unicef

UN WOMEN

UNDP

**UNDP, UNICEF and UN Women
EASTERN CARIBBEAN**

ANGUILLA

COVID-19 HEAT REPORT
HUMAN AND ECONOMIC ASSESSMENT OF IMPACT

Based on research conducted by Dr. Simon Naitram

COVID-19 HEAT SERIES

ANGUILLA
COVID-19 HEAT Report - Human and Economic Assessment of Impact

ANTIGUA AND BARBUDA
COVID-19 HEAT Report - Human and Economic Assessment of Impact

BARBADOS
COVID-19 HEAT Report - Human and Economic Assessment of Impact

BRITISH VIRGIN ISLANDS
COVID-19 HEAT Report - Human and Economic Assessment of Impact

COMMONWEALTH OF DOMINICA
COVID-19 HEAT Report - Human and Economic Assessment of Impact

GRENADA
COVID-19 HEAT Report - Human and Economic Assessment of Impact

SAINT LUCIA
COVID-19 HEAT Report - Human and Economic Assessment of Impact

SAINT VINCENT AND THE GRENADINES
COVID-19 HEAT Report - Human and Economic Assessment of Impact

COVID-19 HUMAN AND ECONOMIC ASSESSMENT OF IMPACT FOR ANGUILLA

INDICATORS	VALUE
Demographic	
Age Dependency Ratio (AP&H Census, 2011)	45%
% of Labour Force Female	51%
Population	13,572
Children Population (0-17 years) Male Female	3,778 1,908 1,870
Macroeconomic	
GDP percapita (UNSD, 2018)	USD$19,891
GDP growth rate (Caribbean Development Bank)	10.9%
Inflation (Caribbean Development Bank)	0.8%
Fiscal	
Debt to GDP ratio (Government of Anguilla)	49.9%
Primary Balance to GDP (Government of Anguilla)	5.1%
Interest to Revenue Ratio (Government of Anguilla)	8.02%
Social	
Unemployment (AP&H Census, 2011)	13%
Unemployment (female) (AP&H Census, 2011)	6%
Unemployment (male) (AP&H Census, 2011)	19%
Poverty rate (Country Poverty Assessment, 2007)	5.8%
Povertyrate (female)	3.6%
Poverty rate (male)	8.2%
Poverty rate (children)	7.2%
Number of school - going children (2017)	3,244
Note: All data is for 2019, unless otherwise stated.	

EXECUTIVE SUMMARY

Anguilla is still in the recovery phase following the devastation of Hurricane Irma in 2017. Real GDP remains 9.7% below the pre-global financial crisis level of economic activity, with the Tourism sector estimated to contribute 37% of Anguilla's total economic activity. In 2019, Anguilla ran a budget surplus of 1.6% of GDP. While the latest data shows an unemployment rate of approximately 13%, strikingly 23.5% of Anguilla's population is affected by poverty or vulnerability. Further, Anguilla's Public Assistance Programme provides a monthly grant to less than 1% of the population which represents 0.22% of the Government of Anguilla's total recurrent expenditure budget for 2020. The Government of Anguilla subsidises 25% to 100% of healthcare and treatment costs for vulnerable individuals.

The early closure of Anguilla's international borders on 18 March 2020 limited the spread of the COVID-19 virus. Nonetheless, global supply chain challenges have constrained recovery, particularly in the construction industry. Moreover, beyond the shutdown, the domestic economy has also been negatively impacted, for example by the cancellation of the Anguilla Summer Festival 2020.

While the limited spread of COVID-19 means that consideration may soon be given to the reopening of the domestic economy, it is likely that the tourism sector will remain closed in the medium term. Our best estimate is that tourism will either partially manage to restart for the Christmas period, or will reopen fully, within the internationally prevailing circumstances, in 2021. This represents an economic downturn forecast of -25% to -30% and marks the difference between a recovery or a recession extending over next year.

With a projected one third of the workforce unemployed, revenue could fall between EC$55 million (22.4%) and EC$66 million (27%) due to dampened demand, job losses, business closures and the absence of the tourism sector.

Tourism workers' vulnerability even before the onset of COVID-19 will likely increase the poverty rate by around 5 percentage points. While women are underrepresented in poverty in Anguilla, they are overrepresented in the tourism sector, suggesting that around 3 percentage points of that increase will be due to women falling into poverty. The COVID-19 crisis will augment the share of workers not participating in formal employment.

The longer the tourism industry remains closed, the greater the financial setback workers will face. An increasing proportion of the population will likely fall below the poverty line. Workers, families, women and children in households will face multi-faceted deprivations such as access to continued and quality education, income loss, and nutrition and health impacts.

The report outlines a number of recommendations including: expanding the time frame for COVID-19 related unemployment benefits and covering the newly unemployed; providing liquidity for small firms with a Government guarantee scheme to backstop MSMEs through the crisis; expanding the School Feeding Programme to cover poor students in all schools and extend the benefit of EC $200 per month for each child; funding the short-run increase in expenditure using a temporary increase in the Interim Stabilisation Levy; establishing a shelter for women victims of gender-based violence, exploring partnerships with the tourism sector; implementing a permanent unemployment benefit fund, financed through a limited contribution increase by workers and employers to the Anguilla Social Security Board (ASSB); and amend the Anguilla Framework for Fiscal Sustainability and Development to account for the COVID-19 (and similar national crises), allowing for fiscal space and credit expansion.

CONTEXT

MACROECONOMIC

Anguilla's real gross domestic product (GDP) is estimated to have increased by 10.9% in 2018 and 2019. This represents a recovery following the significant decline in GDP of 6.6% caused by Hurricane Irma in 2017. Prior to the onset of the COVID-19 pandemic, the Eastern Caribbean Central Bank had predicted a 2.2% growth in the economy. However, real GDP has not yet recovered to its 2007 peak. Real GDP remains 9.7% below the pre-global financial crisis level of economic activity.

Anguilla is very much still recovering from the destruction inflicted by Hurricane Irma in 2017. Total damages were estimated to be US $880 million, which amounted to 97% of GDP in 2016. The rebuilding efforts remain ongoing. The Anguilla Programme is a five-year £60 million capital grant from the Government of the United Kingdom to rebuild Anguilla's critical public infrastructure with enhanced resilience. The pandemic has understandably caused delays with the rebuilding of Anguilla's infrastructure.

According to national accounts data, hotels and restaurants are estimated to have contributed 27% of total GDP in 2019. This is considered the best measure of the direct contribution of the tourism sector. The World Travel and Tourism Council separately estimates that tourism directly and indirectly contributes 37% of Anguilla's GDP. The Government of Anguilla further claims that the direct, indirect, and induced effects of tourism account for 80% of the country's GDP.[1]

The most recent labour force survey in 2011 found 29% of Anguilla's labour force to be employed in hotels and restaurants. This data estimates that 58% of jobs in hotels and restaurants were held by women in 2011. In non-tourism activity, 41% of jobs are held by women. The World Travel and Tourism Council estimates that 51% of jobs are directly and indirectly supported by the tourism sector. While this is likely an overstatement, it is likely that there significant numbers of informal jobs being indirectly supported by the tourism sector.

Anguilla's construction activity contributed 11% to GDP in 2019. Much of the rebuilding activities funded by the Anguilla Programme began in late 2019 and were intended to continue into 2021. Prior to this, there was significant construction activity in the private sector. In 2001, construction was identified as contributing approximately 15% of total employment. Agriculture, livestock, and fishing contribute only 1.7% of total GDP. In 2001, only 3% of total employment was supported by these primary economic activities.

Tourism is Anguilla's main foreign exchange generating industry. However, Anguilla benefits by being part of the foreign reserve-pooling mechanism of the Eastern Caribbean Currency Union (ECCU). Anguilla represents around 5% of the ECCU's total economic activity.

Beyond the economic and social dislocation, Anguilla's domestic financial system suffered significant damage in the aftermath of the global financial crisis of 2007/2008. Two indigenous banks became insolvent in 2013, forcing the Government of Anguilla to take on an additional EC$330.28 million of new debt. Two international commercial banks were significantly affected in Anguilla—one has closed its operations and one has been acquired by another commercial bank. While the Eastern Caribbean Currency Union (ECCU)—of which Anguilla is a part— has significant liquidity backed by the Eastern Caribbean Central Bank, the domestic commercial banking sector in Anguilla is fragile. The need for firms to access working capital financing during the pandemic might be hampered due to this fragility, meaning that a substantial number of liquidity-constrained firms might become insolvent. The possibility of significant business and consumer debt default puts the fragile banking system at risk. Some damage has already been done to the domestic economy. The COVID-19 pandemic has had further knock-on effects on the domestic economy beyond the current shutdown. Of significant note is the cancellation of the Anguilla Summer Festival 2020.

---

1 http://westindiacommittee.org/wp-content/uploads/2017/11/White-Paper-Anguilla-Hurricane-Irma-.pdf

FISCAL

The Government of Anguilla is constrained by the Fiscal Responsibility Act and the associated Framework for Fiscal Sustainability and Development. These impose borrowing limits on the Government and require:

- Net debt below 80% of recurrent revenue
- Debt service payments below 10% of recurrent revenue
- Liquid assets above 25% or 90 days of recurrent expenditure

Note that the Government is already in breach of these limits.

In 2018 the Government of Anguilla's total expenditure equalled USD $85 million, or 28.4% of GDP. Around 38% of its spending was directed to wages and salaries and interest payments were only 8% of total expenditure.

In 2018 the Government of Anguilla's total revenues totalled US$87 million. Of these revenues, 28% were collected from import duties and 14% from taxes on international trade and transactions. Income tax was only collected in the form of the Interim Stabilisation Levy and generated approximately 7% of total revenue. Property tax accounted for 3% of total revenue, levied at a rate of 0.075%. The Government's intention is to implement a services tax on hotel accommodation, electricity, communications and wholesalers by 2021, and expand it to all other services in 2023.

In 2018, Anguilla ran a budget surplus of 1.6% of GDP. Anguilla's debt was 60.3% of GDP in 2018. This increased substantially over the preceding three years from 23.9% in 2015, in part due to the need to recapitalise the indigenous commercial banking system in 2016. This process allowed the Government to retain its overdraft facility, as the National Commercial Bank of Anguilla was able to provide a US$7.2 million overdraft facility for the Government. The Government acquired a policy-based loan from the Caribbean Development Bank (CDB) of US $9.3 million in 2018. This loan was designed to assist Anguilla in implementing a reform programme geared towards fiscal sustainability and enhance resilience against natural disasters. This US $9.3 million was the first of three operations in a programmatic policy-based loan.

SOCIAL SECTOR

Anguilla's most recent survey of social data relies on the Country Poverty Assessment 2007/2009 where 23.5% of Anguilla's population were considered either poor or vulnerable. Of those considered poor, 97% were employed. Of the total female population 3.6% were considered poor, while 8.2% of the male population were considered poor. According to a 2017 UNICEF Assessment, children aged 0-17 accounted for 28% of the poor population and approximately 7.2% of Anguilla's children aged 0-17 lived in poverty.

The unemployment rate was estimated to be 13%. For women, the unemployment rate was lower at 6% versus 19% for men. However, the participation rate among women was significantly lower at 70% versus 78% for men. The low participation rate is in large part driven by family care responsibilities: the 2011 Census found that 543 women were engaged in home duties, compared to only 125 men.

Table 1: Poverty and Vulnerability			
	Threshold (EC$ per year)	Percent of population	Number of people
Poverty	16,348	5.8	876
Vulnerability	20,484	17.7	2,673
Total	**36,832**	**23.5**	**3,549**

Source: Country Poverty Assessment Anguilla 2007/2009. Note that this table uses the Assessment's final population headcount of 15,104

To address poverty alleviation, Anguilla's Public Assistance Programme targets "indigent persons" and provides a monthly grant of between EC$400 and EC$1000. There is no clear objective targeting criteria. Each applicant is assessed by the Social Protection Board guided by the Social Protection Act 2015. To qualify for Public Assistance an individual completes a Public Assistance form, then is assigned a social worker who conducts a home-visit and a financial check at all the banks and the Lands and Surveys Department.

The Social Protection Board then determines whether the individual qualifies for public assistance and the size of the cash grant. As of the 2007 Country Poverty Assessment, there were no individuals considered "indigent" in Anguilla. At present there are 87 persons on the Public Assistance list. Of the 87 recipient households on the Public Assistance list, 33 are recipients with children. Those 33 households cater to 77 children. These payments are typically made by bank transfer. Part or all of this assistance might be given in the form of food vouchers if it is believed that the individuals are not in a position to spend these benefits efficiently. This is a total outlay of EC $45,100 per month, or EC $541,200 per year. This is 1.1% of the Ministry of Social Development and its departments' budget of EC $47.4 million for 2020/21. It represents 0.22% of the Government of Anguilla's total recurrent expenditure budget for 2020/21.

Education in Anguilla is compulsory between the ages of 5 and 17 and is provided free by the Government of Anguilla. Universal access to early childhood education, covering children ages 0-4 years old, is still a work in progress. The Department of Education's most recent report in 2016/17 identifies 415 students across 10 preschools with 12 children per teacher. There are 1,548 students across 8 primary schools (two of which are private) with 18 students per teacher. There is one secondary school spread across 2 main campuses and three alternative campuses with 1,281 students and a student-teacher ratio of 12 to 1. In 2007, 21% of the poorest households were unable to purchase all textbooks required for school. Approximately 82% of individuals were estimated to have internet access in 2016.[2]

---

[2]International Telecommunication Union (2019)

SOCIAL SECTOR CONT'D

Anguilla has one main hospital—the Princess Alexandra Hospital—and three public health clinics. These are overseen by a state-owned enterprise, the Health Authority of Anguilla, and are being upgraded in the aftermath of Hurricane Irma. There are at least two main private clinics. There is no universal healthcare and there is no national health insurance scheme. Through the Department of Social Development and the Ministry of Health and Social Development, the Government of Anguilla provides means-tested medical aid for vulnerable individuals. This can take the form of subsidising 25% to 100% of medical fees or covering care and treatment for these individuals locally or internationally.

Relative to other countries, Anguilla has a low age-dependency ratio. In the 2011 census, there were 4,206 individuals under 15 or over 64. Compared to the working-age population of 9,349, the age dependency ratio was 45%. This was the 199th-highest in the world in 2011. This is likely due, in large part, to the substantial portion of the immigrant workforce living in Anguilla. In the 2007/2009 Country Poverty Assessment, 15% of the population were estimated to be non-nationals.

CHANNELS OF TRANSMISSION

EXTERNAL

Anguilla's main tourism source market is the United States. Around two-thirds of its overnight arrivals and half of its excursionist arrivals in 2019 were from the United States. The IMF expects US GDP to decline by almost 6% in 2020, rebounding by only 4.7 in 2021.

This suggests there will be some permanent loss. Given tourism's status as a luxury service, it might imply lower tourism activity post-pandemic than immediately pre-pandemic.

Table 2: Visitor Arrivals by Source Market and Contribution to GDP				
Market	Arrivals	Share	GDP growth 2020 (%)	GDP growth 2021 (%)
USA	63,236	66%	-5.9	4.7
Canada	4,113	4%	-6.2	4.2
U.K.	4,077	4%	-6.5	4.0
Europe	6,622	7%	-7.5	4.7
Caribbean	13,452	14%	-2.8	4
Other	3,875	4%		
Total	95,375	100%		

Source: Government of Anguilla.
GDP growth predictions are from the IMF's World Economic Outlook April 2020
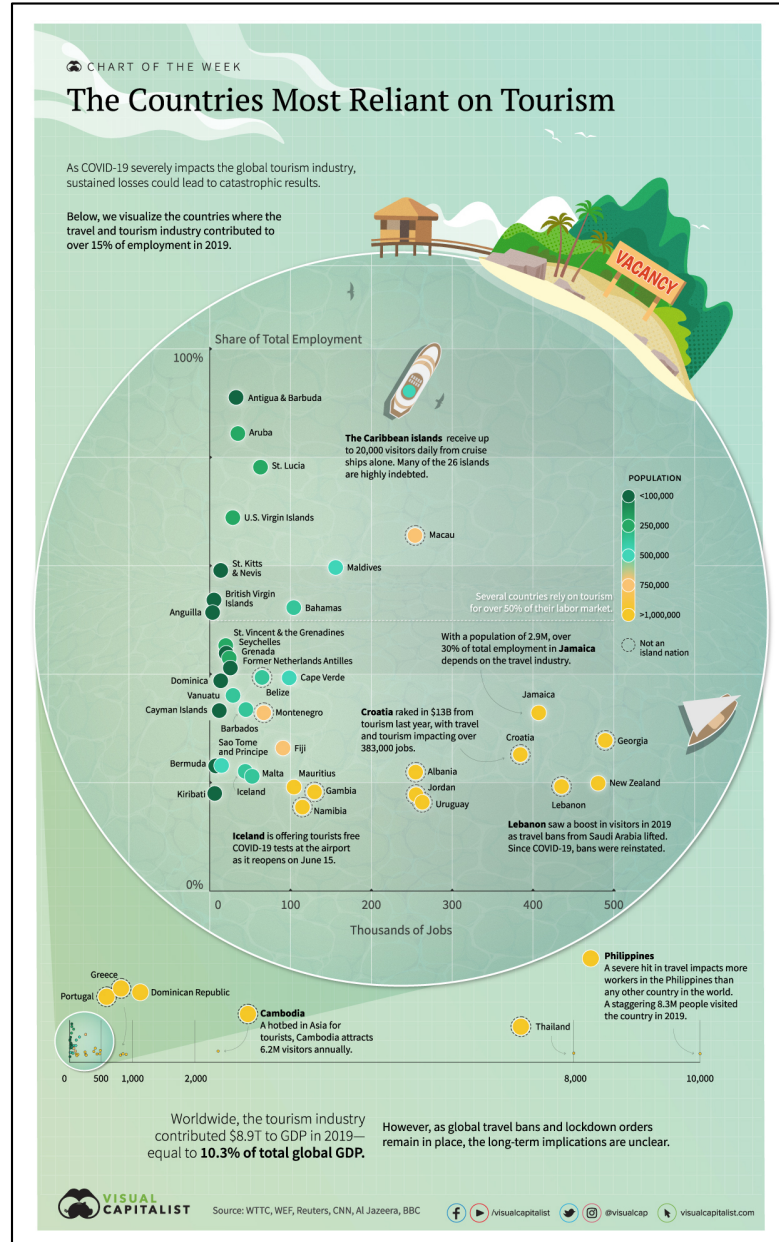
While the limited spread of COVID-19 means that the Government will soon be thinking about reopening the domestic economy, it is likely that the tourism sector will remain closed in the medium term. This is the central risk that COVID-19 poses to the Anguillan economy over the coming 3 to 6 months in the first instance. The Government of Anguilla has said that the borders are unlikely to reopen before the end of May 2020.

The main mechanism through which the expected short-run decline in tourism activity will affect Anguilla is unemployment. Given that around one-quarter of Anguilla's labour force is attached to the tourism sector, there is expected to be significant unemployment until tourism activity rebounds. Anguilla's agriculture and fishing output is limited. In 2017, it accounted for 3% of GDP, with two-thirds of that output generated by the fishing industry. Agriculture is likely to continue to be limited, given the soil composition of the island and high water rates. There appears to be little domestic buffer against shocks to the global supply chain.

Remittances to Anguilla averaged US$2.7 million between 2015 and 2018.[3] This is approximately 1 percent of Anguilla's GDP. Remittances benefit mostly those in the vulnerable range of the population. Around 20% of those in the second quintile of the income distribution reported that they received remittance income. In the aftermath of Hurricane Irma, there was no observable increase in inward remittances. It suggests first that we should not expect an increase in remittances to offset the damage of COVID-19. Expectations of a decline in world GDP in 2020 suggests that instead there might be a significant decline in remittances.

---

[3]IMF Balance of Payments and International Investment Position Statistics (BOP/IIP)

DOMESTIC

Anguilla's early closure of its international borders limited the spread of the COVID-19 virus. The Government of Anguilla shut the airport and seaport to passenger traffic on March 18. On March 27, the Ministry of Health introduced measures to restrict public gatherings and movement of people. Non-essential workers were allowed to leave their residences only to visit the doctor or pharmacy, to buy food or fuel, to make use of banking services, to exercise for no more than 90 minutes per day, or to attend funerals and weddings. The Ministry of Home Affairs and Education partially reopened schools on May 11, 2020. The eventual reopening of the domestic economy will depend on public health advice.

While the eventual reopening of the broader economy depends on public health advice, this gives a tentative indication as to the possible reopening of the domestic economy. Without the tourism sector, this means that Anguilla's economy will principally be dependent on what happens in the non-traded, domestic sectors.

CHART OF THE WEEK

The Countries Most Reliant on Tourism

As COVID-19 severely impacts the global tourism industry, sustained losses could lead to catastrophic results.

Below, we visualize the countries where the travel and tourism industry contributed to over 15% of employment in 2019.

IMPACT

MACROECONOMIC

The IMF's baseline scenario assumes that the COVID-19 pandemic fades globally during the second half of 2020, and allows the global economy to unwind the restrictions on economic activity. The prediction envisages a 3% contraction in global economic activity during 2020 and a 5.8% recovery in 2021.

To augment this baseline forecast, we consider a range of scenarios using a simple SIR-Macro model. The model has four phases, defined in weeks, which identify the various stages of the pandemic and the economic closures that are intended to limit the spread of COVID-19. These phases are:

1. The pre-COVID-19 period where the economy operates without effect. This period lasts from 1 January 2020 to 3 March 2020.

2. COVID-19 first reaches the country and the infection spreads. This period ends on 28 March, 2020.

3. The country shuts the tourism sector, and the domestic economy works remotely—all except essential workers. We assume that some workers are high-flexibility workers who are 80% productive at home, while there are low-flexibility workers who are 50% productive at home. Tourism workers become unemployed. The effect of this shutdown slows the spread of COVID-19.

4. The post-COVID-19 period, which comprises two sub-phases: first the domestic economy reopens; second, the tourism sector reopens, likely at a later date.

Since we already know the lengths of the first two periods, our scenarios consider different dates for the reopening of the domestic economy. The data and parameters used for this simulation are included in the Technical Appendix.

Table 3: Macroeconomic Projections for Different Reopening Scenarios

	8-Week Lockdown		8-Week Lockdown		8-Week Lockdown		8-Week Lockdown		24-Week Lockdown	
	Tourism restarts immediately		Tourism restarts in August		Tourism restarts November		Tourism does not restarts untill 2022		Tourism does not restarts untill 2022	
	2020	2021	2020	2021	2020	2021	2020	2021	2020	2021
GDP Growth	-11%	+11%	-20%	+20%	-25%	+28%	-30%	-3%	-34%	+1%
Consumption	-3%	+5%	-7%	14%	-14%	22%	-19%	-8%	-24%	-3%
Unemployment	18%	14%	27%	16%	34%	17%	39%	46%	39%	46%

Source: Author's calculations. GDP and consumption are measured in real terms. The baseline unemployment rate is 13% and is measured as an average unemployment rate for the full year. The immediate tourism restart scenario assumes that tourism restarts on May 15, 2020.

MACROECONOMIC CONT'D

The two central impacts of the COVID-19 pandemic on the macroeconomy stem from the lockdown of the domestic economy and the lockdown of the tourism sector. The tourism sector directly accounts for around a quarter of Anguilla's economic activity. In the short-run the effects are obvious: tourism workers become unemployed and do not produce output; the domestic economy operates at a severely restricted rate.

The first main mechanism through which these shutdowns damage the economy in the medium term is the closure of businesses. The longer the shutdown lasts, the more likely these firms will become insolvent—both in the tourism and non-tourism sectors. This means that there is scarring from the recession, since not all tourism firms reopen after COVID-19 has passed, leaving the final level of output lower.

The second main mechanism through which the shutdowns damage the domestic economy is the effect of tourism closure on demand for non-tourism goods and services. Based on the September 2001 terrorist attacks which represented an external shock, we estimate that a 1% decline in tourism activity over a two-year period is associated with a 0.41% decline in non-tourism activity. The closure of the tourism sector has repercussions for domestic firms because of the deep decline in domestic demand. Some of the domestic firms will become insolvent because of the "second-hand" effect from the shutdown of the tourism sector.

The worst-case scenario we consider is that the shutdown of the domestic economy lasts for 24 weeks and tourism activity does not restart within the forecast period (until the end of 2021). This would lead to a 34% decline in economic activity in 2020, with an insignificant recovery in 2021. Unemployment levels would be expected to reach up to 46%.

The best-case scenario we consider is that the shutdown of the domestic economy ends on 15 May 2020, at which time the tourism sector is able to reopen. This is an unlikely scenario, but presents us with an idea of the damage that has already been done to the Anguillan economy. In this case, real GDP is predicted to decline by 11% in 2020 and recover by 11% in 2021. Because this model includes an epidemiological component, reopening the tourism sector immediately leaves Anguilla at risk of a return of the virus. In this scenario, we observe an additional mechanism affecting the economy—there would be significant infection, reducing the size of the labour force and limiting output until at least October 2020. Unemployment rates would increase up to around 18% on average, and return close to baseline at 14% in 2021.

The more likely scenarios are that tourism activity reopens in August or November 2020. These involve significant closures in the tourism sector. If tourism reopens in August, we predict that around 5% of tourism jobs are permanently destroyed, while a November reopening predicts that around 8% of tourism jobs are permanently destroyed. An August reopening of tourism is predicted to lead to a 20% decline in GDP in 2020, with a 20% recovery in 2021. This passes through to a 27% unemployment rate in 2020, and a 16% unemployment rate in 2021. A November reopening of tourism is predicted to lead to a 25% decline in GDP in 2020, and a 28% recovery in 2021. The unemployment rate is predicted to average 34% in 2020 and 17% in 2021.

MACROECONOMIC CONT'D

We consider a final scenario: one where the Anguilla economy reopens in May but operates without tourism until the end of the forecast period. This is quasi-autarky. The impact of closing the tourism sector is large, even while the domestic economy remains open. The model predicts that GDP would decline by 30% in 2020, and recover by 3% in 2021. Without a significant rearrangement of the domestic economy, unemployment rates would remain high. This scenario stems from the possibility that the international community does not get the COVID-19 virus under control, as might occur if immunity from COVID-19 lasts for a short period.

The GDP forecasts for the last two scenarios in Table 3 where there is no tourism in 2020 diverge by around 4 percentage points. This divergence is the effect of the additional domestic lockdown of around 16 weeks. Intuitively one might think this should lead to a larger decline. However, we assume that a significant portion of the population continues to work, especially essential services and high-flexibility workers (albeit at somewhat reduced productivity levels). The greater the portion of the population employed in essential services and high-flexibility jobs, the smaller the divergence between these two scenarios and the lower the expected fallout from marginal increases in the domestic lockdown period.

FISCAL

The analysis of the fiscal fallout relies on the two central scenarios: reopening tourism in August 2020 and in November 2020. Given the decline in GDP expected under these scenarios, we project that revenue could fall between EC$55 million (22.4%) and EC$66 million (27%) due to dampened demand, job losses, business closures and the absence of the tourism sector. The bulk of the decline is likely to come as a result of a fall in tax revenue. Taxes on domestic goods and services are projected to fall between EC$22 million and EC$23 million, taxes on international trade and transactions are projected to fall between EC$7.5 million and EC$12 million. Licenses are projected to fall between EC$6.6 million and $7.3 million.

The Premier in the April 2020 budget address indicated that they expect revenue to fall by anywhere between 12% and 44% due to the pandemic—which equates to losing around EC$100 million in revenue at the upper bound. The upper bound appears to be an extreme scenario and indicates the potential decline if COVID-19 inhibits the return of tourism and domestic demand.

FISCAL CONT'D

Table 4: Fiscal Projections for Different Reopening Scenarios				
$ECM	Actuals 2018	Estimates 2019	8-Week Lockdown Tourism in August 2020	8-Week Lockdown Tourism in November 2020
Total Revenue	**233.80**	**250.75**	190.69	179.48
Tax Recurrent Revenue	**199.58**	**234.09**	161.52	152.03
Total Tax Revenue	**163.50**	**197.77**	132.35	124.58
Taxes on Property	6.42	8.46	5.20	4.89
Taxes on income	15.52	16.81	13.81	13.35
Taxes on International Trade and Transactions	96.17	98.41	77.84	73.27
Taxes on Domestic Goods and Services	29.57	57.19	23.94	22.54
License	15.81	16.89	9.96	9.38
Total Non-Tax Revenue	**36.09**	**36.32**		**27.45**
Total Expenditure	**230.10**	**222.26**	227.63	227.63
Recurrent Expenditure			213.22	213.22
Personal Emoluments	**87.50**	**84.24**	88.01	88.01
Retiring Benefits	**10.07**	**9.37**	10.07	10.07
Interest Payments	**19.13**	**18.78**	18.63	18.63
Goods and Services	**42.13**	**49.46**	42.33	42.33
Current Transfers	**46.86**	**50.33**	54.18	54.18
Total Capital Expenditure	**24.41**	**10.09**	14.41	14.41
Fiscal Balance	**3.70**	**28.49**	-36.94	-48.15
Primary Balance	**22.83**	**47.27**	-18.31	-29.52
Fiscal Balance (%GDP)	0.4%	2.9%	-4.7%	-6.6%
Primary Balance (%GDP)	2.3%	4.9%	-2.3%	-4.0%

FISCAL CONT'D

It is expected that expenditure will also be affected by the pandemic. The Government has some non-discretionary expenditure, more specifically, personal emoluments, retirement benefits, interest payment and certain transfers. This rigidity will limit the amount that can be cut from total expenditure. Additionally, the Government has announced some initiatives to combat the pandemic that will require increased expenditure. The measures mentioned are mainly increased transfers to individuals to supplement the loss of income and to protect those most vulnerable. It is estimated that these measures will equate to an EC$7.2 million increase in current transfers. The 2020 budget address highlighted the need for expenditure containment given the potential loss in revenue. Even though the Government will increase outlays on quarantine facilities and medical supplies, it is expected that savings will come as a result of fewer goods and services and reduced capital expenditure as the lockdown should impact goods and services used and capital projects.

The savings assumed is EC$8 million, and with the ECCB lowering the interest rate on outstanding loans a further EC$500,000 is likely to be saved.

The outcome of the estimates for revenue and expenditure suggest a fiscal deficit of between EC$37 million and EC$48 million and a primary deficit of between EC$18.3 million and EC$29.5 million. This size deficit plus planned amortization would require financing of around EC$80 million. This Government of Anguilla is prohibited to borrow more than 80% of recurrent revenue, however the current debt levels are already beyond this, suggesting that raising debt in dire situations is possible. Divestment of state assets may also provide cash flow support, reducing the amount the Government would need to borrow, though this should be considered in the context of the country's development objectives.

SOCIAL

Our model includes predictions for different categories of workers. We simulate the effects on the four categories of workers outlined: tourism, non-essential high-flexibility workers, non-essential low-flexibility workers, and essential workers. Tourism workers are likely to be the most affected by the COVID-19 pandemic.

The longer that the tourism industry remains closed, the greater the financial set-backs these workers and their households will face. This likely implies an increasing proportion of the population falling below the poverty line, as workers, families, women and children in households face multi-faceted deprivations such as access to continued and quality education, income loss, and nutrition and health impacts.

Table 5: Percentage Change in Incomes by Industry

	8-Week Lockdown	8-Week Lockdown	8-Week Lockdown	8-Week Lockdown	24-Week Lockdown
	Tourism restarts immediately	Tourism restarts in August	Tourism restarts in November	Tourism does not restarts until 2022	Tourism does not restart until 2022
Sector	2020	2020	2020	2020	2020
Tourism	-8%	-34%	-56%	-65%	-65%
Non-Essential High-Flexibility	-5%	-6%	-7%	-11%	-15%
Non-Essential High-Flexibility	-21%	-10%	-11%	-14%	-27%
Essential	-2%	-2%	-1%	-1%	-1%

Source: Author's calculations.

SOCIAL CONT'D

In the model, we account for the Anguilla Social Security Board's policy response—to provide three months payments of EC $1000 per month to unemployed workers. In the first instance, if this social protection programme is designed for a short-term period, then it will be unable to stabilise workers' incomes—particularly those in the tourism industry. The decline in incomes in the tourism industry are likely to be in the range of -34% to -56% for the most likely scenarios that tourism reopens between August to November 2020.

If tourism does not restart in 2020, then tourism workers are likely to lose around 65% of their incomes in 2020. Given that around 60% of Anguilla's tourism workers are expected to be women, this decline in tourism activity will have a disproportionate effect on women and worse, for those caring and providing for children. In 2001, tourism accounted for around 37% of the jobs held by women. Around 18% of the poorest fifth of Anguilla's population were employed directly in the tourism sector in 2007. A further 24% of the second-poorest fifth of Anguilla's population were reported to be employed in the tourism sector. This suggests that tourism workers were particularly vulnerable before the onset of COVID-19.

Given that Anguilla's tourism sector had already been damaged by Hurricane Irma, there is likely a substantial portion of these workers who will fall into poverty. Given that around 28% of employment is in the tourism industry, and around 18% are likely to be vulnerable, then a 34% to 56% negative shock to tourism income will likely increase the poverty rate by around 5 percentage points. While women are underrepresented in poverty in Anguilla, they are overrepresented in the tourism sector, suggesting that around 3 percentage points of that increase will be due to women falling into poverty.

As of the 2011 Census, there were 13,572 individuals living in Anguilla. As of 2009, it was estimated that 5.8% of the population were under the poverty line. This puts approximately 790 individuals in poverty. At present the Public Assistance Programme covers only 87 households of which 33 households contain 77 children.

If a further 18% of the population were estimated to be vulnerable in 2009, then this puts a further 2,400 individuals at risk of falling into poverty due to the COVID-19 pandemic.

Poor households in Anguilla were reported to have an average of 4 children per household in 2007. Vulnerable households had 5 children per household on average. This suggests that the COVID-19 crisis, by disproportionately affecting poor households will disproportionately affect children. If more than a quarter of vulnerable households work in tourism, then the pandemic's effect on tourism is likely to increase the child poverty rate from 5.7% to almost 10%.

Prior to the onset of the pandemic, schools in Anguilla had not yet returned to normal after the damage of Hurricane Irma. The secondary school was operating on a shift system, meaning that students were already operating with reduced teaching time. We know that non-school factors play an important role in exacerbating educational inequalities between students, shown by the fact that educational inequalities between students from high-income and low-income backgrounds widen during summer holidays.[4] The longer the school closures, the more severe the learning consequences. The COVID-19 pandemic exacerbates the severe cracks in the existing education system created by Hurricane Irma.

As part of the response to COVID-19, and expansion through the social assistance programme, the Government of Anguilla has put measures in place to provide a top-up cash assistance through a vertical expansion of the Public Assistance Programme (PAP). This extends to children in foster care as well as to those children under the school feeding programme. The cash assistance targets a total of 87 families of which 33 are households with 77 children, for 1 month from the PAP; 20 children in the Foster Care for 3 months; and 65 children in school feeding programme for 3 months. Cash transfer value for the PAP varies, while foster care children receive EC $400 per child, and $EC 200 per child, per month under the school feeding programme.

[4]Alexander, K.L., Entwisle, D.R. and Olson, L.S., 2007. Lasting consequences of the summer learning gap. *American sociological review*, *72*(2), pp.167-180.

SOCIAL CONT'D

Women's entrenched vulnerability to poverty in Anguilla is exacerbated by incidents of natural disaster. Women are often seen as caretakers, and thus are the main or sole providers of care to children, the elderly and the unwell. Additionally, the financial fallout from the COVID-19 pandemic may fall disproportionately on women due to their overrepresentation in the tourism sector. Evidence suggests pre-existing incidences of intimate partner violence—there were 129 reported events of domestic violence in 2019 according to the Royal Anguilla Police Force. Further increased financial reliance on employed partners could increase domestic tension due to financial difficulties. This tension coupled with the imposed curfew increasing the proximity of abusers to their victims could increase the likelihood of intimate partner violence. As of April, there were 35 reported events for 2020—close to the number of 37 for the period January to June 2019.

There is no clear data on informal workers or the informal economy. However, it is acknowledged that each significant economic shock increases the number of workers in the informal economy.

The global financial crisis, the major shocks to the banking sector, Hurricane Irma, and now the COVID-19 crisis will continue to increase the share of workers not participating in formal employment. Shocks to formal economic activity typically limit the availability of opportunities for workers to earn an income. This increases the attractiveness of informal economic activity. This is a perverse response, since these are the workers who are most vulnerable during a shock. As part of the Government response, adaptation of social protection programmes includes expansion of social security schemes, led by 1) the Social Security Board, 2) the Department of Labour and the Ministry of Finance through the introduction of an unemployment or underemployment assistance benefit. Both will target not only formal employment but also informal workers. Conditions for informal workers to receive the unemployment benefit include registering with the Anguilla Social Security Board as a contributor. A national target to reach 3500 unemployed and underemployed workers has been set by the Government.

RECOMMENDATIONS

The Government of Anguilla has taken a series of policy responses, including direct support for employees and self-employed persons through unemployment benefits. This support extends to those who have not contributed to Social Security or who have contributed to Social Security for less than the required number of weeks, providing they can demonstrate that they became unemployed, as a result of COVID-19 and are earning less than EC$800 a month.

Approved non-contributory unemployed persons will receive payments of EC$ 800 for the period during which they remain unemployed if their previous monthly earnings were EC$ 800 or more. Persons who earned less than EC$ 800 before the pandemic will receive a benefit equivalent to their pre-pandemic income.

RESPONSE AND RELIEF

The response and relief phase is the period during which immediate interventions are necessary to mitigate as much as possible the impact on people, communities and businesses. These actions are undertaken in the short-term and are designed to ensure continued access to basic human rights and freedoms.

Improve social protection coverage

The use of social protection system to respond and adapt to shocks is global good practice during this COVID-19 pandemic. Current coverage of the poor and persons vulnerable to poverty has yet to cover 600 persons before the pandemic. Based on the modelled impact of COVID-19, it is estimated more than 2,400 persons will fall into poverty. Relaxing the selection criteria of those poor and vulnerable should be considered to allow for limited administrative effort to increase coverage of social assistance and social transfer programmes—including those students under the school feeding programmes. Provision of cash to recipients including children and women, should be adequate and timely, guided by per capita household expenditure figures. Piggy-backing on the social insurance unemployment relief is another consideration to increase coverage where administration procedures could be streamlined to identify female informal workers caring for children.

Both social assistance and social insurance schemes coverage should speak to each other to ensure maximum coverage of persons in Anguilla and decrease any overlaps. In 2007 the poverty line was estimated at approximately EC$1,360 per month per adult. This suggests that these payments fall short of lifting individuals out of poverty, and would perform worse where an adult is responsible for dependents.

A full rapid assessment of the solvency of the Fund will need to be undertaken to determine the extent to which these benefits can be extended beyond the current planned period to both current recipients and those who will become unemployed. The assessment will need to take account of the short-term needs as well as those in the medium-term and provide meaningful ways to finance the required expansions.

RESPONSE AND RELIEF CONT'D

Provide liquidity for small firms

Given the fragility of the commercial banking sector, any significant defaults would put financial stability at risk. The longer the lockdown lasts, the more pressing the need to provide tourism-related firms with liquidity. While the Government of Anguilla has already taken on significant debt to save the financial system, it must act again to minimise long-run damage to firms and therefore to the financial system.

Micro, small and medium-sized enterprises (MSMEs) typically have limited access to credit and will likely be especially credit constrained during the COVID-19 pandemic. It is the firms at the margin—those most likely to fail— which require assistance. In contrast, the commercial banks' incentives will mean that firms least likely to fail are those who will receive priority funding. A Government intervention is needed to prevent significant failure of MSMEs. **A Government guarantee scheme can be used to backstop MSMEs through the crisis. The aim is for them to be able to cover fixed costs until business activity in their sector reopens.**

At present, the Government of Anguilla has indicated a desire to provide low-cost loans to small businesses through the Anguilla Development Board. It is unclear what the size, restrictions, or interest rate on these loans will be. In addition, businesses will be assessed based on the tax record as an operating business

Expand the School Feeding Programme to cover newly poor students in all schools

Currently, the School Feeding Programme covers only 2 schools. Students outside of these schools do not typically have access to the benefits of the School Feeding Programme. The Government of Anguilla should first **identify students who would now be eligible to benefit from the School Feeding Programme.**

The cash benefit implemented during the COVID-19 shutdown which replaces school feeding would then be extended to these additional students. The cash benefit totals EC $200 per month per child.

Fund the short-run increase in expenditure using a temporary increase in the Interim Stabilisation Levy

The effects of the COVID-19 pandemic are very unevenly distributed. To protect public health, some have lost their jobs while others continue to work. The Government has acted to provide social protection for those who have become unemployed. However, with limited fiscal space and few options for financing, the Government of Anguilla will need to fund these social expenditures in the short-run. The principle of equity suggests that those who continue to generate stable incomes during the COVID-19 pandemic should shoulder the majority of the burden of providing for those who have lost their incomes. Consumption taxes do not achieve this redistribution of the burden of the COVID-19 pandemic—they impose the burden un-equally across the population. Instead, a payroll tax levies the burden of the pandemic on those whose incomes remain stable, providing funds to support social programmes. **The Interim Stabilisation Levy collected EC$16.50 million in 2019 at a rate of 6% of income—contributed equally by employers and employees. While we expect income from this to decline, an increase in the contribution rate would provide significant equitable budget support in the short run**.

RESPONSE AND RELIEF CONT'D

Make available low-cost options for internet access

The COVID-19 pandemic has highlighted the critical role of technology, and in particular the internet. There remain inequalities in the access to the internet in Anguilla.

The internet is a critical tool for access to learning, jobs, entrepreneurship, ideas, markets, finance, and even to social protection. It should therefore be treated as a basic right, and regulated as a utility. Internet service providers can be engaged to provide low-cost, low-speed options. This expands their customer base while improving the livelihoods of the most vulnerable in society. Further, it limits the problem of educational inequalities due to moving to online learning by broadening access to the internet for children in poverty.

Establish a shelter for women victims of gender-based violence

Emerging global data shows that since the outbreak of COVID-19, gender-based violence and particularly domestic violence has intensified. This increase is also likely to be mirrored in Anguilla as security and money worries heighten following the closure of the tourism sector, accentuated by confined living conditions and restricted movement. The Government of Anguilla passed the Domestic Violence Bill in 2017, which provides protections for victims. **However, to ensure the safety of women, there is the need for a safe haven for women who experience gender-based violence. As a short-term solution, Government could seek to partner with hotels and temporarily use their facilities which currently are at low or no occupancy for this purpose. This model is currently being used in France where shelters have exceeded capacity and other Caribbean countries are exploring the use of similar alternative accommodations. This would require specialised staff for temporary shelters.**

Epidemiological Analysis for Reopening

Any meaningful assessment of the country's future economic prospects should be done in relation to an epidemiological strategy. The aim is to allow for an initial opening of the economy while upholding the health and protection of citizens along the process. This is in the spirit of preserving both people's health and livelihoods. The main epidemiological considerations should be:

1. Managing COVID-19 importation risks

2. Implementing risk mitigation measures at the workplace and in the journey to the workplace which are adequate to the level of risk and contact that each worker has.

3. Reducing the number of contacts at community level, via the use of protective equipment and physical distancing measures

The measures taken through the reopening of the economy need to be accompanied by very strong surveillance for coronavirus disease. Assuming the possibility of there being some asymptomatic cases undetected in the community, diminishing the potential contagious contacts that people have should be a priority for the economic reopening. The number of people whom each person could infect once the economy reopens should be restricted to as few as possible. With this in mind, Anguilla may **consider producing a re-opening plan that considers strategic economic objectives in the context of COVID-19 surveillance and control strategies, planning for different scenarios depending on the evolution of the pandemic. One must go hand in hand with the other.**

RECOVERY AND RESILIENCE

The recovery and resilience phase is the next stage in the process, and represents the transition from the critical response and relief phase to medium and long–term interventions that help people rebuild their lives.

Implement a permanent unemployment benefit fund

It is clear that the Government of Anguilla recognises the importance of providing social protection during major shocks. It is also clear that Anguilla is particularly vulnerable to major shocks, having experienced three major economic shocks in just over a decade. After Hurricane Irma, the Anguilla Social Security Board established a Temporary Unemployment Assistance Benefit for eligible individuals. The Government of Anguilla has implemented a repeat in the wake of the COVID-19 shutdown. It is imperative that Anguilla prepare themselves for future major shocks through the creation of a permanent unemployment fund.

The Anguilla Social Security Board (ASSB) requires a contribution of 10% of a worker's income. The employer is entitled to deduct 5% of a worker's salary, and is to contribute the remaining 5% themselves. **A small increase in the contributions can substantially fund a permanent unemployment benefit fund that would limit the need for Government intervention during major economic shocks.**

At present, the ASSB reports that it has 8,000 active workers under its insurance. A permanent unemployment benefit would be called on to make small payouts during normal times, particularly given the low rate of unemployment Anguilla is estimated to have during normal times. However, in the aftermath of Hurricane Irma, up to 10% of tourism sector employees were estimated to have been unemployed. This fund would be an automatic stabiliser during significant shocks.

Improve coverage and targeting for the Public Assistance Programme as part of investment to strengthen social protections system to be child- and shock-responsive

The current Public Assistance Programme is not easily scalable and does not respond to the needs of the country during shocks. The Programme involves significant discretion during the decisionmaking process. Additionally, it is a three-stage process, which involves substantial administration procedures including the management of recipients' profile and information and review of each application received. One of the selection criteria weighing heavily is an individual having a family to provide for or others who can take care of them, which is one-dimensional view of poverty. National monetary and multi-dimensional measurement of poverty should be used to inform targeting mechanisms and strengthen programme design of the PAP.

Lessons from the COVID-19 response and the use of social protection programmes to expand and scale up assistance should be institutionalized to shape up refinement, objectives, design and implementation of the PAP. In addition, strong considerations should be taken for informal workers who may not be registered by social insurance and absorb them into social assistance programmes in the event of significant shocks as they would automatically fall into poverty.

RECOVERY AND RESILIENCE CONT'D

Amend the Anguilla Framework for Fiscal Sustainability and Development to account for national crises.

The need for flexibility of fiscal rules during national crisis should be explicitly made part of the Anguilla Framework for Fiscal Sustainability and Development. For example, Annex D of the current Framework acknowledges the impact of the global financial crisis on the Government's budget:

• Allowing the Government to temporarily breach the borrowing limits on net debt, debt service, and liquid assets

• Sets less strict intermediate limits on net debt, debt service, and liquid assets

• Requires a return to the original borrowing limits on net debt, debt service, and liquid assets within a specified time frame.

This example should be generalised to account for different types of national crises which require significant Government outlays to protect the people of Anguilla. Criteria for the relaxation of the rules should be discrete, so that it kicks in when there is a significant shock rather than regular business cycle fluctuations. For example, declines in GDP of greater than 10% in a single year might be considered an appropriate definition of a significant economic shock. This protects the integrity of these fiscal rules while providing the flexibility to ensure that the Government has fiscal space to respond in the event of severe economic crises.

Ensure the implementation of the proposed services tax.

In order to return to fiscal and debt sustainability, the Government of Anguilla will need to ensure that the proposed services taxes are implemented in 2021 and expanded in 2023. In combination with the already-implemented Interim Good Tax and the Excise Tax, these can aid in returning the Anguillan debt to sustainable levels after the COVID-19 pandemic has passed.

Annex

COVID-19
The Model

June 3, 2020

Drawing from Eichenbaum et al. (2020) and Kaplan et al. (2020): combination of SIR and macro model to evaluate policy options in small open economies highly reliant on tourism.

SIR Model

SIR model for the epidemiological side. For sectors $i = (T, H, L, E)$ define

$$\text{Susceptible:} \quad S_{t+1}^i = S_t^i - T_t^i \tag{1}$$

$$\text{Infected:} \quad I_{t+1}^i = I_t^i + T_t^i - (\gamma + \mu) \cdot I_t^i \tag{2}$$

$$\text{Recovered:} \quad R_{t+1}^i = R_t^i + \gamma \cdot I_t^i \tag{3}$$

$$\text{Deceased:} \quad D_{t+1}^i = D_t^i + \mu \cdot I_t^i \tag{4}$$

$$\text{New infected:} \quad T_t^i = \beta \cdot (1 + \delta)^m \cdot (1 + \alpha^i \cdot \delta) \cdot S_t^i \cdot \sum_i I_t^i \tag{5}$$

$$\text{Population:} \quad Pop_{t+1} = Pop_0 - \sum_i D_t^i \tag{6}$$

with γ recovery rate, μ death rate, β infection rate, δ extra exposure from market work (instead of remote work or the sector being shut), m number of sectors working market, and α^i sector-specific weight.

The infection rate β is a function of public and health policy, for example strictness of quarantine rules, how well informed the public is about preventive measures, etc. The infection rate β is augmented by a factor δ for every sector that is open and operating normally (i.e. market), with $\delta \in [0, 1]$ infection risk from in-person interaction at work and m number of sectors operating as normal (market). The effect is multiplicative: if more sectors are operating normally then the risk of infection increases exponentially. The sector-specific weight α^i captures the increased (decreased) chances of being infected if working market

(remote).

$$
\alpha^i = \begin{cases} 0 & \text{if } m = 0 \text{ or } m = 4 \\ +\dfrac{1}{m} & \text{if } 0 < m < 4 \text{ and market} \\ -\dfrac{1}{4-m} & \text{if } 0 < m < 4 \text{ and remote/shut} \end{cases} \tag{7}
$$

Working market implies more in-person interactions and therefore a higher risk of infection. Working remote, by greatly limiting in-person interactions, decreases the risk of infection. For simplicity we assume that the extent of exposure and risk of infection is the same for all those working market, regardless of their job or sector.

Macro Model

In real terms (i.e. no prices). Three types of agents: households, firms, government. Households consume all disposable income and supply labour inelastically. Firms can belong to four sectors: tourism $(i = T)$, high flexibility $(i = H)$, low flexibility $(i = L)$, or essential $(i = E)$. High flex is for example software engineering, low flex is restaurants, essential is pharmacies. Generally sectors can either work market (i.e. regular work), work remotely (i.e. telecommuting), or be shut. If they work remotely they will be $\phi^i \in [0, 1]$ as productive as working market. If they are shut they will not produce. Unless shut, firms produce final goods Y^i using labour and technology (we do not consider capital). Finally, the government pays unemployment benefits and transfers to households, subsidies to firms, collects income tax from the first and corporate tax from the second.

Phases

The model has four phases, which we define in periods of weeks.

1. **First phase:** pre-COVID-19 period where the economy operates without effect.

2. **Second phase:** COVID-19 first reaches the country and the infection spreads uncontrolled.

3. **Third phase:** the country shuts the tourism sector and the domestic economy, apart from essential workers, works remote. High flexibility workers are able to work at home albeit with reduced productivity. Low flexibility workers work with a substantially reduced productivity. Tourism workers become unemployed. Shutting tourism and switching high and low flex sectors to remote working slows down the infection and flattens the curve.

4. **Fourth phase:** post-COVID-19 period. It comprises of two sub-phases:

(a) the domestic economy returns to normal: high and low flex sectors work market. Tourism remains shut,

(b) Tourism re-opens.

The model

In the real world when a sector is shut firms have no revenues but still have to pay fixed costs. These fixed costs pile up, and at some point the firm will not have enough liquidity to cover them. The longer the shutdown lasts and the more liquidity constraint a sector is, the higher the share of firms that fail. In our model the share of firms failing in sector i is $\rho_t^i \in [0, 1]$, and it follows

$$
\rho_t^i = \begin{cases} 0 & \text{if } i = E \\ \dfrac{t - n^i}{n^{max}} \cdot \rho & \text{if shut} \\ \eta \cdot \dfrac{t - n^i}{n^{max}} \cdot \rho & \text{if not shut} \end{cases} \tag{8}
$$

where n^i is the period when sector i shut down, n^{max} the maximum number of periods the sector can be shut for (i.e. length of periods 3 and 4), and ρ long-term failure probability.

We introduce this as a labour friction. If a share ρ_t^i of firms fail, since firms and workers are homogeneous and atomistic, it means that the same share ρ_t^i of workers is unemployed.

Labour

$$
\text{if market/remote:} \quad N_t^i = (1 - \rho_t^i) \cdot \left(S_t^i + R_t^i\right) \tag{9}
$$

$$
\text{if shut:} \quad N_t^i = 0 \tag{10}
$$

Healthy people can work. Unless the firms has failed or the sector is shut off, they do.

Production, with production function $Y = f(N_t) = A \cdot N_t$.

$$
\text{if market:} \quad Y_t^i = A^i \cdot N_t^i \tag{11}
$$

$$
\text{if remote:} \quad Y_t^i = (\phi^i \cdot A^i) \cdot N_t^i \tag{12}
$$

$$
\text{if shut:} \quad Y_t^i = 0 \tag{13}
$$

High-flex and low-flex sectors can switch to remote work, though this reduces their productivity by a factor ϕ^i, with $\phi^H > \phi^L$. Shut sectors do not produce any output.

Profits

$$
\text{if market/remote:} \quad \Pi_t^i = (1 - \tau_F) \cdot \left(Y_t^i - w^i \cdot N_t^i - \lambda_F \cdot w^i \cdot (1 - \rho_t^i) \cdot I_t^i\right)
$$

$$
\text{if shut:} \quad \Pi_t^i = 0
$$

If the sector is market or remote then firms who still operate have to pay wages and sick pay, as well as corporate tax τ_F. If the sector is shut then the firms

make no profits. Note that the failure rate is implicit in the workforce, and that only workers who are employed by firms that have not failed receive sick pay.

Income

if market/remote: $\Gamma_t^i = (1 - \tau_I) \cdot w^i \cdot N_t^i + (\lambda_F + \lambda_G) \cdot w^i \cdot (1 - \rho_t^i) \cdot I_t^i$

$$+ \theta \cdot w^i \cdot (1 - \rho_t^i) \cdot (S_t^i + I_t^i + R_t^i) + \Pi_t^i \tag{14}$$

if shut: $\Gamma_t^i = \theta \cdot w^i \cdot (S_t^i + I_t^i + R_t^i) + \Pi_t^i \tag{15}$

with τ_I income tax (same for all sectors), $(\lambda_G + \lambda_F)$ sick pay rate with λ_G share paid by the government and λ_F share paid by the firm, $\theta \in [0, 1]$ unemployment benefits rate paid by the government. Γ_t^i income, N_t^i labour in hours worked[1].

Consumption

$$C_t = (1 - \tau_C) \cdot MPC \cdot \sum_i \Gamma_t^i \tag{16}$$

where MPC is the marginal propensity to consume and τ_C consumption tax.

Government

$$B_t = \sum_i \left[\tau_I \cdot w^i \cdot N_t^i + \tau_F \cdot \left[Y_t^i - w^i \cdot N_t^i - \lambda_F \cdot w^i \cdot (1 - \rho_t^i) \cdot I_t^i \right] + \tau_C \cdot MPC \cdot \Gamma_t^i \right.$$

$$\left. - \lambda_G \cdot w^i \cdot (1 - \rho_t^i) \cdot I_t^i - \theta \cdot w^i \cdot (1 - \rho_t^i) \cdot \left(S_t^i + I_t^i + R_t^i \right) \right] \tag{17}$$

The governments revenues come from the income tax on the healthy people who work in firms that have not failed and from corporate tax on those firms. The government pays welfare transfers to households, subsidies to firms that have not failed, sick pay to the unhealthy individuals employed in firms that have not failed, and unemployment benefits to all those who were working in firms that failed or those working in shut sectors.

<u>Trade</u>: net of tourism Y_t^H that is not consumed by locals, net imports are

$$(IM - X) = C_t - \left(Y_t^H + Y_t^L + Y_t^E \right) \tag{18}$$

Initial conditions

During phase 1 (of length n_1) the population does not change:

$$Pop_t = \sum_i S_t^i = 1 \quad \forall t = 0, ..., n_1 \tag{19}$$

---

[1]We assume that everyone works full time, so N_t^i is the share of healthy employed population working in the sector.

At time $n_1 + 1$, when the infection starts[2]:

$$I^i_{n_1+1} = \varepsilon \cdot S^i_{n_1+1} \tag{20}$$
$$S^i_{n_1+1} = 1 - I^i_{n_1+1} \tag{21}$$
$$R^i_{n_1+1} = 0 \tag{22}$$
$$D^i_{n_1+1} = 0 \tag{23}$$
$$Pop_{n_1+1} = Pop_{n_1+1} \tag{24}$$

and from time $t = n_1 + 2$ onwards the infections spreads as described in the SIR Model section.

Calibration

Table 1: Health parameters

Parameter	Description	Value
γ	Recovery rate	$0.99 \cdot \dfrac{7}{14}$
μ	Mortality rate	$0.01 \cdot \dfrac{7}{14}$
β	Infection rate (health policy)	0.40
δ	Extra infection risk (work)	0.30
ε	Initial impact	0.001

The model is weekly. Since the illness lasts roughly 14 days, we adjust the health parameters of table 1 to a period being $\dfrac{7}{14}$ of the illness. 1% of people who contract covid-19 pass away, giving us a mortality rate of $0.01 \cdot \dfrac{7}{14}$. The remaining 99% recover, hence the recovery rate of $0.99 \cdot \dfrac{7}{14}$. We calibrate β and δ to be in line with the R0 parameters inferred by, among others, Liu et al. (2020) or Hellewell et al. (2020). We get β and δ from assuming $R_0 = 2.5$ when all economic activity continues as normal and $R_0 = 1.1$ when only the essential sector operates normally and everyone else either is shut or operates remotely. It must be noted that these R_0 are on the conservative side: R_0 was estimated to be almost 5.0 for Lombardy, for example. We choose lower R_0 because of the

---

[2]Note that we assume the infection starts in all sectors simultaneously and with uniform probability

lower population density of the countries considered, as well as on the hypothesis that the virus spreads slower in hotter climates (Cookson, 2020). Then

$$\begin{cases} \beta \cdot (1+\delta)^4 = 2.5 \cdot \dfrac{7}{14} \\ \beta \cdot (1+\delta) = 1.1 \cdot \dfrac{7}{14} \end{cases}$$

and we approximate the results to $\beta = 0.4$ and $\delta = 0.3$. Last, the initial impact is $\varepsilon = 0.001$ as in Eichenbaum et al. (2020).

The model initial conditions are calibrated using data from the national statistical services. The economic parameters are the current tax rates, sick pay rates, and unemployment benefits rate. Productivity rates an educated guess, as there are no studies that measure the productivity of remote work. Changes in the productivity rates would rescale production during lockdown, but would not have long-term effects in this simple model. Last, we calibrate the probability of firms failing when shut down so that if the sector is shut until the end of the simulation (end of 2021) then 20% of the firms in the sector fail.

Note that we redistribute the elasticity of non-tourism activity to changes in tourism activity to high flex and low flex sectors only, leaving essential firms untouched, by calculating

$$\eta = \eta' \cdot \frac{A_t^H \cdot N_t^H + A_t^L \cdot N_t^L + A_t^E \cdot N_t^E}{A_t^H \cdot N_t^H + A_t^L \cdot N_t^L}. \tag{25}$$

References

Cookson, C. (2020, mar). Scientists hopeful warmer weather can slow spread of coronavirus.

Eichenbaum, M., S. Rebelo, and M. Trabandt (2020). The Macroeconomics of Epidemics. *NBER Working Paper Series 26882*.

Hellewell, J., S. Abbott, A. Gimma, N. I. Bosse, C. I. Jarvis, T. W. Russell, J. D. Munday, and A. J. Kucharski (2020). Articles Feasibility of controlling COVID-19 outbreaks by isolation of cases and contacts. *Lancet Glob Health 8*, 488–496.

Kaplan, G., B. Moll, and G. Violante (2020). Pandemics According to HANK.

Liu, Y., A. A. Gayle, A. Wilder-smith, and J. Rocklöv (2020). The reproductive number of COVID-19 is higher compared to SARS coronavirus. *Journal of Travel Medicine*, 1–4.