>	-0.844 (0.959)	-3.983*** (0.000)	-0.802 (0.963)	-19.236*** (0.000)
<i>lrog</i>	-2.985 (0.137)	-19.020*** (0.000)	-3.120 (0.103)	-19.020*** (0.000)
<i>lsah</i>	2.898 (0.164)	-18.981*** (0.000)	-2.918 (0.157)	-18.998*** (0.000)
<i>lscl</i>	-2.453 (0.351)	-19.006*** (0.000)	-2.522 (0.317)	-19.006*** (0.000)
<i>lwcl</i>	-2.373 (0.392)	-20.109*** (0.000)	2.344 (0.408)	-20.118*** (0.000)

Note: *** denotes significance at 1%, values in round brackets are p-values. Tests include both trend and intercept. *ltloy*, *litr*, *ldmr*, *lpec*, *lrog*, *lsah*, *lscl* and *lwcl* represent total loss of income, international restrictions, domestic movement restrictions, public events closure, restriction on gathering, stay at home restrictions, school closure and workplace closure respectively.

Table 3. Distributional impact of lockdown in Malaysia.

Variables	Dependent Variable = <i>ltloy</i>			
	OLS	FMOLS	DOLS	ARDL
<i>litr</i>	0.459*** (0.314)	0.486*** (0.177)	0.471*** (0.170)	0.512*** (0.163)
<i>ldmr</i>	-0.033 (0.110)	-0.030 (0.108)	-0.045 (0.097)	-0.043 (0.104)
<i>lpec</i>	0.482*** (0.094)	0.446*** (0.123)	0.458*** (0.112)	0.492*** (0.109)
<i>lrog</i>	0.243*** (0.075)	0.237** (0.105)	0.240** (0.095)	0.264*** (0.093)
<i>lsah</i>	-0.095 (0.091)	-0.096 (0.100)	-0.113 (0.092)	0.094 (0.089)
<i>lscl</i>	0.292*** (0.074)	0.241** (0.102)	0.260*** (0.093)	0.286** (0.092)
<i>lwcl</i>	0.270*** (0.071)	0.294*** (0.104)	0.271*** (0.095)	0.267*** (0.093)

Note: *** and ** denote significance at 1% and 5% level respectively. Values in round bracket (.) are standard errors. OLS, FMOLS, DOLS and ARDL are Ordinary Least Squares (OLS) with robust standard error, Fully Modified OLS, Dynamic OLS and Autoregressive Distributed lag, respectively. *ltloy*, *litr*, *ldmr*, *lpec*, *lrog*, *lsah*, *lscl* and *lwcl* represent the logarithm form of total loss of income, international restrictions, domestic movement restrictions, public events closure, restriction on gathering, stay at home restrictions, school closure and workplace closure respectively.

The outcome or dependent variable is the total loss of income, while international restrictions, domestic movement restrictions, public events closure, restrictions on gathering, stay at home restrictions, school closure and workplace closure are the hypothesized or independent variables. With the exception of domestic and stay-at-home movement restrictions, the results revealed a positive and significant relationship between total loss of income and all the lockdown measures. For instance, the result of the link between loss of income and international movement restrictions suggests that as the Malaysian government implements further movement restriction to limit international traveling due to COVID-19 pandemic, the citizens

of Malaysia within the most vulnerable income groups lose their income. This finding corroborates the finding of Habibullah et al. (2021) that increasing restriction increases the rate at which income is lost during the era of COVID-19 in Malaysia. Similarly, the result of public events closure presented in Table 3 shows that there exists a strong positive and significant link between public events closure and loss of income in the era of the pandemic. This implies that public events closure as an aspect of the movement control order (MCO) has a direct impact on the loss of income in the country. Technically, the loss of income is initially precipitated by the loss of employment. As MCO is increased

by the government to mitigate the impact of COVID-19, those whose income is earned on a daily and weekly basis are immediately affected. While movement restrictions are in place, the economic activities that generate daily income become vulnerable and those in such income groups begin to lose their jobs. The loss of a job then leads to a loss of income. This finding is also supported by the finding of Habibullah et al. (2021).

Table 3 also presents the result of the connection between the restriction on gathering, school closure, workplace closure, and loss of income in Malaysia. The outcomes also revealed a positive and significant effect of restriction on gathering, school, and workplace closure on the loss of income. As the pandemic persists, most educational workers at primary,

secondary, and tertiary levels were restricted to remote working from home. Similarly, workers in government Ministries, Departments and Agencies (MDA) as well as private-sector workers were restricted from going to work. This has led to the loss of income of workers, especially in the private sector. This is intuitive because it is not all work that can be done remotely from home. As such, workers from the private sector as well as self-employed workers such as vulcanizers, street vendors, bricklayers, roadside mechanics, artisans and petty traders among others lose their jobs as well as income. Furthermore, although the coefficient of domestic and stay at home movement restrictions are negative, they are statistically not significant and have less power to draw any inference for policy implications.

Table 4. Cointegration, short-run and error correction of distribution impact of lockdown.

Variables	Dependent Variable = $ltloy$		
	Bound test F-statistic	$\Delta ltloy_{t-1}$	ecm_{t-1}
<i>ltr</i>	44.31 [5.58]	-0.151 (0.304)	-0.561*** (0.048)
<i>ldmr</i>	25.37 [5.58]	-0.044 (0.244)	-0.487*** (0.055)
<i>lpec</i>	47.15 [5.58]	0.815 (0.515)	-0.586*** (0.049)
<i>lrog</i>	44.34 [5.58]	-0.646** (0.323)	-0.556*** (0.048)
<i>lsah</i>	40.33 [5.58]	0.032 (0.186)	-0.530*** (0.048)
<i>lscl</i>	41.02 [5.58]	0.585** (0.253)	-0.545*** (0.049)
<i>lwcl</i>	43.02 [5.58]	0.177 (0.290)	-0.558*** (0.048)

Note: ***and ** denote significance at 1% and 5% level respectively. Values in round bracket (.) are standard errors; Values in round bracket [.] are upper bounds critical values for the ARDL estimation. ecm_{t-1} is the error correction model while *ltloy*, *ltr*, *ldmr*, *lpec*, *lrog*, *lsah*, *lshc* and *lwpc* represent the logarithm form of total loss of income, international restrictions, domestic movement restrictions, public events closure, restriction on gathering, stay at home restrictions, school closure and workplace closure respectively.

Moreover, Table 4 presents the short-run model of the ARDL method and the error correction model. As presented in Table 4, restrictions on gathering and school closure serve as additional robustness to the long-run estimations. The coefficients of the error correction model are all negative, less than one in absolute terms and significant. Therefore, this study opens that the lockdown measures that were put in place by the Malaysian government to mitigate the impact of COVID-19 pandemic have led to the loss of income in the economy. However, the study projected that the loss of income is higher in an occupation that cannot be done remotely and in which income is generated on a daily and weekly basis.

CONCLUSIONS AND POLICY IMPLICATIONS

This paper assessed the distributional effect of lockdown measures on the loss of income in Malaysia. The study includes total loss of income, uses daily data, and applies the three variants of ordinary least squares regression and ARDL methods. The outcome is of importance to policymakers regarding strategies to rebuild a resilient economy to withstand future pandemics. The finding suggests that loss of income during the COVID-19 era has a positive and important relationship with the lockdown measures in Malaysia. This suggests that as the government intensifies restrictions to mitigate the effect of COVID-19, the most vulnerable income

groups lose their purchasing power for goods and services. International restrictions, public event closure, school closure and workplace closures are especially found to be significant and positively connected with loss of income. Due to the loss of income arising from loss of employment, the economic health of the country has been affected; as such, the government has embarked on stimulus packages in cash to reduce the effect of lockdown on those that earned income daily and weekly. Hence, the Malaysian government has injected \$68.5 billion into the macroeconomy through various stimulus programs. This is with the intention of reducing the pain of loss of income, especially for the poor and low-income earners. Since the target of these stimulus packages is the vulnerable poor, the efficiency in the mechanism of identifying the right poor and vulnerable groups must be highly designed in the policy decisions.

The implication of this finding for policy purposes is that although the stimulus packages will help in addressing the short-term impact of the loss of income arising from the restrictions. Policy alternatives such as the provision of undoubted vaccines and their usage will reduce restriction measures and allow for the opening up of the economy to enable the vulnerable income groups to regain back their jobs and hence the lost income. Therefore, it is apparent that continuous locking down of the economy will not be the most

efficient approach to addressing the challenge of COVID-19 in the long run.

REFERENCES

- Arndt, C., Davies, R., Gabriel, S., Harris, L., Makrelov, K., Robinson, S., Levy, S., Simbanegavi, W., van Seventer, D., Anderson, L., 2020. Covid-19 lockdowns, income distribution, and food security: An analysis for South Africa. *Glob. Food Sec.* 26, 1-5.
- Asfaw, A.A., 2021. The effect of income support programs on job search, workplace mobility and COVID-19: International evidence. *Econ. Hum. Biol.* 41, 1-11.
- Beck, M.J., Hensher, D.A., Wei, E., 2020. Slowly coming out of COVID-19 restrictions in Australia: Implications for working from home and commuting trips by car and public transport. *J. Transp. Geogr.* 88, 1-17.
- COVID-19 Business Pulse Surveys Round 1, 2020. Impacts of COVID-19 on firms in Malaysia. (Report from 1st Round of COVID-19 Business Pulse Surveys). World Bank Group. Available at <https://openknowledge.worldbank.org/handle/10986/34965>.
- Dickey, D.A., Fuller, W.A., 1981. Likelihood ratio statistics for autoregressive time series with a unit root. *Econom. J. Econom. Soc.* 49, 1057-1072.
- DOS, 2021. Department of statistics Malaysia. Accessed during 2021 from <https://www.dosm.gov.my/v1/>.
- Engle, R.F., Granger, C.W.J., 1987. Co-integration and error correction: representation, estimation, and testing. *Econom. J. Econom. Soc.* 55, 251-276.
- Habibullah, M.S., Saari, M.Y., Din, B.H., Safuan, S., Utit, C., 2021. Labour market reactions to lockdown measures during the Covid-19 pandemic in Malaysia: An Empirical Note. *J. Ekon. Malaysia.* 55, 39-49.
- Hertz-Palmor, N., Moore, T.M., Gothelf, D., DiDomenico, G.E., Dekel, I., Greenberg, D.M., Brown, L.A., Matalon, N., Visoki, E., White, L.K., 2021. Association among income loss, financial strain and depressive symptoms during COVID-19: Evidence from two longitudinal studies. *J. Affect. Disord.* 291, 1-8.
- Kim, H.H., Kim, H.K., 2021. Income inequality, emotional anxiety, and self-rated health in times of the coronavirus pandemic: Evidence from a cross-national survey. *Res. Soc. Stratif. Mobil.* 75, 1-11.
- Maji, I.K., Adamu, S., 2021. The impact of renewable energy consumption on sectoral environmental quality in Nigeria. *Clean. Environ. Syst.* 2, 1-8.
- Martin, C.A., Jenkins, D.R., Minhas, J.S., Gray, L.J., Tang, J., Williams, C., Sze, S., Pan, D., Jones, W., Verma, R., 2020. Socio-demographic heterogeneity in the prevalence of COVID-19 during lockdown is associated with ethnicity and household size: Results from an observational cohort study. *EClinical Medicine.* 25, 1-8.
- Mikolai, J., Keenan, K., Kulu, H., 2020. Intersecting household-level health and socioeconomic vulnerabilities and the COVID-19 crisis: an analysis from the UK. *SSM-Population Heal.* 12, 1-9.
- MMOH. 2021. Malaysian ministry of health. Accessed during 2021 from <http://moh.gov.my/>.
- Ohri-Vachaspati, P., Acciai, F., DeWeese, R.S., 2021. SNAP participation among low-income US households stays stagnant while food insecurity escalates in the months following the COVID-19 pandemic. *Prev. Med. Reports.* 24, 101555. [Doi.org/10.1016/j.pmedr.2021.101555](https://doi.org/10.1016/j.pmedr.2021.101555)
- Pesaran, M.H., Shin, Y., Smith, R.J., 2001. Bounds testing approaches to the analysis of level relationships. *J. Appl. Econom.* 16, 289-326.
- Phillips, P.C.B., Perron, P., 1988. Testing for a unit root in time series regression. *Biometrika.* 75, 335-346.
- Picchioni, F., Goulao, L.F., Roberfroid, D., 2021. The impact of COVID-19 on diet quality, food security and nutrition in low and middle income countries: A systematic review of the evidence. *Clin. Nutr.* (In Press). [Doi.org/10.1016/j.clnu.2021.08.015](https://doi.org/10.1016/j.clnu.2021.08.015).
- Qian, Y., Fan, W., 2020. Who loses income during the COVID-19 outbreak? Evidence from China. *Res. Soc. Stratif. Mobil.* 68, 1-5.
- Stella, S.Y., Ali, S.H., Chin, M., Russo, R.G., Đoàn, L.N., Rummo, P., 2021. Contrasting the experiences for high-and low-income Asian Americans during COVID-19. *Prev. Med. Reports* 24, 1-5.
- Stock, J.H., Watson, M.W., 1993. A simple estimator of cointegrating vectors in higher order integrated systems. *Econom. J. Econom. Soc.* 61, 783-820.
- UNDP, 2020. United Nations Development Program. Annual report available at <https://www.undp.org/publications/undp-annual-report-2020>.
- WBG, 2021. World Bank Group - International Development, Poverty, And Sustainability: Available at <https://www.worldbank.org/en/home>.
- WHO, 2020. World Health Organization. Available at <https://www.who.int/>.

Publisher's note: Science Impact Publishers remain neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made. The images or other third-party material in this article are included in the article's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this license, visit <https://creativecommons.org/licenses/by/4.0/>.