Estimating output and labor loss due to COVID-19: Evidence from some East Asian countries

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Synopsis

- Output and labor loss can be estimated using a growth decomposition method.
- Due to the strict lockdown measures, the COVID-19 pandemic caused the greatest decreases in output and employment in the second quarter of 2020.
- The forecasting result shows that Malaysia, the Philippines, and Vietnam's output can rebound in the third quarter of 2022, whereas Thailand's output continues to decline.
- In the second and third quarters of 2022, the labor force is expected to increase across all industries.

Introduction

The first case of COVID-19 was reported on December 31, 2019. After that, many people in several countries have been infected by the coronavirus. To deal with the COVID-19 pandemic, many governments have implemented strict lockdown measures to prevent the transmission. Consequently, many industries were unable to operate, and many businesses were forced to reduce production or possibly close. Employers were ultimately forced to reduce wages and work hours, or even lay off their employees. This means that the spread of COVID-19 has both direct and indirect economic consequences.

Many researchers have attempted to estimate the impact of COVID-19 on economic output. For example, Fernandes (2020) studied the economic impact of the COVID-19 crisis across industries and countries.

The results showed that a global recession is inevitable. The COVID-19 pandemic reduced GDP growth by approximately 3–6 percent, depending on the country. Maliszewska (2020) also predicted the impact of COVID-19 on economic output using the computable general equilibrium model. They found that COVID-19 would result in a 3.9 percent drop in global GDP, whereas the developed and developing countries would lose 3.3 and 4 percent, respectively. However, some countries might lose more than 6.5 percent of their GDP due to their economic dependence on international trade and tourism. Considering the impact by country, Aragie et al. (2021) utilized the social accounting matrix multiplier method to evaluate the effects of COVID-19 on Ethiopia's output as a result of the lockdown measure.

They discovered that the GDP would fall by 14.3 percent, whereas the agricultural sector's GDP would decline by only 4.7 percent.

Although we recognize the difficulty in estimating the impact of COVID-19 where prior works had to use some complicated models or methods to single out the loss, we found a simpler approach to tackle this issue. Hence, this study proposes a novel approach called the growth decomposition method to estimate the output and labor loss. This method allows us to assess the direct and indirect impact where all other factors are controlled. Our study covers some East Asian countries, including Thailand, Malaysia, the Philippines, and Vietnam. Apart from the loss that we intend to estimate, our results from 2020 to 2022 can also show how the economies recovered following the COVID-19 lockdown.

Data and Methodology

The quarterly data used in the analysis were obtained from the CEIC database. We use the real GDP as the proxy for output, whereas the total number of workers (or labor force) is the proxy for labor. Different countries have different periods due to the availability of data, but this does not affect our analysis or results (Table 1).

Table 1: Variables and Data Availability

Country	Variable	
	Real GDP	Labor
Thailand	1993q1-2022q2	2011q1-2022q1
Malaysia	2015q1-2022q2	2015q1-2022q2
Philippines	2012q1-2022q2	2012q1-2022q2
Vietnam	2010q1-2022q2	2012q2-2022q2

Source: CEIC

To estimate the output and labor loss, we propose the growth decomposition method, which focuses on quantifying the gap between real and predicted numbers. As depicted in Figure 1, the loss or gain is calculated as the difference between the real data and the estimated or predicted data, while controlling for all other variables that may directly or indirectly affect output and labor. Precisely, five steps comprise the growth decomposition method:

(i) Data collection

(ii) Growth calculation and analysis

- Calculate the Year-on-Year (YoY) growth to estimate an output (or labor) gain/loss from lockdown:

$$GDP_t = GDP_{t-4} + g_{YoY,GDP} GDP_{t-4}$$
$$Labor_t = Labor_{t-4} + g_{YoY,Labor} Labor_{t-4}$$

where GDP is the real GDP, Labor is the number of workers, and t denotes the quarter.

– Calculate the Quarter-on-Quarter (QoQ) growth to predict the future output (or labor) under different scenarios:

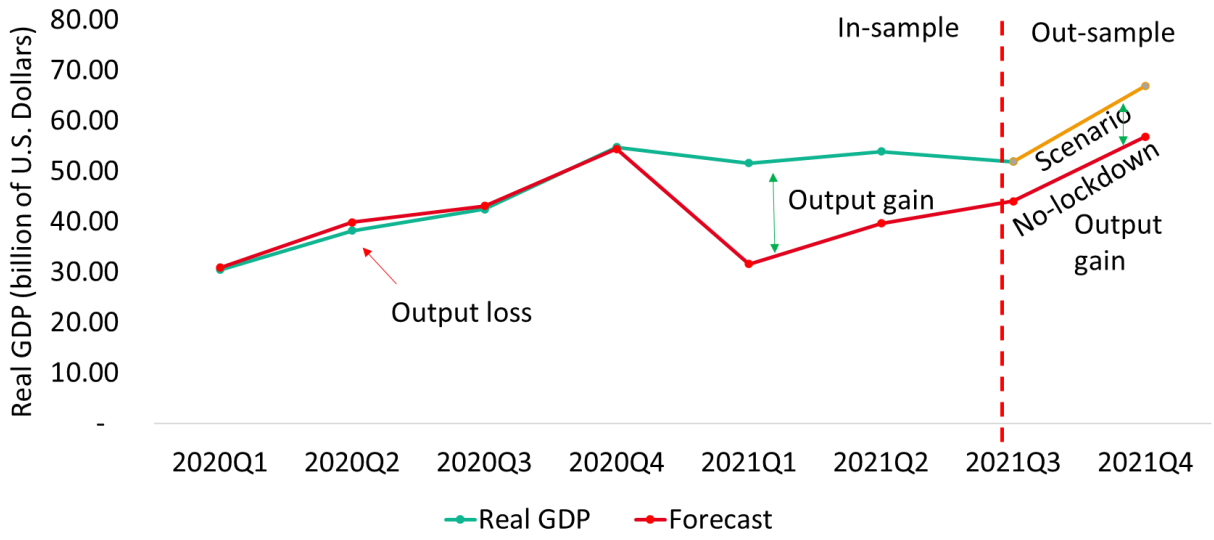
$$GDP_t = GDP_{t-1} + g_{QoQ,GDP} GDP_{t-1}$$
$$Labor_t = Labor_{t-1} + g_{QoQ,Labor} Labor_{t-1}$$

(iii) Select the growth scenarios ($g_{QoQ,GDP}$ and $g_{QoQ,Labor}$) to predict the output (or labor) where the scenarios include better (upper), moderate, and worst (lower) situations. Table 2 shows the results for scenario analysis by country.

(iv) Calculate the output (or labor) under these scenarios.

(v) Calculate an output (or labor) gain/loss by comparing the differences between the actual and predicted numbers. Note that YoY growths can aid in mitigating indirect economic effects such as seasonality, export volatility, and halted economic activities due to COVID-19.

Figure 1: Illustration of Growth Decomposition



Source: Calculated by the authors

Table 2: Scenario Analysis by Country

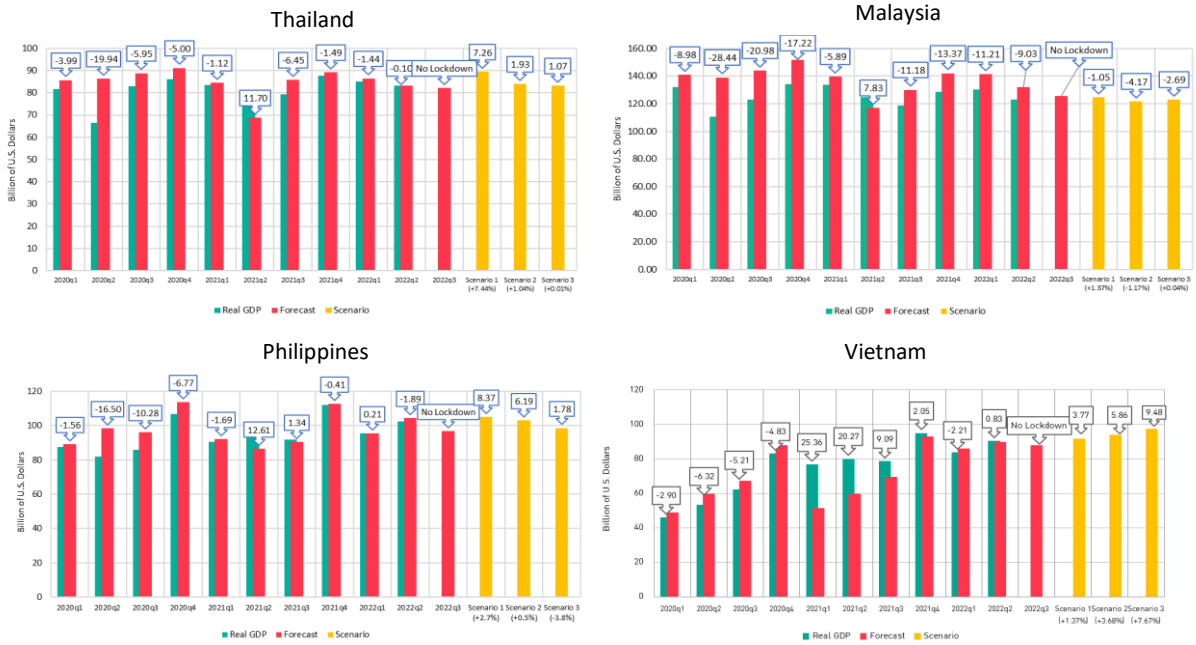
Real GDP				Total number of workers		
Country	**Forecast**	**Method**	**Overall (%)**	**Forecast**	**Method**	**Overall (%)**
Thailand	**2022Q3**	Mean All	1.37	**2022Q2**	Mean COVID-19	0.33
		Mean COVID-19	−1.17		Upper meanQ2	1.07
		Lower meanQ3	0.04		Lower meanQ2	0.64
Malaysia		Upper meanq3	7.44	**2022Q3**	Upper meanQ3	0.73
		Lower meanq4	1.04		Mean All	−0.04
		Mean COVID-19	0.01		Mean COVID-19	−0.77
Philippines		Upper mean All	2.66		Mean Q3	0.55
		Mean COVID-19	0.54		Mean All	0.41
		Mean Q3	−3.77		Mean COVID-19	0.29
Vietnam		Lower mean Q4	1.37		Mean COVID-19	1.22
		Mean COVID-19	3.68		Mean Q3	1.97
		Lower mean Q3	7.67		Lower mean All	0.38

Source: Calculated by the authors

Results

In 2020, Thailand, Malaysia, the Philippines, and Vietnam lost their output from the COVID-19 pandemic by approximately USD 75.62, 34.88, 35.11, and 19.26 billion, respectively (not reported here due to the space). The main reason is the lockdown imposed in the second quarter of 2020. Although COVID-19 has prolonged and still existed in 2021, Malaysia, the Philippines, and Vietnam can rebound with a gain of USD 2.64, 11.85, and 56.77 billion, respectively, whereas Thailand continued to incur losses of approximately USD 22.61 billion. However, in the first half of 2022, Thailand, Malaysia, and Vietnam were again at a loss due to the new wave of COVID-19. Our forecasting results show that Malaysia, the Philippines, and Vietnam might be able to rebound in the third quarter of 2022, depending on scenarios, whereas Thailand is expected to lose approximately USD 1.05–4.17 billion (Figure 2).

Figure 2: Output Loss by Country



Source: Calculated by the authors

Likewise, the COVID-19 pandemic generated a job loss in Thailand, Malaysia, and the Philippines with a maximum of 0.46, 0.49, and 8.61 million workers, respectively, in the second quarter of 2020. In Vietnam, 6.29 million workers lost their jobs in the third quarter of 2021. This means that job retention schemes during the spread of COVID-19 cannot help avoid employment loss in their countries. However, in the first half of 2022, the total number of workers in Thailand, Malaysia, the Philippines, and Vietnam is gradually increasing. In the second and third quarters of 2022, the number of workers is expected to increase, according to our projections (Figure 3).

: Labor Loss by (

Source: Calculated by the authors

Conclusion

The spread of COVID-19 has both direct and indirect economic repercussions. Using the growth decomposition method, this study aims to estimate the loss of output and labor caused by the COVID-19 pandemic. In the second quarter of 2020, Thailand, Malaysia, the Philippines, and Vietnam all suffered from the loss. Nevertheless, the forecasting result shows that Malaysia, the Philippines, and Vietnam may experience an increase in output in the third quarter of 2022, depending on the scenarios. Similarly, the forecasted number of workers in Thailand, Malaysia, the Philippines, and Vietnam tends to increase during the second and third quarters of 2022. This suggests that Thailand, Malaysia, the Philippines, and Vietnam may recover from job losses in the last quarter of 2022. However, losses could still occur in the fourth quarter of 2022 due to other factors such as high inflation and the conflict between Ukraine and Russia.

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