

ERIA Discussion Paper Series**No. 406****Policy Strategies to Strengthen the Travel and Tourism Sectors from the COVID-19 Pandemic Shocks: A Computable General Equilibrium Model for the Indonesian Economy**Irlan Adiyatma RUM^{#§}*Department of Economics, Universitas Padjadjaran, Indonesia*

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Abstract: *The travel and tourism sectors have become the most vulnerable sectors to the COVID-19 pandemic. Studies have shown that most tourist-destination countries will experience economic shocks due to the pandemic. This study analyses the impact of the COVID-19 pandemic shock and the implications of policies taken by the government to strengthen the travel and tourism sectors. As the largest travel and tourism economy in ASEAN, this study uses Indonesia as a case study. It uses a computable general equilibrium (CGE) model using a detailed national input–output table for the creative sectors. The study develops baseline scenarios (low and lower-middle recovery), general policy scenarios (moderate and highly effective support) and specific policy scenarios for the travel and tourism sectors. Through changes in export demand, the impact of the pandemic depends on the existing conditions and policy interventions. The pandemic causes the nominal gross domestic product at the national level to decline by an interval of [−1.99%, −2.97%] and for tourism and travel sectors by [−6.81%, −10.38%] depending on the recovery period. If the recovery is low (all annual inbound tourism expenditure is removed), the Indonesian macroeconomy will be worse than under the lower-middle recovery, given the same government intervention. Thus, effectiveness becomes an important factor for creating a better impact. Adding capital stimulus into the tourism sector helps to further reduce output decline in the travel and tourism sectors, but it is not enough to help the economy recover from the pandemic. The best policy strategy is to make sure that the mitigation plan will be implemented effectively.*

Keywords: economic impact, travel and tourism, COVID-19 pandemic, CGE model, Indonesia

JEL Classification: D58; F61; F62

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1. Introduction

The travel and tourism sectors are important sectors for the international economy. In 2019, the tourism sector alone contributed to almost 29% of the world's services exports and created about 300 million jobs globally (UNWTO, 2019). These sectors have become a source of income and employment for developed and developing countries. Because of cultural heritage, these sectors have the potential to grow in the future, despite the COVID-19 pandemic. The travel and tourism sectors are amongst the fastest-growing economic sectors and have become an important driver of economic growth and development. In 2018, there was a total of 1,407 million international tourist arrivals in the world, which was 6% higher than the previous year. Tourism receipts amounted to US\$1,480 billion, an increase of 4.4% from the previous year (UNCTAD, 2020). These all show that international tourism has become a huge industry in the world. In addition, these sectors are labour-intensive in nature and comprise a high proportion of jobs taken by women and young employees, showing that they have been seen as inclusive.

Now, the travel and tourism sectors have been heavily hit by the COVID-19 pandemic. The Organisation for Economic Co-operation and Development (OECD) estimated that the COVID-19 impact points to a 60% decline in international tourism in 2020 (OECD, 2020a). This could rise to 80% if the recovery is delayed until December. In mid-2020, the number of COVID-19 infections was still showing an increasing trend, and there is no sign of recovery soon. Although daily cases in Asia showed a decline in October 2020, they were increasing in Europe and the United States. In response, most countries have closed their borders to visitors and tourists. This situation became the first time ever that 100% of global destinations introduced travel restrictions. Compared to other regions, Asia and the Pacific recorded the highest growth in arrivals and the second-highest in total arrivals in 2018 after Europe. With the highest growth, the global restriction in tourism arrivals could have more economic consequences for some developing countries, especially in Asia where their economies also depend on travel and tourism.

Indonesia also depends on these sectors. They have become Indonesia's hope for improving economic growth in the future. The tourism and travel sectors contributed 5.25% to the national gross domestic product (GDP) in 2018 (or around US\$55.64 billion) and created more than 12.6 million jobs (around 10% of total employment) (Kemenparekraf, 2020). Since Indonesia is an archipelagic country, some provinces rely on these sectors as the main contributors to their economies. Although they may generate a small contribution to national GDP, the travel and tourism sectors comprise a greater contribution to national employment. There are many small and medium-sized enterprises (SMEs) that have grown to support the travel and tourist sectors in Indonesia.

Now, the COVID-19 pandemic has triggered crises in Indonesia's travel and tourism. The government announced that around 1.7 million people have lost their jobs, and this number will continue to rise if the situation remains uncertain. After 6 months into the crisis, Indonesia is entering a new phase in fighting the virus whilst at the same time managing to re-open its tourism economy. Even when the tourism supply chains start to function again, the situation will not be the same. The demand for travel and tourism will need some time to recover.

This pandemic is having a significant impact on livelihoods in Indonesia, especially amongst the most vulnerable communities. Close to 10 million people are at risk of falling below the national poverty line, with the poverty incidence expected to have increased from 9.4% in 2019 to between 11%–13% in 2020 (ADB, 2020). The government estimates that there will be 5.2 million Indonesians who will lose their jobs due to the economic slowdown induced by COVID-19. Furthermore, the pandemic's shocks also impact business positions and give rise to urgent and near-term support from the government. This is a complex and challenging job, and quantifying the impact of policy intervention will be important to examine first.

This study aims to measure to what extent strategies can strengthen the travel and tourism sectors against the COVID-19 pandemic shocks in Indonesia. The study develops different baseline scenarios based on the duration of the crisis and measures alternative strategies that can help the national economy to rebound.

2. Literature Review

The OECD analysed the impact of the coronavirus on the world economy using a model called the NiGEM global macroeconomy model (OECD, 2020b). They developed two scenarios in terms of contagion. The first is a contained outbreak, with a short-lived but severe downturn in China. This scenario includes imposed reduced domestic demand in China and Hong Kong by 4% in Q1 2020 and 2% in Q2 2020. Global equity prices and non-food commodity prices are lowered by 10% in Q1 2020. They showed that the world GDP will fall by 0.5% points in 2020, and global trade will decline by 0.9% in 2020. But, under a broader contagion scenario, world GDP will be reduced by 1.5% points, and global trade will decline by around 3.75% in 2020. The rest of Asia will suffer from China's struggles with coronavirus. Malaysia, Singapore, and Indonesia will be hurt most immediately by the falloff in China's tourism.

A study by Orlik et al. (2020) also estimated that the coronavirus could cost the global economy US\$2.7 trillion. They also used the NiGEM global macroeconomy model. The model allows monetary policy to respond to weaker growth. Under the widespread contagion scenario, China's GDP growth is estimated to slow by -2% points below the baseline forecast (no virus outbreak). They showed that world GDP growth for the year 2020 would be 1.2%. Indonesia, in this case, will experience a decline in its GDP by -2.8% points below the baseline forecast. If we consider the global pandemic scenario, the world GDP growth goes to zero, and Indonesia will have a decline by -4.6% points below the baseline forecast. Under the widespread contagion, countries that currently report greater than 100 cases will suffer the same shock as China, and countries with any reported cases will suffer half of the shock suffered by China. Whilst under the global pandemic, all countries are assumed to suffer the same shock as China.

A study by Maliszewska et al. (2020) predicts the impact of a global pandemic on the world economy. The pandemic is expected to reduce Indonesian GDP by 1.74% under a mid-recovery, and fall by more than 3.51% under slow recovery. If Indonesia experiences a bigger reduction in annual output due to a deeper and more prolonged pandemic, the economy will experience progressively more negative growth as the impacts of the shocks accumulate (see Appendix 1 for an illustration).

Another study by UNCTAD (2020) analyses the potential impact of the decline in the tourism sector. According to the study's results, Indonesia stands out with a loss of 4% in GDP in a mid-recovery and 6% in a slow recovery.

Few studies have used a computable general equilibrium (CGE) model for tourism studies. Zhou et al. (1998) used an input–output (IO) model and a CGE model to analyse the economic effect of a decline in tourism in Hawaii. The assumption of the CGE model was a competitive economy that included utility maximisation in consumption, cost minimisation in production, zero pure profit, and market clearance. In both models, a 10% decline in visitor expenditures reduced output in tourism sectors, such as hotels, transportation, and restaurants and bars, with smaller reductions in output for the other sectors. Sugiyarto, Blake, and Sinclair (2003) used a CGE model to study the economic impact of tourism and globalisation in Indonesia. They showed that tourism expansion amplified the positive effects of globalisation. Production increased and welfare improved even further, whilst the adverse effects of globalisation on government deficits and the trade balance were reduced. Pambudi, McCaughey, and Smythet (2009) used a multiregional static CGE model to estimate the effect of the Bali bombing on the Indonesian economy in the short run. Bali itself was worst affected by the Bali bombing, with a 50% drop in tourism demand and decreases in GDP by 2.33%, employment by 4.93%, household consumption by 4.68%, and imports by 8.95%. Other popular tourist destinations were also affected, such as Jakarta and Yogyakarta.

Many studies have been conducted on the impact of the coronavirus on the global economy. Some studies have also analysed the impact on the Indonesian economy. However, these studies have not used counter scenarios for policy intervention. This paper will try to illustrate both the potential impact of the COVID-19 pandemic and the possible outcomes of the policy intervention.

3. Study Design

A CGE model will be used in this study. This method is most suitable for the study because it can quantify the impact of a global shock on the national economy and also the effect of alternative solutions for restoring the economy. An input–output table (IOT) will be used in the study as the data source. It describes the production and consumption relationship within the economy, as it captures the demand–supply interaction between all sectors and final demand. By using a national IOT in the model, the study will develop scenarios to measure the impact of the COVID-19 pandemic shock and to what extent the policy strategies can strengthen the travel and tourism sectors. The impact of a COVID-19 pandemic shock will be presented in several indicators, i.e. macroeconomic impacts, sectoral output impacts, employment impacts, and household impacts. The implications of policy shocks will be presented in these indicators as well. Using comparative analysis, this study will be able to decide the best strategies that can help the economy to recover, especially for the travel and tourism sector.

3.1. Model and data

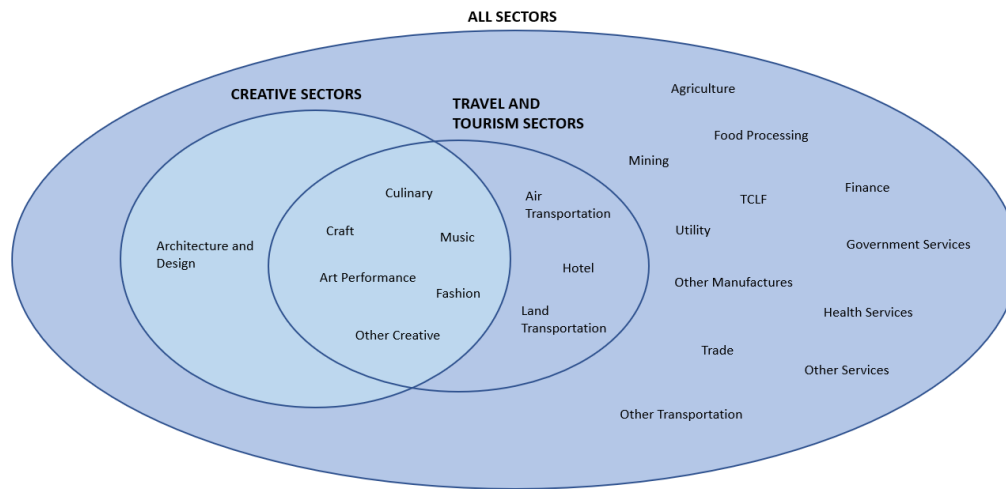
This study will choose a simplified CGE model for clarity on how the economy reacts and responds to the shock. A CGE model is a large numerical model that combines economic theory with real economic data to derive computationally the impact of global shocks or policy shocks in the economy. It fits the economic data to a set of equations that aim to capture the structure of the economy and the behavioural response of agents (firms, households, and government). This provides a framework to simulate alternative policies and trace the impact on their economic indicators, including household income and employment.

In this study, we use a CGE model called MINIMAL, developed by CoPS (2001), and use the licensed GEMPACK software for the simulation. It uses standard microeconomic theory (cost-minimising, utility-maximising, etc.) to underline the structural equations. The model consists of equations explaining the flow in the model database as a product of price and quantity. The demand and supply equations for private-sector users are derived from the solutions to the

optimisation problems, which are assumed to underlie the behaviour of the users in conventional neoclassical microeconomics. Users are assumed to be price takers with producers operating in competitive markets, which prevents the earning of pure profits. Some of the equations describe the market-clearing conditions for commodities and primary factors, producers' demand for produced inputs and primary factors, final demand (investment, household, export, and government), the relationship of prices to supply costs and taxes, and a few macroeconomic variables and price indexes. For this study, we use short-run closure for several reasons. There should be fixed capital stock for the industry. If a firm needs to decrease output, it can employ fewer workers but not increase capital in the short run. It takes time to expand its capital. The real wage is also fixed in the short run. As a result, a decreasing price indicates lower profits that justify the contraction of output.

For the database, we use the national IOT for 2014 published by Indonesia's Statistics Office (BPS, 2017). It covers 63 sectors, from agriculture to services, and also contains 16 creative sectors in addition to the standard sectors. This IOT captures the most recent economic activity across industries and final use in the country, which will be an advantage for this study. Based on the purpose of this study, we need to have more detail on tourism sectors, which can be provided by this database. In the previous IOT, the tourism sector is described in the hotel, restaurant, and other service sectors. In this study, we can define travel and tourism as a group of several sectors, such as hotel, air transportation, land transportation, and six tourism-related creative sectors. These sectors are culinary, craft, fashion, music, art performance, and other creative sectors outside the architecture and design sectors (see Figure 1). Considering all the related sectors for this study, we finally use 22 aggregated sectors in total (see Appendix 2 for the sector aggregation).

Figure 1. Scope of the Travel and Tourism Sectors



TCLF = textile, clothing, leather and footwear.

Source: Author's grouping.

In this study, we try to describe both the potential impact of the COVID-19 pandemic and the possible outcome of the policy intervention. This study gives an overview on ‘what if’ the pandemic continues to play out until 2021 (almost a 1-year shock, from March 2020) and ‘what if’ certain policy interventions are implemented in the economy. This study will measure the extent to which policy can help and strengthen the travel and tourism sectors.

3.2. Scenarios

There are two baseline scenarios that will be imposed to capture the different recovery periods, starting from the middle-to-slow recovery from the COVID-19 pandemic shock. Since this pandemic started in March 2020, a year has now passed. Tourism destinations have not reopened for international as of mid-2021. So, we start from a lower-middle recovery, where two-thirds of inbound tourism expenditure is removed in the country. This is equivalent to an 8-month standstill in international tourism. For a low recovery, all annual inbound tourism expenditure is removed from the country. This is equivalent to a 12-month standstill in international tourism. In each baseline scenario, aggregate real household consumption is reduced due to job losses because of the COVID-19 pandemic. The Ministry of National Development Planning (BAPPENAS) predicted that the

national unemployment level will be corrected to 11 million people by the end of 2020 (Kompas.com, 2020a). Earlier, the Statistics Office reported that the national unemployment level reached 9.77 million people in August 2020 (Kompas.com, 2020b).

Table 1. Scenarios

Policy Scenario	Baseline Scenario	
	Lower-middle Recovery	Low Recovery
No policy scenario	[SIM A]: 2/3 of inbound tourism expenditure is removed + real household consumption declines by 2%	[SIM B]: 3/3 of inbound tourism expenditure is removed + real household consumption declines by 3%
Policy scenario		
> Moderate support	[SIM C]: [SIM A] + 2/3 of stimulus plan has been implemented + 1/4 tax rate cut	[SIM D]: [SIM B] + 2/3 of stimulus plan has been implemented + 1/4 tax rate cut
> Highly effective support	[SIM E]: [SIM A] + 3/3 of stimulus plan has been implemented + 1/2 tax rate cut	[SIM F]: [SIM B] + 3/3 of stimulus plan has been implemented + 1/2 tax rate cut
>> Tourism support	[SIM G]: [SIM A] + 3/3 of stimulus plan has been implemented + 1/2 tax rate cut + tourism stimulus plan	[SIM H]: [SIM B] + 3/3 of stimulus plan has been implemented + 1/2 tax rate cut + tourism stimulus plan

Source: Author's compilation.

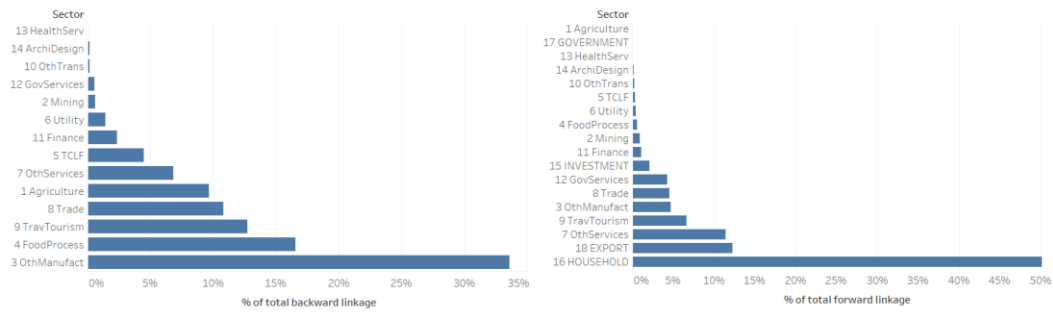
For the policy scenarios, 2+1 scenarios will be imposed to capture the different levels of effectiveness of the policy response. First, we develop two main policy scenarios for government plans to mitigate the COVID-19 pandemic. Then, we impose a specific policy scenario to support the tourism sector. The government has formed economy-wide stimulus packages including some liquidity injections and fiscal relief. A press release from the National Committee for COVID-19 Mitigation and Economic Recovery (KPC PEN, 2020) remarks that 60.9% of the total budget, or around Rp423.23 trillion, has been distributed into the stimulus packages. It has six main programmes, which cover from health to corporate financing. There is a Rp97.26 trillion budget plan for the health programme, a Rp234.34 trillion budget plan for the social protection programme, and a Rp65.97 trillion budget plan for a government programme. There is also a stimulus for microenterprise and corporate financing, with a total budget plan of around Rp297.64 trillion. Thus, based on this information, we design a policy shock with moderate to highly effective support. The moderate support will be based on the current status of 60.9% realisation, whilst the highly effective support will capture the full realisation of the government's stimulus planning. To support microenterprises and corporate firms, all policy scenarios will have a reduction in the production tax rate by 25%–50%. This is to accommodate the government programme to stimulus microenterprises and corporate firms through tax incentives (Baker McKenzie, 2020). Also, this study imposes a specific policy scenario as an additional stimulus plan for the tourism sector. The Ministry of Tourism and Creative Economy plans to inject Rp3.3 trillion into the sector to help improve health protocols in tourist destinations (Beritasatu, 2020).

4. Results

4.1. Backward and forward linkages of the travel and tourism sectors

The travel and tourism sectors cover all tourism-related sectors, including hotel, culinary (restaurant), air transportation, land transportation, and creative sectors, except architecture and design. Figure 2 describes the sectors that are related to the travel and tourism sectors, both backward and forward linkages. A backward linkage happens when the activity of an industry can give feedback effects on the development of the base sectors. Food processing, trade, and agriculture are the most related sectors in the backward linkage. The culinary sector has the highest output compared to other travel and tourism sectors. It drives the backward sectors to be more related to the culinary sector, such as food processing and agriculture. Besides the trade sector, the textile, clothing, leather, and footwear (TCLF) sectors have a medium linkage. All these sectors will be affected if there is a decline in the activity of the travel and tourism sectors. On the other side, a forward linkage happens when the activity of an industry can lead to the development of an advanced stage industry. Besides final use, other service sectors have high forward linkages with the travel and tourism sectors. Any change in the output of the travel and tourism sectors will affect the development of other service sectors that require input from this sector. Note that subsectors inside the travel and tourism sectors also have high backward and forward linkages. There is a high interindustry linkage across sectors inside the travel and tourism sectors.

Figure 2. Backward and Forward Linkages of Travel and Tourism Sectors



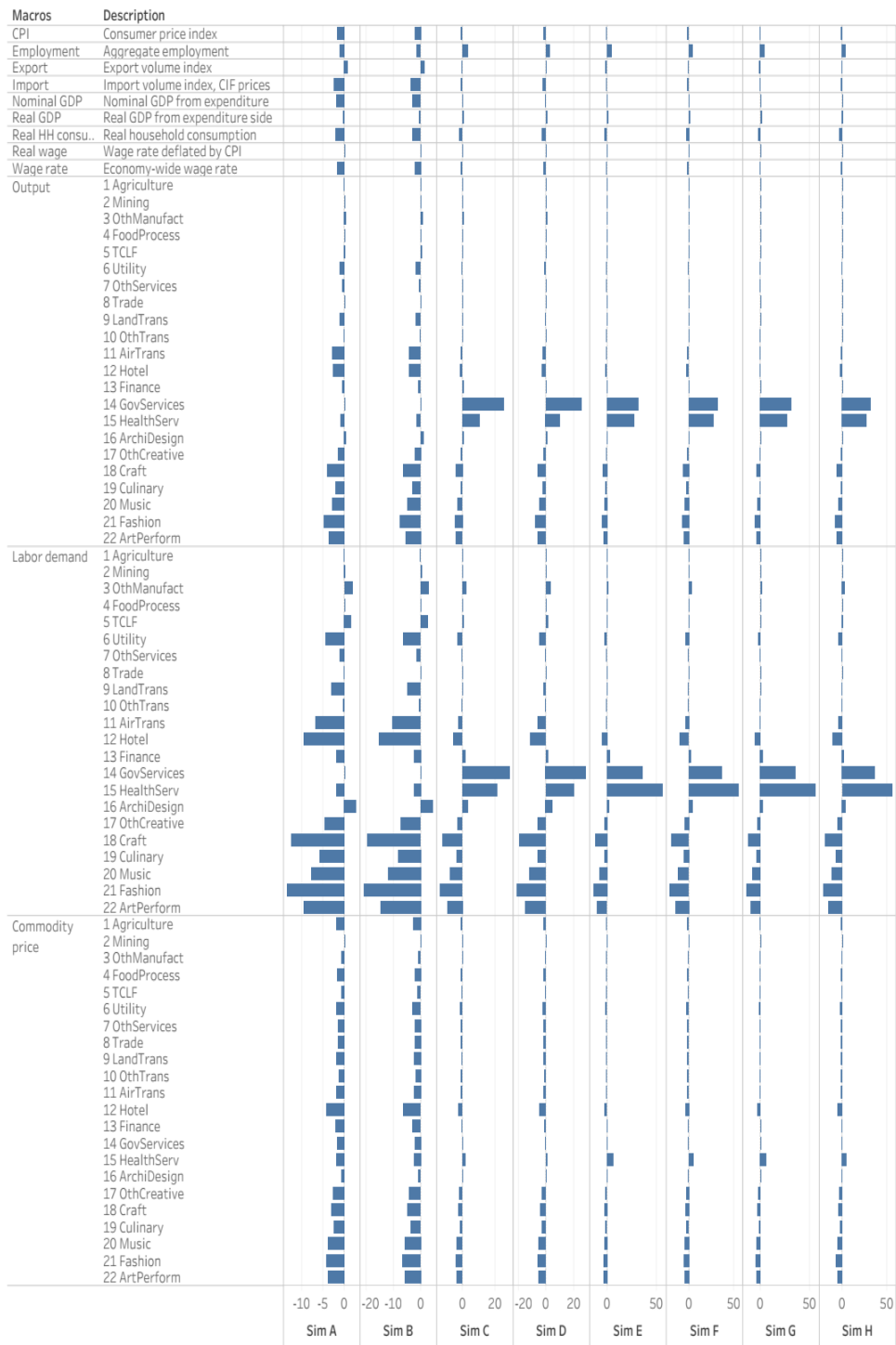
TCLF = textiles, clothing, leather, and footwear.

Source: Author's calculation.

4.2. Impacts of the COVID-19 pandemic

To understand the impact of the COVID-19 pandemic on the economy, we develop a baseline scenario that describes the impulse of the pandemic shock. There is a decline in foreign demand in the travel and tourism sectors and also an increase in the national unemployment rate, which affects the decline in real household consumption. There are two baseline scenarios in this study, lower-middle recovery and low recovery, depending on the recovery rate. If there is no policy intervention, then the economy can be described as in Figure 3.

Figure 3. Simulation Results
 (% deviation from the baseline)



CIF = cost, insurance, and freight, CPI = consumer price index, GDP = gross domestic product, HH = household, TCLF = textiles, clothing, leather, and footwear.

Note: See Appendix 3 for the exact numbers.

Source: Author's calculation.

If we have a lower-middle recovery [SIM A]

The national economy will experience a decline. Nominal GDP at the national level declines by -1.99% from the baseline and for the tourism and travel sectors by -6.81% from the baseline. The consumer price index (CPI) also declines by -1.52% from the baseline. This creates a deflation effect on the economy, which can lead to a temporary economic crisis. It will lead to lower production levels, which, in turn, lead to lower wages and lower demand by industry and consumers, which leads to further decreases in prices. Real GDP declines by -0.29% from the baseline. National employment declines by -0.92% from the baseline. Total imports decline by -2.44% , and exports increase by 1.05% from the baseline. Sectors such as agriculture experience an increase in their exports. Almost most service sectors experience output and employment declines. Output for the travel and tourism sectors declines at an interval of $[-1.99\%, -4.79\%]$. The fashion and craft sectors experience greater output declines from the baseline compared to other sectors. If we take into account the contribution of each sector to total output, we identify that the culinary and craft sector experiences the highest output decline. Employment for the travel and tourism sectors declines with the interval $[-4.6\%, -13.5\%]$. Almost all service products experience a decline in domestic prices. Commodity prices for travel and tourism services decline with the interval $[-1.66\%, -4.21\%]$. The hotel and fashion sectors experience a greater decline in domestic prices from the baseline compare to other sectors.

If we have a low recovery [SIM B]

The national economy will experience a severe decline. Nominal GDP at the national level declines by -2.97% from the baseline and for the tourism and travel sectors by -10.38% from the baseline. The CPI declines more, by -2.29% from the baseline. This creates a greater contraction in the economy. Real GDP declines by -0.42% from the baseline and national employment declines by -1.38% from the baseline. Total imports experience a decline of -3.62% . Although the travel and tourism sectors experience export decline, in aggregate, total exports increase by 1.43% from the baseline. Most service sectors experience greater declines in output and employment. Output for the travel and tourism sectors declines with the interval $[-2.23\%, -7.54\%]$. Precisely, the hotel sector moves from a -2.61% decline to a $-$

4.15% decline from the baseline. The culinary sector moves from a –1.99% decline to a –3.02% decline from the baseline. The air transportation sector experiences a greater decline in output and moves from a –2.83% decline to a –4.27% decline from the baseline. From this result, we reveal that air transportation experiences a higher percentage output decline from the baseline. We also reveal that the culinary sector experiences a higher value output decline from the baseline. Employment for the travel and tourism sectors declines more, with the interval [–7.15%, –21.02%]. Commodity prices for travel and tourism services decline more, with the interval [–2.50%, –6.57%].

4.3. Implications of a government mitigation plan

We develop policy scenarios in two categories to describe the different levels of effectiveness. There is an increase in demand for government and health services and also production tax cuts to support microenterprises and corporate businesses. There are two policy scenarios in this study, moderate support and highly effective support, depending on the implementation rate. If the policy intervention takes place, then the economy can be described as in Figure 3.

Under lower-middle recovery: if we have moderate mitigation [SIM C]

The national economy will bounce back from crisis to zero growth. Government support under moderate mitigation will make nominal GDP have a near-zero percentage deviation from the baseline (0.02%). The CPI declines by –0.92% from the baseline, which is lower than under no policy intervention. A lower CPI indicates a better situation for consumers since they can enjoy the same standard of living with less money. However, it will be worse for businesses as falling prices squeeze their profit margins. It causes real GDP to increase by 1.03% from the baseline. This shows that although there is still some low deflation in the economy, the real GDP now increases because of this policy intervention. National employment will increase by 3.04% from the baseline. Imports still experience a decline by –1.21% and also for exports by –0.56% from the baseline. Besides finance, government, and health services, all service sectors still experience output declines.

Output for the travel and tourism sectors decline with the interval $[-0.92\%, -4.89\%]$. If we take into account the contribution of each sector to the total output, we identify that the fashion and craft sectors experience the greatest output declines. This policy can help to reduce the output declines in the travel and tourism sectors. Output in the hotel sector, as an example, moves from -2.61% to -1.49% from the baseline. Employment for the travel and tourism sectors declines with the interval $[-2.25\%, -13.82\%]$. The air transportation sector, as an example, experiences less decline in employment, from -6.82% to -2.25% from the baseline. Almost all commodity prices in the travel and tourism sectors experience a greater decline compared to a scenario without policy intervention. This all shows that moderate mitigation can help to reduce the impact of the COVID-19 pandemic, but it is still not enough to create positive economic growth.

Under lower-middle recovery: if we have highly effective mitigation [SIM E]

The national economy will experience a positive impact. Under highly effective mitigation, the government can encounter impacts from the COVID-19 pandemic if we have a lower-middle recovery baseline. This means that if we can control the COVID-19 spread sooner, then under highly effective mitigation, the economy can survive from the pandemic shock. Nominal GDP shows an increase of 0.93% from the baseline, higher than under moderate mitigation. The CPI declines by -0.58% from the baseline, lower than in moderate mitigation. Here, businesses experience smaller profit losses. This causes real GDP to increase by 1.57% from the baseline. This shows that highly effective mitigation will create a greater increase in real GDP. National employment increases by 4.64% from the baseline. Imports perform better compared to moderate mitigation, with a lower decline by -0.66% from the baseline. Here exports experience a worse result than before, with a decline of -1.35% from the baseline.

Besides the finance, government, and health services, all service sectors experience lower output declines compared to the case of moderate mitigation. Output for the travel and tourism sectors declines with the interval $[-0.34\%, -4.90\%]$. The fashion and craft sectors still experience the most output decline. This policy can help to reduce output declines in the travel and tourism sectors. Output in the hotel sector, as an example, now moves from -1.49% to -1.27% from the

baseline. Employment for the travel and tourism sectors now declines with the interval $[-0.82\%, -12.85\%]$, lower than in the moderate mitigation case. The air transportation sector, as an example, experiences less decline in employment, from -2.25% to -0.82% from the baseline. Almost all commodity prices in the travel and tourism sectors experience greater declines compared to the moderate mitigation case. This all shows that highly effective mitigation can help to counter the impacts of the COVID-19 pandemic, resulting in positive economic growth.

Under low recovery: if we have moderate mitigation [SIM D]

The national economy will not reach zero growth yet. Government support under moderate mitigation cannot help the economy to bounce back if there is low recovery. Nominal GDP will decline by -0.97% from the baseline. The CPI will decline by -1.69% , which is higher than for lower-middle recovery. This causes real GDP to increase only by 0.88% from the baseline. This is not necessarily good, because a greater decline in the CPI will cause businesses to lose their profits. National employment increases by 2.58% from the baseline. Total imports experience a decline of -2.41% and also for exports of -0.19% from the baseline. Output for the travel and tourism sectors declines with the interval $[-1.72\%, -7.63\%]$. Output in the hotel sector, as an example, moves from -4.15% to -3.01% from the baseline. Employment for the travel and tourism sectors declines with the interval $[-5.69\%, -21.26\%]$. The air transportation sector, as an example, experiences a greater decline in employment, from -10.25% to -5.69% from baseline. Almost all commodity prices in the travel and tourism sectors experience greater declines compared to the case without policy intervention. However, if we compare the low and lower-middle recovery, we can identify that the speed of recovery is an important factor. If we have a moderate mitigation policy, low recovery will place more pressure on the economy. Thus, we identify that the level of COVID-19 recovery is significant for determining the success of economic recovery.

Under low recovery: if we have highly effective mitigation [SIM F]

The national economy will bounce back from crisis to zero growth. The government can help the economy to bounce back if there is highly effective mitigation. Nominal GDP only changes by around -0.07% from the baseline. The

CPI will decline by -1.34% from the baseline, which is lower than in the moderate mitigation case. This causes real GDP to increase by 1.42% from the baseline, which is higher than before. This shows that highly effective mitigation will create a higher increase in real GDP. A low recovery holds back the impacts that can be generated from highly effective mitigation. National employment increases by 4.19% from the baseline. This is almost twice as high as in the moderate mitigation case. Total imports experience a decline of -1.86% from the baseline and exports by -0.98% from the baseline. Imports perform better compared to the moderate mitigation case, with a lower decline of -1.86% from the baseline. Exports are worse than before, with a decline of -0.97% from the baseline. Output for the travel and tourism sectors declines with the interval $[-1.56\%, -7.63\%]$. Output in the hotel sector, as an example, moves from -3.01% to -2.77% from the baseline. Employment for the travel and tourism sectors declines with the interval $[-4.26\%, -21.26\%]$. The air transportation sector, as an example, experiences a greater decline in employment, from -5.69% to -4.26% from the baseline. Almost all commodity prices in the travel and tourism sectors experience greater declines compared to the moderate mitigation case. This shows that highly effective mitigation can help the economy to bounce back to zero growth.

4.3. Strategy to strengthen the travel and tourism sectors

In this study, we impose additional policy into the simulation under a highly effective mitigation plan. This policy will be specifically directed to the tourism sector only. We think that the best mitigation plan needs to be implemented before any additional shock takes place in the economy. The best priority here is to mitigate the impacts of the COVID-19 pandemic in a highly effective way. Then, any additional policy can stand on top of the national mitigation plan. The strategy here is to impose additional investment in the current capital stock of the tourism sector by Rp3.3 trillion based on the government stimulus plan. Two baseline scenarios need to be considered in this study, lower-middle recovery and low recovery. If the additional stimulus on the tourism sector takes place, then the economy can be described as in Figure 3.

Under lower-middle recovery: if we have a tourism stimulus policy in addition to highly effective mitigation [SIM G]

The national economy will experience a positive impact. Nominal GDP shows an increase of 0.91% from the baseline, but this is slightly lower than without the tourism stimulus. This additional policy makes the CPI decline by -0.63%, higher than without the tourism stimulus [SIM E]. This explains why real GDP increases more, by 1.6% from the baseline. The decrease in prices is the consequence of lower demand from industry and consumers. For businesses, falling prices will push down their profit margins, resulting in a challenging situation during the pandemic. Thus, the additional tourism stimulus will give more benefit to consumers but at the same time also place greater pressure on businesses compared to the scenario without the tourism stimulus. National employment is not changed by this stimulus. However, the price of labour declines more in this case. Imports experience a decline from -0.66% to -0.68% from the baseline. On the other hand, exports experience an increase from -1.35% to -1.25% from the baseline. Output for the travel and tourism sectors declines with the interval [-0.34%, -4.73%]. This is a more narrow interval compared to the case without the tourism stimulus. The fashion and craft sectors, which have the highest impact, experience a lower output decline. This additional policy can help to further reduce the output decline in the travel and tourism sectors. Output in the hotel sector, as an example, now moves from -1.27% to -0.77% from the baseline. Employment for the travel and tourism sectors does not change much. Almost all commodity prices in the travel and tourism sectors experience further declines compared to the case without the tourism stimulus. This all shows that the additional stimulus can alleviate the impacts of the COVID-19 pandemic on the travel and tourism sectors, but with less economic growth. However, this stimulus policy is not enough to help the economy recover from the COVID-19 pandemic.

Under low recovery: if we have a tourism stimulus policy in addition to highly effective mitigation [SIM H]

The national economy only bounces back to zero growth without an additional policy. The nominal GDP only changes by -0.09% from the baseline. The additional policy makes the CPI decline by -1.4% , which is higher than without the tourism stimulus [SIM F]. This makes real GDP increase by 1.45% from the baseline, which is quite similar to the case without the tourism stimulus. This shows that highly effective mitigation will create a higher increase in real GDP. However, this tourism stimulus in addition to highly effective mitigation cannot make a significant impact on the economy for recovery. The reason is that this is in a low recovery baseline. This result confirms that it is important to control the COVID-19 pandemic earlier. National employment increases by 4.18% from the baseline. This is almost the same as in the case without the tourism stimulus. Total imports experience a decline by -1.88% from the baseline and also for exports by -0.89% from the baseline. Imports still experience the same result as in the case without the tourism stimulus. However, exports perform better than without the stimulus, moving from -0.98% to -0.89% from the baseline. Output for the travel and tourism sectors declines with the interval $[-1.44\%, -7.46\%]$. Now, it has a shorter interval compared to the case without the tourism stimulus. Output in the hotel sector, as an example, moves from -2.77% to -2.28% from the baseline. Employment for the travel and tourism sectors also does not change much. Almost all commodity prices in the travel and tourism sectors experience further declines compared to without the tourism stimulus. This all shows that an additional stimulus can help to further reduce the impact of the COVID-19 pandemic on the travel and tourism sectors, but with zero economic growth. However, this stimulus policy cannot help the recovery from the COVID-19 pandemic.

5. Discussion

There are high interindustry linkages across sectors within the travel and tourism sectors.

We identify that the travel and tourism sectors have high interindustry linkages across subsectors. Subsectors within the travel and tourism sectors include land transportation, air transportation, hotels, and creative sectors that are related to tourism. This is true for both the backward and forward linkages, as shown in Figure 2. The single sector that has the highest backward linkage is the food processing sector. This is relevant because the culinary sector, a member of the sector, has the highest output in this group. It drives the travel and tourism sectors to have a strong backward linkage with the food and processing sector. On the other hand, if we take into account final use, the highest forward linkage is households and exports. We identify that the highest export demand for services is the travel and tourism sectors. Any change in export demand will create a significant impact on these sectors. The COVID-19 pandemic certainly will change export demand for these sectors since many travel restrictions are being implemented worldwide to control the spread.

It really depends on how long we can control the spread.

The low recovery scenario describes the situation where there are no international tourists entering the country within the year. We remove all annual inbound tourism expenditure from the economy. We also reduce aggregate household consumption as unemployment rises. In this case, the national economy experiences a decline in nominal GDP by -2.97% from the baseline, creating a temporary economic crisis for the country. This is the economic impact that countries have to take if they do not make many mitigation plans under the low recovery. Now, if we assume that the world can reduce the spread of COVID-19 within the year, we can have better results. Under lower-middle recovery, we only remove two-thirds of the inbound tourism expenditure from the economy as we can control the spread of COVID-19 sooner. The national economy experiences a decline in nominal GDP by -1.99% from the baseline, still creating a temporary economic crisis but with less magnitude. This result assures that the main priority is controlling the spread sooner. If the world can do this, we can have a better economic recovery.

Effectiveness is important for creating better impacts.

If we take into account the government mitigation plan, the economy appears to bounce back again. Under a moderate mitigation scenario, we impose a policy scenario on what the government has implemented to mitigate the impact of the COVID-19 pandemic, which is 60.9% of the total budget. Under the lower-middle recovery, the macroeconomy will bounce back to almost zero growth. Since the CPI declines by -0.92% from the baseline, real GDP increases by 1.03% from the baseline. This shows that government mitigation can reduce the economic impact better than without mitigation. However, if we have a highly effective mitigation scenario, the impact is higher. In this scenario, the government succeeds in implementing its mitigation plans. Under lower-middle recovery, the macroeconomy reaches a 0.93% increase from the baseline. This is better than zero growth in a moderate scenario. As the CPI declines by -0.58% from the baseline, now the real GDP increases by 1.57% . This shows that effective mitigation can build a buffer for businesses against profit loss, although the whole economy has not fully recovered. Effectiveness becomes important for creating a better impact on the economy. If we want to improve, we need to work effectively to mitigate the impact of the COVID-19 pandemic.

Tourism stimulus policy will help the travel and tourism sectors but not enough.

We develop a strategy to strengthen the travel and tourism sectors. In this study, we impose an additional capital stimulus on the tourism sector. Under lower-middle recovery, this policy in addition to highly effective mitigation will make nominal GDP increase by 0.91% from the baseline. This is slightly lower than without the tourism stimulus. On the other hand, now the CPI declines by -0.63% from the baseline, which is higher than without the tourism stimulus. This all makes real GDP increase by 1.6% from the baseline. Output for the travel and tourism sectors declines with a shorter interval compared to without the tourism stimulus. If we compare the cases with and without the tourism stimulus, we can see that this policy can make a difference. This shows that this additional policy can help to further reduce the output declines in the travel and tourism sectors, but it is not enough to help the economy recover from the COVID-19 pandemic. Sectors that have backward linkages with travel and tourism experience a higher increase in

their output, compared to the tourism stimulus case. We understand here that the stimulus can help to alleviate the impacts of the COVID-19 pandemic on the travel and tourism sectors, but not enough to bring recovery to the whole economy. Thus, it depends on how the government implements its national mitigation plans.

6. Conclusion

This study aims to measure the extent to which strategies can strengthen the travel and tourism sectors against the shocks of the COVID-19 pandemic. We develop different baseline and policy scenarios to achieve a comprehensive equilibrium model that explains how the economy responds to the COVID-19 pandemic and find a new equilibrium from there. We developed eight scenarios in this study, with four stage scenarios for each baseline.

We find that subsectors within the travel and tourism sectors have high backward and forward linkages. This shows high interindustry linkages across subsectors. The travel and tourism sectors have high backward linkages with food processing and agriculture and also trade. If there is lower demand for the travel and tourism sectors, then these sectors will be affected. On the other hand, the travel and tourism sectors have high forward linkages with households and exports. So, if there is lower household or export demand, then the travel and tourism sectors will be affected too.

The impact of the COVID-19 pandemic can be measured in this study. By imposing the right simulation, this study can explain the effects on the economy. We find that the nominal GDP will decline by the interval $[-1.99\%, -2.97\%]$ depending on the recovery period. The CPI index will also decline by the interval $[-1.52\%, -2.29\%]$. National employment will decline by interval $[-0.92\%, -1.38\%]$. If the recovery is low, then the national macroeconomy will be worse than in the lower-middle recovery case. We cannot have a high recovery since the pandemic has exceeded the first semester. But from this study, we can understand what the impact would be if the recovery were even worse than what we have simulated here.

Taking into account the government's mitigation plans and putting them into equilibrium, we find that effectiveness becomes important for creating a better

impact. If we implement highly effective mitigation, we can have the optimism to beat this pandemic. Under lower-middle recovery, there is a significant difference if we compare the situation with the moderate and highly effective mitigation cases. If the government implements highly effective mitigation, nominal GDP shows an increase of 0.93% from the baseline. However, if the government only achieves moderate mitigation, nominal GDP only shows zero growth in the national economy. From here, we can understand that the government mitigation plan can be considered to be good, but it depends on how it is implemented.

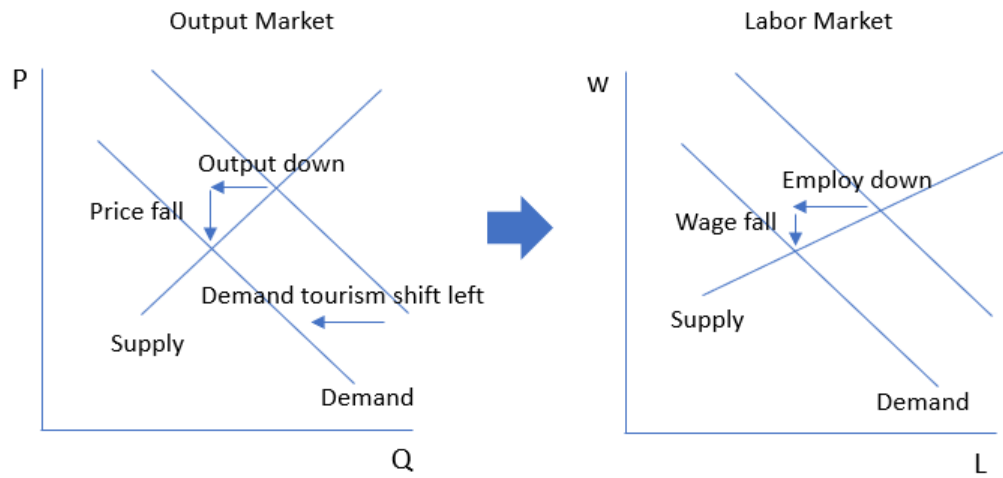
From here, we impose a strategic policy to strengthen the travel and tourism sectors. If we add an additional capital stimulus into the tourism sector, the national macroeconomy will not change significantly. Under lower-middle recovery, nominal GDP will increase by 0.91% from the baseline, which is slightly lower than without the tourism stimulus. The reason is that the travel and tourism sectors in the economy only contribute 12.89% of the total national output. However, this stimulus definitely can help to further reduce the output declines in the travel and tourism sectors. So, the better strategy here is to make sure that the mitigation plan will be implemented effectively. From there, we can make an additional stimulus for the travel and tourism sectors.

References

- Asian Development Bank (ADB) (2020), *Proposed Countercyclical Support Facility Loans Republic of Indonesia: COVID-19 Active Response and Expenditure Support Program*. Manila: ADB.
<https://www.adb.org/sites/default/files/project-documents/54139/54139-001-rrp-en.pdf> (accessed 7 October 2020).
- Baker McKenzie (2020), *Indonesia: New Fiscal Incentives in Relation to COVID-19*. Jakarta: Baker McKenzie.
<https://www.bakermckenzie.com/en/insight/publications/2020/03/new-fiscal-incentives-in-relation-to-covid19> (accessed 11 November 2020).
- Beritasatu (2020), *Stimulus Pariwisata Rp. 3.3 Triliun Segera Cair*. Jakarta: Beritasatu.com. <https://www.beritasatu.com/ekonomi/687017/stimulus-pariwisata-rp-33-triliun-segera-cair> (accessed 10 November 2020).
- Badan Pusat Statistik (BPS) (2017), *Tabel Input–Output Updating Ekonomi Kreatif 2014* (Catalog BPS No. 9401005). Jakarta: BPS.CoPS (2001), *MINIMAL: A Simplified General Equilibrium Model*. Victoria: CoPS.
<https://www.copsmodels.com/minimal.htm> (accessed 24 September 2020).
- Kemendparekraf (2020), *Laporan Kinerja Kementerian Pariwisata tahun 2019*. Jakarta: Kementerian Pariwisata dan Ekonomi Kreatif.
- Kompas.com (2020a), *Bappenas Prediksi Jumlah Pengangguran Tahun ini capai 11 Juta Orang*. Jakarta: Kompas.com.
<https://money.kompas.com/read/2020/08/27/190600626/bappenas-prediksi-jumlah-pengangguran-tahun-ini-capai-11-juta-orang> (accessed 12 November 2020).
- Kompas.com (2020b), *Indonesia Resesi, Jumlah Pengangguran Naik Jadi 9.77 Juta Orang*. Jakarta: Kompas.com.
<https://money.kompas.com/read/2020/11/05/141654326/indonesia-resesi-jumlah-pengangguran-naik-jadi-977-juta-orang> (accessed 12 November 2020).
- KPC PEN (2020), *Realisasi Penanganan COVID-19 dan Pemulihan Ekonomi nasional*. Jakarta: KPC PEN. <https://covid19.go.id/edukasi/masyarakat-umum/realisasi-program-penanganan-covid-19-dan-pemulihan-ekonomi->

- nasional-25-november-2020 (accessed 12 November 2020).
- Maliszewska, M., A. Mattoo, D. der Mensbrugge (2020), 'The Potential Impact of COVID-19 on GDP and Trade', *Policy Research Working Paper* No. 9211. World Bank Group.
- Orlik, T., J. Rush, M. Cousin, and J. Hong (2020), *Coronavirus Could Cost the Global Economy \$2.7 Trillion. Here's How*. Bloomberg.
<https://www.bloomberg.com/graphics/2020-coronavirus-pandemic-global-economic-risk> (accessed 6 October 2020).
- Organisation for Economic Co-operation and Development (OECD) (2020a), *Tourism Policy Responses to the COVID-19*. Paris: OECD.
<https://www.oecd.org/coronavirus/policy-responses/tourism-policy-responses-to-the-coronavirus-covid-19-6466aa20> (accessed 6 October 2020).
- OECD (2020b), *Coronavirus: The World Economy at Risk*. Paris: OECD.
<https://www.oecd.org/berlin/publikationen/Interim-Economic-Assessment-2-March-2020.pdf> (accessed 6 October 2020).
- Pambudi, D., N. McCaughey, and R. Smyth (2009), 'Computable General Equilibrium Estimates of the Impact of the Bali Bombing on the Indonesian Economy', *Tourism Management*, 30(2), pp.232–9.
- Sugiyarto, G., A. Blake, and M.T. Sinclair (2003), 'Tourism and Globalization: Economic Impact in Indonesia', *Annals of Tourism Research*, 30(3), pp.683–701.
- UNCTAD (2020), *COVID-19 and Tourism: Assessing the Economic Consequences*. UNCTAD. https://unctad.org/system/files/official-document/ditcinf2020d3_en.pdf (accessed 6 October 2020).
- UNWTO (2019), *International Tourism Highlights* (2019 Edition). UNWTO.
<https://www.e-unwto.org/doi/pdf/10.18111/9789284421152> (accessed 6 October 2020).
- Zhou, D., J.F. Yanagida, U. Chakravorty, and P. Leung (1998), 'Estimating Economic Impact from Tourism', *Annals of Tourism Research*, 24(1), pp.76–89.

Appendix 1. Partial Impact of a Demand Shift on Tourism



L = quantity of labour, P = price of tourism, Q = quantity of tourism, w = wage of labour.

Source: Author's illustration.

Appendix 2: Sector Mapping

No.	Original Sector	Mapping Sector	No.	Original Sector	Mapping Sector
1	Other agriculture crops	Agriculture	33	Sea transport	Other transport
2	Horticultural crops	Agriculture	34	River transport	Other transport
3	Estate crops	Agriculture	35	Air transport	Air transport
4	Livestock	Agriculture	36	Storage and post	Other services
5	Agriculture services	Agriculture	37	Accommodation	Hotel
6	Forestry	Agriculture	38	Information and communication	Other services
7	Fishery	Agriculture	39	Bank	Finance
8	Oil and Gas	Mining	40	Insurance	Finance
9	Coal	Mining	41	Other financial services	Finance
10	Metal mining	Mining	42	Real estate	Other services
11	Other mining	Mining	43	Company services	Other services
12	Refinery	Other Manufacture	44	Government administration	Government services
13	Food Beverage	Food Process	45	Education services	Other services
14	Tobacco	Food Process	46	Health services	Health services
15	Textile	TCLF	47	Other services	Other services
16	Leather and footwear	TCLF	48	Architecture	Architecture and design
17	Wood furniture	Other Manufacture	49	Interior design	Architecture and design
18	Pulp and paper	Other Manufacture	50	Visual design	Architecture and design
19	Chemical	Other Manufacture	51	Product design	Architecture and design
20	Rubber and plastics	Other Manufacture	52	Film and animation	Other creative sectors
21	Non-metal industry	Other Manufacture	53	Photography	Other creative sectors
22	Basic metal	Other Manufacture	54	Craft	Craft
23	Computer and electronic	Other Manufacture	55	Culinary	Culinary
24	Machinery	Other Manufacture	56	Music	Music
25	Transport equipment	Other Manufacture	57	Fashion	Fashion
26	Other manufacture	Other Manufacture	58	Application and games	Other creative sectors
27	Electricity and gas	Utility	59	Publishing	Other creative sectors
28	Water and waste	Utility	60	Advertising	Other creative sectors
29	Construction	Other Services	61	TV and radio	Other creative sectors
30	Automotive trade	Trade	62	Art Performance	Art Performance
31	Trade	Trade	63	Fine arts	Other creative sectors
32	Land transport	Land transport			

TCLF = textiles, clothing, leather, and footwear.

Source: Author's mapping.

Appendix 3: Simulation Results (% deviation from the baseline)

Macros	Description	Sim A	Sim B	Sim C	Sim D	Sim E	Sim F	Sim G	Sim H
CPI	Consumer price index	-1.53	-2.29	-0.93	-1.69	-0.58	-1.35	-0.63	-1.40
Employment	Aggregate employment	-0.93	-1.39	3.04	2.58	4.65	4.19	4.65	4.18
Export	Export volume index	1.05	1.43	-0.56	-0.19	-1.35	-0.98	-1.25	-0.89
Import	Import volume index, CIF prices	-2.44	-3.63	-1.22	-2.41	-0.66	-1.86	-0.68	-1.88
Nominal GDP	Nominal GDP from expenditure	-1.99	-2.97	0.02	-0.97	0.93	-0.07	0.91	-0.09
Real GDP	Real GDP from expenditure side	-0.29	-0.44	1.03	0.89	1.57	1.43	1.60	1.45
Real HH consumption	Real household consumption	-2.03	-2.97	-2.03	-2.97	-2.03	-2.97	-2.03	-2.97
Real wage	Wage rate deflated by CPI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wage rate	Economy-wide wage rate	-1.53	-2.29	-0.93	-1.69	-0.58	-1.35	-0.63	-1.40
Output	1 Agriculture	-0.03	-0.04	0.00	-0.02	0.05	0.03	0.06	0.04
	2 Mining	0.07	0.10	0.05	0.08	0.04	0.07	0.04	0.08
	3 OthManufact	0.64	0.97	0.62	0.94	0.62	0.95	0.65	0.97
	4 FoodProcess	0.06	0.10	0.09	0.13	0.18	0.22	0.19	0.23
	5 TCLF	0.44	0.64	0.21	0.40	0.11	0.31	0.14	0.34
	6 Utility	-1.03	-1.52	-0.63	-1.13	-0.41	-0.90	-0.41	-0.90
	7 OthServices	-0.39	-0.56	-0.20	-0.37	-0.12	-0.29	-0.11	-0.29
	8 Trade	-0.01	0.01	0.01	0.03	0.08	0.10	0.11	0.12
	9 LandTrans	-1.05	-1.57	-0.06	-0.57	0.29	-0.22	0.30	-0.22
	10 OthTrans	-0.13	-0.17	-0.18	-0.22	-0.16	-0.20	-0.14	-0.19
	11 AirTrans	-2.83	-4.28	-0.93	-2.36	-0.34	-1.76	-0.34	-1.76
	12 Hotel	-2.62	-4.16	-1.50	-3.01	-1.28	-2.77	-0.77	-2.28
	13 Finance	-0.54	-0.79	0.61	0.36	0.95	0.70	0.97	0.71
	14 GovServices	0.02	0.03	25.66	25.67	32.16	32.17	32.16	32.18
	15 HealthServ	-0.90	-1.32	10.67	10.25	27.72	27.31	27.71	27.30
	16 ArchiDesign	0.67	1.02	0.67	1.01	0.65	0.99	0.68	1.02
	17 OthCreative	-1.43	-2.24	-0.94	-1.72	-0.79	-1.56	-0.65	-1.44
	18 Craft	-4.15	-6.49	-4.08	-6.39	-4.03	-6.34	-3.89	-6.20
	19 Culinary	-2.00	-3.03	-1.26	-2.27	-1.06	-2.07	-0.79	-1.81
	20 Music	-2.90	-4.61	-2.85	-4.54	-2.87	-4.55	-2.66	-4.35
	21 Fashion	-4.79	-7.55	-4.90	-7.63	-4.91	-7.64	-4.73	-7.46
	22 ArtPerform	-3.57	-5.64	-3.63	-5.68	-3.65	-5.70	-3.47	-5.52
Labor demand	1 Agriculture	-0.13	-0.18	-0.01	-0.06	0.19	0.13	0.22	0.17
	2 Mining	0.41	0.62	0.29	0.50	0.24	0.44	0.25	0.46
	3 OthManufact	2.08	3.15	2.01	3.08	2.02	3.08	2.11	3.17
	4 FoodProcess	0.20	0.35	0.29	0.43	0.62	0.75	0.67	0.80
	5 TCLF	1.72	2.50	0.80	1.57	0.42	1.19	0.56	1.33
	6 Utility	-4.40	-6.49	-2.72	-4.82	-1.78	-3.89	-1.78	-3.89
	7 OthServices	-0.95	-1.38	-0.48	-0.92	-0.28	-0.72	-0.28	-0.71
	8 Trade	-0.02	0.05	0.05	0.10	0.28	0.33	0.37	0.41
	9 LandTrans	-3.08	-4.59	-0.17	-1.68	0.85	-0.66	0.87	-0.64
	10 OthTrans	-0.37	-0.48	-0.50	-0.61	-0.45	-0.57	-0.40	-0.52
	11 AirTrans	-6.83	-10.26	-2.25	-5.69	-0.83	-4.26	-0.82	-4.26
	12 Hotel	-9.73	-15.30	-5.63	-11.17	-4.79	-10.31	-5.13	-10.67
	13 Finance	-1.75	-2.56	1.99	1.17	3.11	2.28	3.15	2.33
	14 GovServices	0.02	0.03	29.04	29.06	36.45	36.47	36.46	36.48
	15 HealthServ	-1.74	-2.55	21.15	20.30	56.80	55.91	56.78	55.89
	16 ArchiDesign	3.04	4.62	3.02	4.59	2.93	4.50	3.07	4.64
	17 OthCreative	-4.61	-7.16	-3.03	-5.54	-2.54	-5.03	-2.75	-5.25
	18 Craft	-12.60	-19.43	-12.37	-19.15	-12.23	-18.99	-12.38	-19.15
	19 Culinary	-5.62	-8.47	-3.54	-6.39	-2.99	-5.82	-3.73	-6.56
	20 Music	-7.64	-12.06	-7.53	-11.90	-7.56	-11.91	-7.49	-11.85
	21 Fashion	-13.54	-21.02	-13.83	-21.26	-13.85	-21.27	-13.86	-21.29
	22 ArtPerform	-9.44	-14.78	-9.59	-14.89	-9.65	-14.93	-9.64	-14.93
Commodity price	1 Agriculture	-1.79	-2.64	-1.05	-1.91	-0.36	-1.23	-0.33	-1.20
	2 Mining	0.00	0.00	0.02	0.02	0.03	0.03	0.03	0.04
	3 OthManufact	-0.57	-0.85	-0.30	-0.58	-0.19	-0.47	-0.20	-0.48
	4 FoodProcess	-1.53	-2.25	-1.00	-1.74	-0.58	-1.32	-0.58	-1.32
	5 TCLF	-0.72	-1.10	-0.63	-1.01	-0.59	-0.97	-0.58	-0.96
	6 Utility	-1.97	-2.91	-1.39	-2.34	-1.19	-2.14	-1.21	-2.17
	7 OthServices	-1.38	-2.06	-0.92	-1.60	-0.75	-1.43	-0.79	-1.47
	8 Trade	-1.42	-2.11	-0.93	-1.63	-0.69	-1.39	-0.71	-1.41
	9 LandTrans	-1.65	-2.46	-0.79	-1.60	-0.59	-1.32	-0.53	-1.34
	10 OthTrans	-1.27	-1.88	-0.91	-1.53	-0.76	-1.38	-0.79	-1.41
	11 AirTrans	-1.67	-2.51	-0.93	-1.77	-0.72	-1.55	-0.75	-1.58
	12 Hotel	-4.17	-6.48	-2.58	-4.85	-2.08	-4.34	-2.41	-4.68
	13 Finance	-2.07	-3.08	-0.39	-1.41	0.16	-0.86	0.12	-0.90
	14 GovServices	-1.55	-2.33	-0.06	-0.85	0.34	-0.45	0.27	-0.51
	15 HealthServ	-1.70	-2.53	1.84	1.00	6.13	5.28	6.10	5.25
	16 ArchiDesign	-0.59	-0.89	-0.18	-0.47	-0.05	-0.34	-0.06	-0.36
	17 OthCreative	-2.64	-4.03	-1.81	-3.19	-1.54	-2.91	-1.71	-3.08
	18 Craft	-3.01	-4.65	-2.65	-4.27	-2.52	-4.15	-2.62	-4.24
	19 Culinary	-2.47	-3.70	-1.66	-2.89	-1.30	-2.53	-1.59	-2.81
	20 Music	-3.77	-5.86	-3.27	-5.35	-3.10	-5.17	-3.21	-5.29
	21 Fashion	-4.22	-6.58	-3.94	-6.30	-3.83	-6.18	-3.93	-6.28
	22 ArtPerform	-3.74	-5.81	-3.35	-5.41	-3.20	-5.26	-3.32	-5.38

Source: Author's calculation.

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