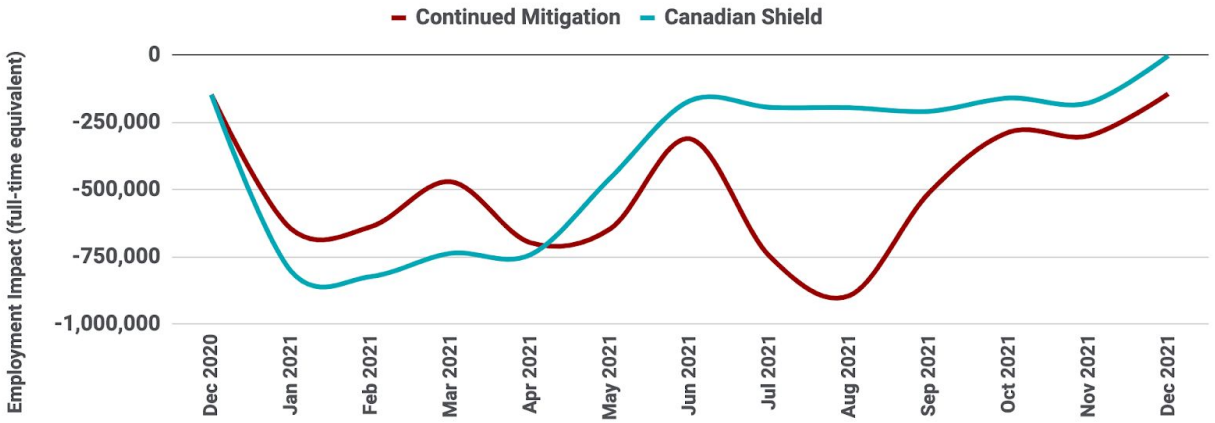
Will the Canadian Shield lockdown policy save jobs in Ontario?



Projections from Limestone Analytics STUDIO model

Starting in late December, Ontario began a second wave of strict province-wide lockdowns to reduce the transmission of COVID-19. These measures have been put in place as Ontario, along with other provinces across Canada, face epidemiological projections showing how healthcare systems in many locations are again at risk of being overrun by the disease. This raises a question as to how strict the new restrictions should be and how quickly we should move to relax them as the immediate risk of hospitals being overwhelmed is avoided.

Is it better to relax the economic restrictions as soon as we can safely do so, or to follow a more aggressive mitigation strategy in which we prioritize further reductions to reduce the probability of future waves of disease and lockdown policies before widespread vaccination is possible?

This document compares the costs to the Ontario economy of continuing to follow a mitigation policy modeled after the policies from early 2020, or alternatively adopting the "Canadian Shield" strategy with stricter restrictions in the early months of 2021 in order to avoid additional waves of lockdown later in the spring. The Canadian Shield strategy, proposed by the COVID Strategic Choices Group, involves shifting priority away from a quick-as-possible reopening to instead prioritize avoiding later waves of restrictions.

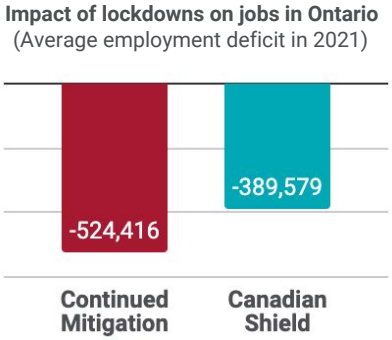
Our previous COVID-19 economic update provided nationwide economic projections for various mitigation strategies, including the Canadian Shield. That analysis was used by the COVID Strategic Choices Group to compare the economic and health outcomes under alternative scenarios before releasing its Canadian Shield proposal.[1] In the current policy brief, we provide detailed economic

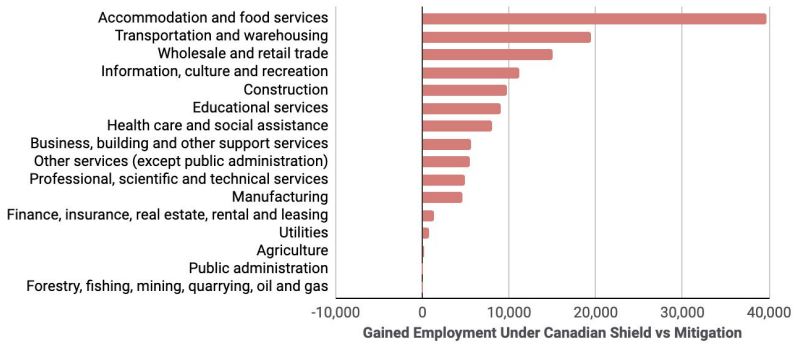
[1] For details on the Canadian Shield proposal see https://covidstrategicchoices.ca/. For details on our economic model and Canadawide analysis see https://limestone-analytics.com/publications/.

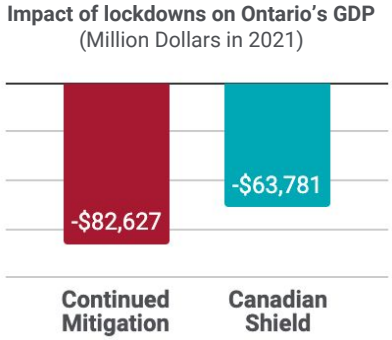
projections for Ontario, including a breakdown by industry. *The numbers presented here differ slightly from the aggregate estimates for Ontario presented in our previous estimates and are consistent with the updated projections for the Canadian Shield policy to incorporate a more detailed approximation of the projected lockdown relaxation under the policy. At the end of this document, we also provide updated projections for all of Canada.*

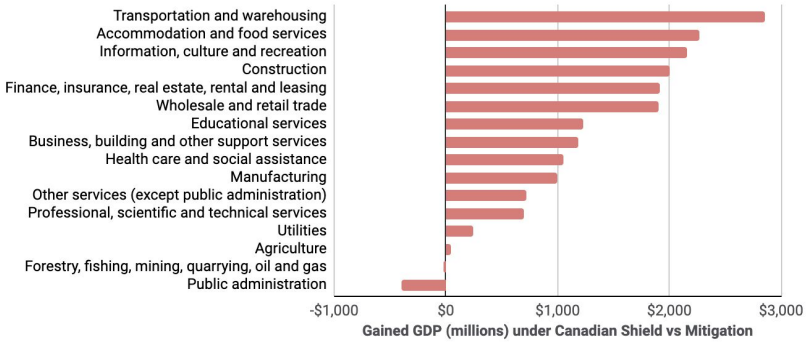
The analysis shows that the Ontario economy is better off under the Canadian Shield than the alternative strategy of continued mitigation. This is because a more-intense early year lockdown can be less costly for the economy than less-intense, shorter duration lockdowns spread across a longer period of time. We show that this is the case even under the expectation that vaccinations will be widely available in the second half of the year. Full economic activity does not immediately resume with the lifting of economic restrictions; rather the economy takes time to fully recover. This means that an intense lockdown that allows for full reopening afterwards can result in fewer overall jobs lost and a lower decline in GDP than on-again, off-again lockdowns where new restrictions are required every few months.

As such, the Canadian Shield strategy is estimated to save Ontario approximately $19 billion in GDP and 135,000 full-time equivalent jobs over the course of 2021. Details are provided in the brief below.









Projections from Limestone Analytics STUDIO model

Background

Limestone Analytics, together with economists from Queen's University, developed the Short-Term Under-capacity Dynamic Input-Output (STUDIO) model to measure the economic impact of COVID-19.[2] The model is designed to provide GDP and workforce projections under various pandemic mitigation and recovery policies. It is capable of providing national, provincial, or local-level projections of job and GDP loss for alternative lockdown and reopening strategies in order to guide policymaker strategy.

STUDIO captures *dynamic* input-output interactions between industrial sectors resulting from the lock-down and recovery policies. The highly-flexible model can consider policies implemented at either the province-wide or location-specific levels to provide projections down to the level of census division and industry level using readily-available public data sources. It can accommodate various scenarios regarding how the disease is likely to spread and consumer behaviour likely to change over the recovery period. The model has been implemented for all of Canada and provides the economic projections for the federally funded Looking Glass project supported through Canada's Digital Technology Supercluster, and was the economic model behind the Canadian Shield analysis.

In this policy brief, we highlight the ability of the STUDIO model to provide rapid-response policy analysis to guide the short-to-medium term policy response within Canada. The analysis applies the model to two alternative strategies COVID-19 mitigation and recovery that are being debated among policy leaders going into 2021. The analysis reported here provides detailed projections for Ontario while complementing the previous analysis we conducted for all of Canada. The numbers in this report for Ontario have also been updated to reflect more recent data. That previous analysis can be found on the Limestone Analytics publication page: https://limestone-analytics.com/publications/

Limestone Analytics is able to provide more detailed and customized analyses, including the breakdown at the local level of the economic costs of alternative mitigation and reopening strategies being considered by the government.

Policy Options and Scenarios

We provide economic projections for the period of January to December 2021 for two mitigation and recovery strategies that map into alternative approaches for addressing COVID-19 in Ontario until the widespread vaccination of the population. The first strategy involves continuing to follow the mitigation strategy that the government has largely been following for the past several months. The second is to adopt the Canadian Shield strategy that has been proposed by the COVID Strategic Choices Group led by Global Canada.

Policy 1: Continued Mitigation

One option available to policymakers is to continue along the current path in many locations of locking down in cases where hospitals are at risk of being overrun by the disease, and restricting high-risk activities and large gatherings, but otherwise avoiding strict economic and social

[2] The academic paper summarizing the methodology is: Cotton, Christopher, Brett Crowley, Bahman Kashi, Huw Lloyd-Ellis, and Frederic Tremblay (2020). Quantifying the Economic Impacts of COVID-19 Policy Responses on Canada's Provinces in (Almost) Real Time. Queen's Economic Department Working Paper 1441. https://limestone-analytics.com/publications/

restrictions. Such a policy may play out in several different ways, depending on the disease spreads and the effectiveness of short term mitigation strategies. Based on consultations with other members of Canada's COVID Strategic Choices Group, we model the Continued Mitigation policy as an on-again, off-again lockdown strategy.

As an estimation of how such a policy will play out, we assume that the first month of each quarter involves moderate lockdown restrictions, defined as being 2/3rds as economically restrictive as the lockdown policies in each province in May 2020 (during the first stage of the more-relaxed lockdown restrictions that were rolled out following the stricter policies from March and April). Each one-month lockdown period followed by two months of reopening before another round of light-to-moderate lockdown is implemented. For the scenario illustrated in this document, we assume that such an on-again-off-again cycle continues through fall 2021, after which time we assume vaccinations are widely-available enough to avoid another wave of lockdown restrictions. This means that the last month of lockdown is July 2021 and no additional lockdown occurs in October 2021, and the economy converges to the trajectory of the recovery from summer to fall 2020.

Policy 2: Canadian Shield

The policy alternative involves the imposition of immediate and wider-reaching lockdown restrictions in an effort to ensure that COVID-19 transmission rates decline to the point that they continue to decline after the lockdown restrictions are relaxed. For this policy case, the January lockdown restriction is assumed to be wide-reaching and strict, which is assumed to be 2/3rds as economically restrictive across all industries and locations as the heavy lockdown restrictions that were in place across Canada during April 2020. Assuming such restrictions are moderately less costly compared to what they were in April 2020 could be interpreted as either the restrictions themselves being less-strict or better-targeted compared to the blanket stay-at-home orders from last April, as well as the fact that many businesses are better able to cope with remote work and travel bans than they were at the beginning of 2020. In February, the strict lockdown restrictions from January are then relaxed moderately and remain in place through April 2020. These less-restrictive measures defined as being 2/3rds as economically restrictive as the policies that were in place across provinces in May 2020. From May 2021 onward, the economy begins its recovery towards 'normal' activity.

For details regarding the epidemiological model and policy projections behind the Canadian Shield scenario, see the Canadian Shield policy proposal released by the COVID Strategic Choices Group led by Global Canada.[3]

[3] https://covidstrategicchoices.ca/

Economic Projections

The STUDIO model can provide economic projections by industry at the local level. For the purposes of this report, we break out results for Ontario by industry but not localities. The estimates are presented in terms of lost economic activity compared to the level of activity that would have been expected in the same time period had the COVID-19 pandemic never happened.

We can consider how the economic costs of COVID-19 for Ontario evolve over the course of the year under different scenarios. Tables 1 and 2 break out the projected Ontario-wide economic impact by quarter. The chart in Figure 1 displays the trends under each scenario from December 2020 through December 2021.

The projections show that the stricter lockdown under the Canadian Shield strategy results in a more substantial economic decline in the first quarter of 2021 compared to a Continued Mitigation strategy. However, the economic deficit over the rest of the year is lower under the Canadian Shield strategy compared to the alternative. This is because the stricter lockdown restrictions are designed to avoid the need for additional waves of lockdown restrictions later in the year. In aggregate, the decline in jobs and GDP are both lower under the Canadian Shield policy, suggesting that such a policy is better for the economy.

Tables 3 and 4, together with Figures 3 and 4, break out the job and GDP projections by industry. The tables show the transportation, accommodation, and food services sectors benefit most from the shift in strategy. These sectors are also those that are hardest hit by COVID-19 overall.[4] Differences in cross-industry patterns in job loss and GDP loss are due to differences in wages paid within the industries.

Table 1: Ontario average deficit in FTE employment due to COVID-19 by policy, 2021

	Q1	Q2	Q3	Q4	Average
Continued Mitigation	-584,626	-551,343	-717,739	-243,956	**-524,416**
Canadian Shield	-733,655	-491,006	-218,065	-115,587	**-389,579**

Projections from Limestone Analytics STUDIO model

Table 2: Quarterly deficit in Ontario annual GDP due to COVID-19 (millions CAD), 2021

	Q1	Q2	Q3	Q4	Total
Continued Mitigation	-$23,352	-$20,994	-$27,429	-$10,852	**-$82,627**
Canadian Shield	-$30,161	-$18,745	-$7,728	-$7,147	**-$63,781**

Projections from Limestone Analytics STUDIO model

[4] To explore the industry breakdown of the impact of COVID-19 to date, see the dashboard Limestone developed for the Eastern Ontario Leadership Council: http://www.eolc.info/en/working-groups-and-projects/covid-19-economic-modelling.aspx

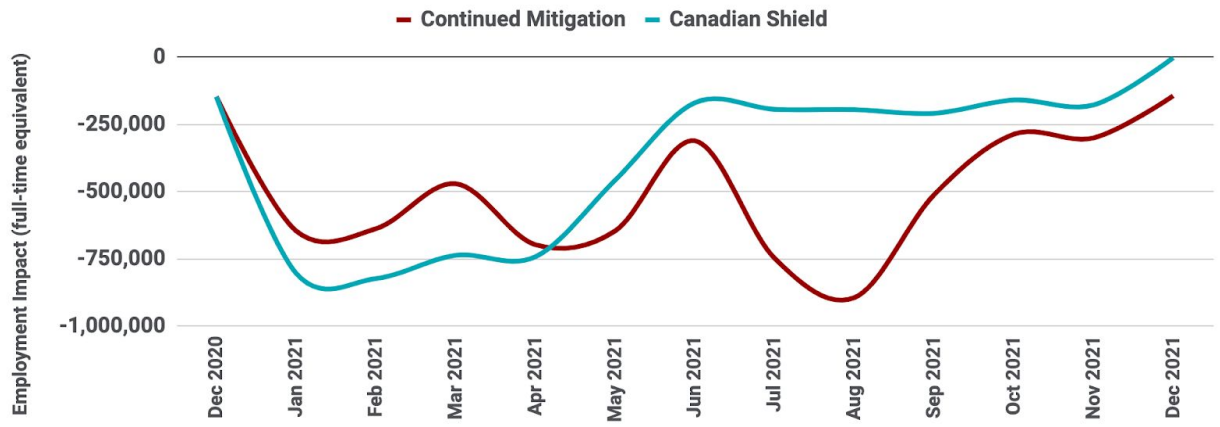
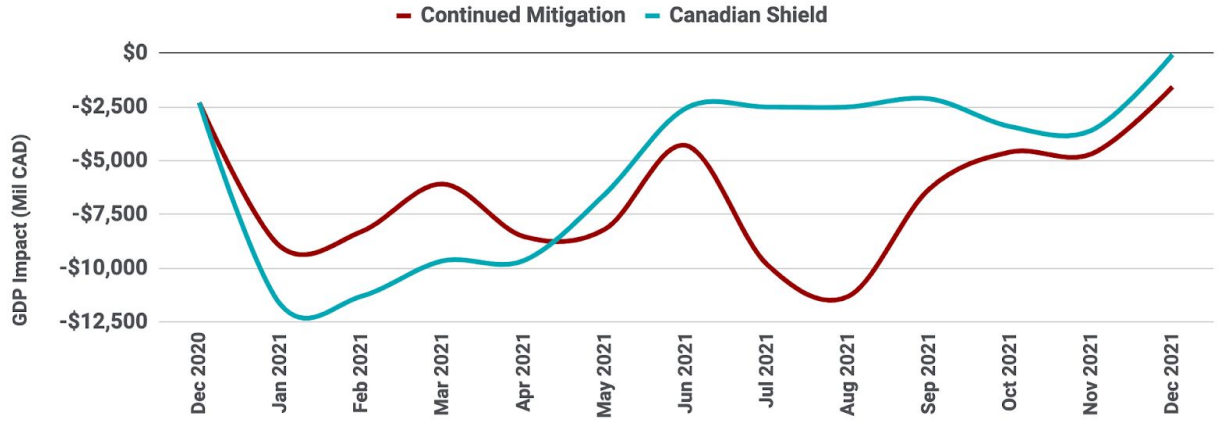


Figure 1: Projected trends in full-time equivalent job loss due to COVID-19 under each policy alternative

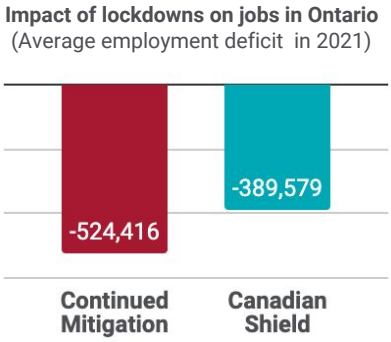


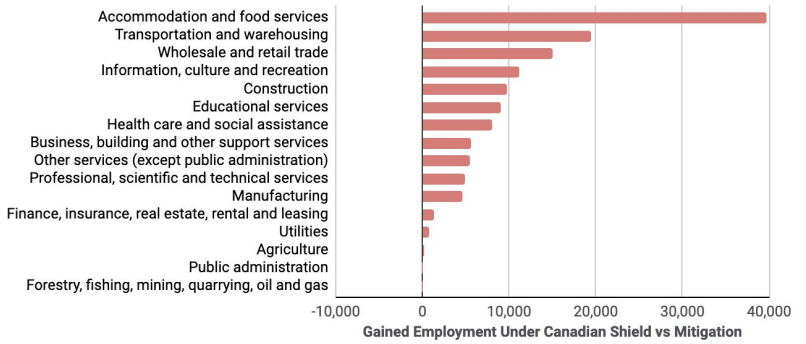
Projections from Limestone Analytics STUDIO model

Figure 2: Projected trends in national GDP deficit due to COVID-19 under each policy alternative

Table 3: Ontario average annual deficit in FTE employment due to COVID-19 by policy, 2021

	Continued Mitigation	Canadian Shield	Jobs Saved
Agriculture	-597	-360	237
Forestry, fishing, mining, quarrying, oil and gas	-946	-1,017	-71
Utilities	-3,472	-2,776	696
Construction	-37,676	-27,986	9,690
Manufacturing	-51,553	-46,956	4,597
Wholesale and retail trade	-91,642	-76,622	15,020
Transportation and warehousing	-42,160	-22,741	19,419
Finance, insurance, real estate, rental and leasing	-7,057	-5,671	1,386
Professional, scientific and technical services	-23,240	-18,404	4,836
Business, building and other support services	-15,678	-10,111	5,567
Educational services	-51,577	-42,523	9,054
Health care and social assistance	-44,847	-36,818	8,029
Information, culture and recreation	-27,656	-16,428	11,228
Accommodation and food services	-102,640	-62,908	39,732
Other services (except public administration)	-23,517	-18,062	5,455
Public administration	-159	-196	-37
Total	**-524,417**	**-389,579**	**134,838**





Projections from Limestone Analytics STUDIO model

Figure 3: Differences in full-time equivalent employment by sector under alternative policies, 2021

Table 4: Deficit in Ontario's GDP due to COVID-19 by policy, 2021

	Continued Mitigation	Canadian Shield	Difference
Agriculture	-$126	-$76	$50
Forestry, fishing, mining, quarrying, oil and gas	-$345	-$370	-$25
Utilities	-$1,242	-$996	$246
Construction	-$7,527	-$5,525	$2,002
Manufacturing	-$11,309	-$10,309	$1,000
Wholesale and retail trade	-$11,459	-$9,559	$1,900
Transportation and warehousing	-$6,230	-$3,377	$2,853
Finance, insurance, real estate, rental and leasing	-$9,711	-$7,799	$1,912
Professional, scientific and technical services	-$3,410	-$2,711	$699
Business, building and other support services	-$3,249	-$2,064	$1,185
Educational services	-$6,209	-$4,985	$1,224
Health care and social assistance	-$5,913	-$4,866	$1,047
Information, culture and recreation	-$5,473	-$3,315	$2,158
Accommodation and food services	-$5,766	-$3,495	$2,271
Other services (except public administration)	-$3,123	-$2,404	$719
Public administration	-$1,537	-$1,929	-$392
Total	**-$82,629**	**-$63,781**	**$18,849**

Projections from Limestone Analytics STUDIO model

Figure 4: Differences in GDP by sector under alternative policies, 2021

Discussion of Results for Ontario

The economic projections compare economic costs under the Canadian Shield COVID-19 mitigation strategy and a continued mitigation approach that involves relaxing economic restrictions more quickly, similar to the approach taken in spring 2020. Both scenarios are calibrated using epidemiological and policy projections provided by Canada's COVID Strategic Choices Group in their policy analysis of alternative mitigation and recovery strategies. The projections are intended to enable more-informed policy discussion and provide rigorous quantitative estimates to help guide policy recommendations.

The analysis clearly illustrates how a more intense early year lockdown can be less costly for the economy than less-intense, shorter duration lockdowns spread across a longer period of time. We show that this is the case even under an expectation that vaccinations will be widely available in the second half of the year, facilitating a more robust recovery in the fall and winter even without an early-year lockdown. This is because full economic activity does not immediately resume with the lifting of economic restrictions; rather the economy takes time to fully recover. This means that an intense lockdown that allows for fuller reopening afterwards may result in fewer overall jobs lost and a lower decline in GDP than on-again, off-again lockdowns where new restrictions are required every few months before the economy has a chance to fully recover from the previous round of restrictions.

Understanding how various lockdown policies are likely to impact the economy is essential for Canada's policy response. However, the employment and GDP figures considered here are just some of the outcomes that need to be considered by policymakers when weighing alternative options. It is important to acknowledge several effects that are not fully accounted for in our projections. First, the model provides estimates of lost employment and GDP; it does not assign any additional economic value to declines in health or mortality (which are also likely to favour the Canadian Shield proposal). Second, our model does not account for differences in the impact on mental health, social interactions, or education outcomes, even though these factors are likely to affect future productivity and economic outcomes into the future. A full accounting of the costs and benefits of alternative policy choices would need to account for these effects, and others. It is important to consider the extent to which some of these additional costs may be avoided under any new wave of lockdown policies. Even though they are not explicitly modeled, it is our opinion from extensive work evaluating education systems and programs that the reopening of in-person primary schools, for example, should be prioritized when safe reopening is feasible.

Other considerations not present in the current analysis include breakdowns by municipality. The STUDIO model at the foundation of the analysis can account for local level differences in lockdown policies, and we have the capability to produce projections for different policy scenarios at the local level.

Furthermore, we do not consider declines in employment by age or gender. However, based on an analysis using 2020 data, we know that the employment losses under COVID-19 disproportionately affect young workers and women. These trends are likely to continue to hold in 2021.[5]

[5] For an analysis of gender and age differences in job loss to date, see Limestone's COVID-19 Economic Impact Explorer. https://limestone-analytics.com/project/economic-impact-explorer/

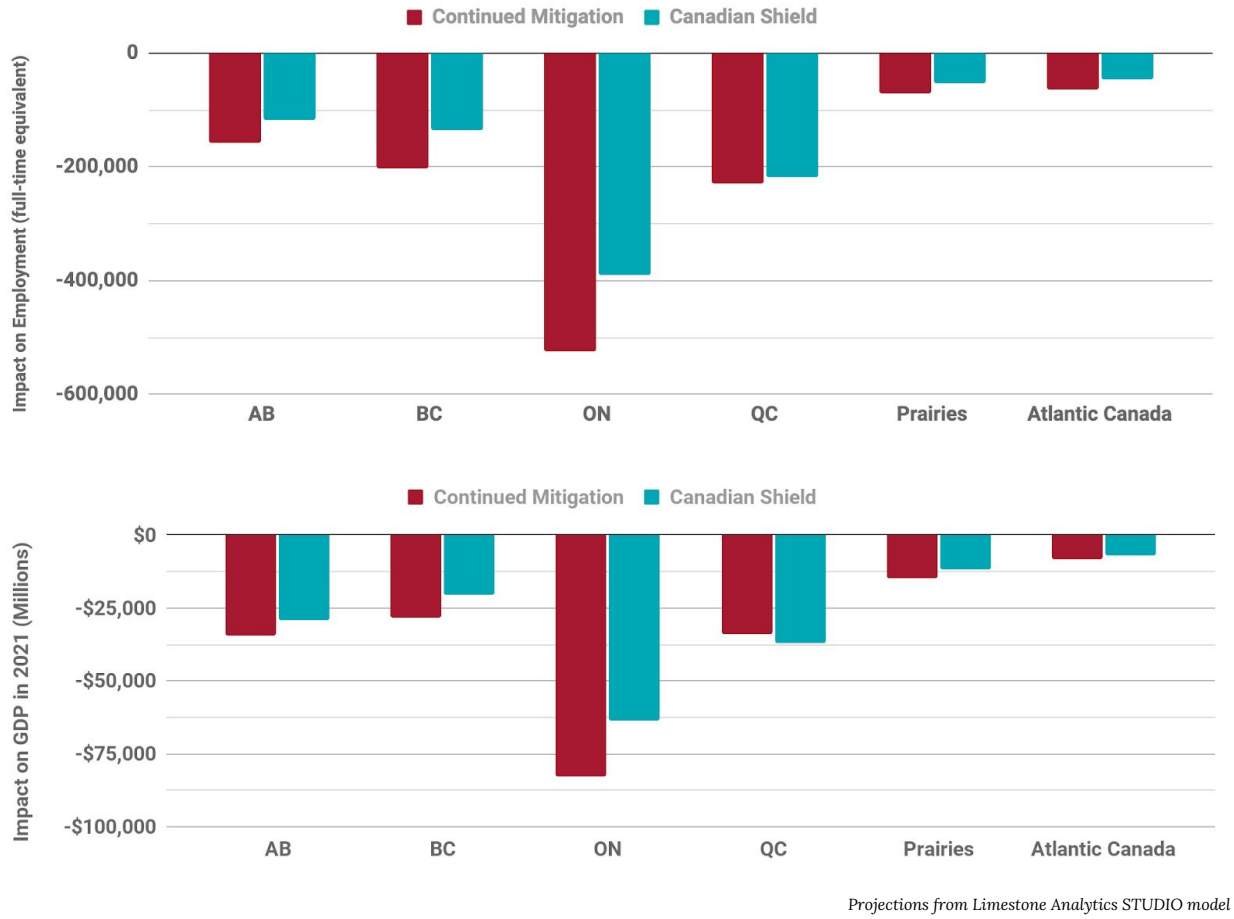
It is important to highlight that the most appropriate application of a Canadian Shield strategy involves relaxing restrictions when they can be relaxed while maintaining downward trends in disease transmission.

These projections highlight the ability of Limestone's STUDIO model to guide policy through the analysis of a myriad of mitigation and recovery scenarios. It can provide justifiable quantitative projections based on a rigorous peer-reviewed methodology for any description of how the disease and policy are likely to evolve over the coming year. The accuracy of the economic projections will depend on how well the scenarios fed into the model match the actual evolution of the disease and policy response that occurs under any policy.

Updated Canadawide Projections

In our previous policy brief, we provided economic projections under various mitigation and recovery strategies for all of Canada, as well as aggregate estimates for individual provinces and regions within Canada. Since the initial release, we have updated the economic model to improve the expected accuracy of the Canadian Shield projections to ensure that it best matches the description of the policy under consideration in the policy debate. The other estimates from the previous reports (including projections under the continued mitigation strategy, a continued mitigation strategy with delayed vaccine, and a stricter-lockdown Melbourne Model) remain unchanged with the updates.

These updates to the accuracy of the Canadian Shield strategy lead to very slightly higher economic losses under that strategy, but these changes are small enough that they do not change any of the qualitative results from the nationwide analysis. *The Canadian Shield strategy remains the least economically costly strategy for the nationwide economy compared to any of the alternative strategies, whether we focus on job or GDP loss.*



Projections from Limestone Analytics STUDIO model

Figure 5: Impact on Employment and GDP across Canada in 2021

Table 5: Impact on GDP across Canada in 2021

	AB	BC	ON	QC	Prairies (MB + SK)	Atlantic Canada	CA
Continued Mitigation	-$34,600	-$28,156	-$82,627	-$34,187	-$14,636	-$8,128	**-$202,334**
Canadian Shield	-$29,182	-$20,327	-$63,781	-$37,219	-$11,716	-$6,959	**-$169,184**

Projections from Limestone Analytics STUDIO model

Table 6: Impact on Employment across Canada in 2021

	AB	BC	ON	QC	Prairies (MB + SK)	Atlantic Canada	CA
Continued Mitigation	-157,636	-203,240	-524,416	-228,956	-70,210	-63,939	**-1,248,397**
Canadian Shield	-117,861	-135,228	-389,579	-218,055	-52,777	-46,092	**-959,592**

Projections from Limestone Analytics STUDIO model

About Limestone

Limestone Analytics (Limestone) is a Canada- and U.S.-based consulting firm that specializes in the evaluation of projects and policies around the globe. The firm is recognized for combining academic rigour, state-of-the-art methods, and policy experience to provide the highest-quality, customized analysis and evaluation services and to help clients incorporate evidence into the design, financing and implementation of their projects. The firm and its principal staff have successfully completed assignments for large organizations and NGOs such as the US Department of State, Nutrition International, Copenhagen Consensus Center, World Bank, World Vision and the Millenium Challenge Corporation, among many other clients.

Limestone Analytics, together with economists from Queen's University, developed the Short-Term Under-capacity Dynamic Input-Output (STUDIO) model to measure the economic impact of COVID-19. That model serves as a foundation for the analysis in this policy brief.

This policy brief is based on research conducted by Christopher Cotton, Brett Crowley, Bahman Kashi, Huw Lloyd-Ellis, and Frederic Tremblay.[6]

[6] Cotton is the Director of Research at Limestone Analytics and the Jarislowsky-Deutsch Chair in Economic & Financial Policy at Queen's University; Crowley is an Associate at Limestone; Kashi is the President of Limestone and an Adjunct Professor at Queen's; Lloyd-Ellis is a Professor of Economics at Queen's and an Academic Research Advisor at Limestone; Tremblay is a Research Associate at Limestone and Ph.D. Candidate at Queen's.