COURT FILE NUMBER	2301 12271
COURT	COURT OF KING'S BENCH OF ALBERTA
JUDICIAL CENTRE	CALGARY
PLAINTIFFS	REBECCA MARIE INGRAM & CHRISTOPHER SCOTT, carrying on business as THE WHISTLE STOP CAFE
DEFENDANT	HIS MAJESY THE KING IN RIGHT OF ALBERTA
DOCUMENT	**AFFIDAVIT OF CHRISTOPHER COTTON**
ADDRESS FOR SERVICE AND CONTACT INFORMATION OF PARTY FILING THIS DOCUMENT	Alberta Justice Civil Litigation Team 9th Floor, Peace Hills Trust Tower 10011 – 109 Street Edmonton, Alberta T5J 3S8 Attention: John-Marc Dube Phone: [redacted] File No: LIT-40712

Clerk's Stamp

JUDICIAL CENTRE OF CALGARY
FILED DIGITALLY
2301 12271
Jun 12, 2024
11:25 AM
CLERK OF THE COURT

I, Christopher Cotton, of the City of Kingston, in the Province of Ontario, MAKE OATH AND SWEAR

1. My name is Christopher Cotton. I am a Professor of Economics at Queen's University in Kingston, Ontario.

2. I have been asked by the Respondent, His Majesty the King in right of Alberta, to provide my expert opinion to the Court with respect to economic issues that may arise in this proposed class action lawsuit, specifically with respect to the application for certification of this action as a class proceeding.

3. My qualifications and background are set out in my Curriculum Vitae, attached to this my affidavit as **Exhibit A.**

4. Attached as **Exhibit B** to this my affidavit is my expert opinion report, including the information and assumptions upon which my opinion is based.

5. I understand and acknowledge that as an expert providing opinion evidence, my role is to assist the Court. This role includes the duty to provide fair, objective, impartial and independent assistance to the Court. My expert opinion report, and my opinions contained within it, are provided in accordance with this duty and I confirm I am willing and able to comply with this duty. I understand that my duty to the Court includes not

only my expert report, but also extends to any testimony I may be required to give in support of my expert report.

SWORN BEFORE ME at Kingston, Ontario, this 6 day of June 2024.

A Notary Public for the Province of Ontario

Christopher Cotton

Angela Fallow
352 King St E
Kingston, ON K7L 3B6

This is exhibit 'A' referred to in affidavit of Christopher Cotton sworn before me, this 6 day of June 2024

A COMMISSIONER FOR TAKING AFFIDAVITS

CHRISTOPHER COTTON

Jarislowsky-Deutsch Chair in Economic & Financial Policy
Department of Economics, Queen's University

CV date: March 2024

Contact:
94 University Ave., Dunning Hall 230
Kingston, Ontario K7L 3N6 Canada
cc159@queensu.ca
https://christophercotton.ca/

U.S. citizen; Canadian permanent resident

Education

Ph.D., Economics, Cornell University, Ithaca, NY 2008

M.A., Economics, Cornell University, Ithaca, NY 2007

B.A. (honors), Economics, Michigan State University, 2001

Professional leaderships and coaching certification: Queen's Academic Leadership Program, senior university administrator stream, including Third Factor professional coaching certification, 2020-2021

Appointments

Academic Positions

Since 2014 *Jarislowsky-Deutsch Chair in Economic & Financial Policy*
Queen's University, Kingston, Ontario

Since 2018 *Professor, Department of Economics*
Queen's University, Kingston, Ontario

Since 2021 *Professor, cross-appointed, School of Policy Studies*
Queen's University, Kingston, Ontario

Since 2021 *Professor, cross-appointed, School of Medicine*
Translational Medicine graduate faculty
Queen's University, Kingston, Ontario

2014 - 2018 *Associate Professor, tenured, Department of Economics*
Queen's University, Kingston, Ontario

2008 - 2014 *Assistant Professor, Department of Economics*
University of Miami, Coral Gables, Florida

2003 - 2008 *Graduate Teaching & Research Assistant*
Cornell University, Ithaca, New York

Primary Research & Policy Affiliations

Since 2017 *Co-Owner/Partner,* **Limestone Analytics**
Chief Research & Quality Assurance Officer, Senior Economist & Subject Matter Expert
Engaged with strategy, management, and project work for growing firm providing impact analysis and evaluation services for clients including USAID, MCC, WHO, FCDO/UKAid, World Bank, Gates Foundation, World Vision, Nutrition Intl., etc.
https://limestone-analytics.com/

Since 2016 *Director,* **John Deutsch Institute for the Study of Policy**
Queen's University based research institute to support policy-focused economic research and collaboration. https://jdi.queensu.ca/

Since 2020 *Co-Director,* **NSERC One-Society Network**, https://onesocietynetwork.ca/
Building a network of researchers across sectors and supporting collaborative research to understand the broader impacts of pandemics and related policy. Funded through the Natural Sciences and Engineering Research Council of Canada's Emerging Infectious Disease Modeling initiative https://onesocietynetwork.ca/

Other Research & Policy Affiliations

Since 2018 *Executive Board,* **Canadian Public Economics Group (CPEG)**
Official Canadian Economic Association study group, https://www.cpeg.ca/

Since 2021 *Invited Researcher,* **Abdul Latif Jameel Poverty Action Lab (J-PAL)**
Massachusetts Institute of Technology based network, https://www.povertyactionlab.org/

Since 2021 *Affiliated Researcher,* **Institute for Intergovernmental Relations**
Queen's University research institute, https://www.queensu.ca/iigr/

Since 2022 *Senior Economist and Evaluation Expert*, **World Vision Citrus**
A collaboration between World Vision Canada and Limestone Analytics to expand the use of evidence and evaluation across World Vision, including conducting evaluations of specific program models, provide analytical support for projects and management, and building general capacity across one of the world's largest charities

2021-2022 *Senior Education and Evaluation Expert*, **World Health Organization (WHO)**
Impact analysis of school feeding programs led through Limestone Analytics

2020-2021 *Econ Modeling Lead,* **Global Canada COVID Strategic Choices Group**
National initiative to bring together academic and industry experts to review scientific evidence and provide actionable policy recommendations for Canada's provincial and national COVID response, https://www.global-canada.org/covid-strategic-choices

2020-2021 *Invited Member,* **Royal Society of Canada COVID-19 Working Group on Economic Recovery**, https://rsc-src.ca/en/themes/economic-recovery

2020-2021 *Econ Modeling Lead,* **Canada Digital Technology Super-cluster Looking Glass COVID-19 program 'Looking Glass' project**, Federally funded initiative to support industry and academic partnership to develop risk assessment and modeling dashboard for local policymakers in Canada, https://www.digitalsupercluster.ca/

2019-2021 *Team Lead & Senior Education Finance Expert*, **USAID LEAP III**
Development, piloting, and implementation of course on education finance for USAID education officers world wide, https://limestone-analytics.com/

2019 *Senior Innovative Financing & Evaluation Expert*, **World Vision & UNICEF**
Impact bond feasibility study for projects to reduce stunting in Lesotho

2018-2019 *Impact Evaluation/RCT Lead*, **World Vision, Youth Ready Project**
Lead for the impact evaluation of pilot projects for a youth employment training program in El Salvador and Honduras, https://www.wvi.org

2018 *Campaign Finance Policy Expert*, **Ministry of Attorney General of British Columbia**
Expert witness on the impact of newly introduced campaign finance regulations.

2017-2021 *Lead External Evaluator,* **IGATE-T Girls' Education Challenge project**
Lead external evaluator for the official evaluation of the World Vision led IGATE-T project, funded through the UK (DFIC/FCDO)'s GEC challenge fund.
https://www.open.ac.uk/about/international-development/projects-and-programmes/

2000 - 2003 *Consultant & Practice Area Manager*, **Anderson Economic Group**
Contributed to economic modeling and evaluation projects for public sector clients; led market and education analyses https://www.andersoneconomicgroup.com/

Funding & Awards

Grants & Other Funding

1. Jarislowsky-Deutsch Chair in Economic & Financial Policy, Queen's University. Since 2014. Endowed university research chair providing salary support, course buyout, & research stipend
2. SSHRC's Canada New Frontiers in Research Fund (NFRF), Special call for innovative approaches to research in the pandemic context; Grant amount: **$235,411** CAD; Date: 2022-2025. "New approaches to maintaining research quality during times of crisis: Re-imagining peer review when rapid dissemination is needed for policy." Role: *Principal Investigator (PI)*, with co-PI David Maslove (Queen's)
3. Natural Sciences and Engineering Research Council of Canada (NSERC), Emergining Infectious Disease Modelling (EIDM) program; Grant amount: **$1,250,000** CAD; Date: 2021-2024. "One Society Network - Mathematical modelling of multi-sector impact of pandemics and control policies." Role: Co-PI, with Chris McCabe (U Alberta) and a relatively large team of economists and epidemiologists across several institutions
4. Canada's Digital Technology Supercluster, COVID-19 Program; Grant amount: **$2,200,000** CAD; Date: 2020-2021. "Looking Glass - Protecting Canadians in a Return to Community." Role: Economic Modeling Lead on the project, which supported academic-industry partnership combining economic & epidemiological modeling; Admin: Kings Distributional Systems in partnership with Limestone Analytics and Queen's University
5. Social Sciences and Humanities Research Council of Canada (SSHRC), Insight Grant; Grant amount: **$116,924** CAD; Date: 2017-2023. "To whom should we donate? Understanding project selection and coordination problems in charitable giving and crowdfunding." Role: *Principal Investigator (PI)* with collaborators Luca Corazzini and Chloe Tergiman
6. Spencer Foundation education grant; Amount: **$27,600** USD; Date: 2012-2013; "Assessing Affirmative Action Using Specially-Designed Field Experiments: How Policy Influences Incentives, Effort and Achievement." Role: collaborator, with Thomas Dee and Joseph Price (PI)
7. Arsht Research on Ethics and Community Grant; Amount: **$24,478** USD; Date: 2011-2012. "Is the American dream for sale? Using new data on the timing of earmark requests and contributions to assess the ethical standards in the US Congress." Role: *Principal Investigator (PI).*

Research & Teaching Awards

2022	Queen's University nominee, Governor General's Innovation Award. (The university could nominate one candidate/project for the national award.)
2020	Chair of Excellence, Economics, Ca' Foscari, University of Venice (deferred due to COVID)
2019	Dan Usher Prize for Excellence in Economic Research, Queen's University
2018	QED Teaching Award, Economics Department, Queen's University
2015	QED Faculty Research Prize, Economics Department, Queen's University
2013	Provost Research Award in Business and Social Sciences, University of Miami
2012	Provost Research Award in Business and Social Sciences, University of Miami
2009	James W. McLamore Research Award in Business and Social Sciences, U Miami

Research

Academic Publications

1. C. Cotton, A. Nordstrom, J. Nanowski, and E. Richter, Can Discussions About Girls Education Improve Academic Outcomes: Evidence from a Randomized Development Intervention, *World Bank Economic Review*, forthcoming 2024

2. N. Afodjo, C. Cotton, M. Jones, and L. Scholle-Cotton The impact of pandemic school closures in Canada, chapter in 2024 State of the Federation book published by McGill-Queen's University Press book, forthcoming 2024

3. C. Li and C. Cotton, Profiling restrictions in a model of law enforcement and strategic crime, *European Journal of Law & Economics*, 2023. https://doi.org/10.1007/s10657-023-09766-9

4. C. Cotton, B. Hickman and J. Price, Affirmative action and human capital investment: Evidence from a large contest experiment, *Journal of Labor Economics*, 40(1): 157-185, 2022.
   previously NBER Working Paper w20397
   Featured in articles at *Quartz*, FiveThirtyEight.com, and *The Chronicle of Higher Education*

5. C. Cotton, B. Crowley, B. Kashi, H. Lloyd-Ellis, and F. Tremblay, Quantifying the economic impacts of COVID-19 policy responses in (almost) real time, *Canadian Journal of Economics*, v54, 2021

6. Z. Kurzawa, C. Cotton, N. Mazurkewich, A. Verney, J. Busch-Hallen, and B. Kashi, Training healthcare workers increases IFA use and adherence: Evidence and cost-effectiveness analysis from Bangladesh, *Maternal and Child Nutrition*, 17: e13124, 2021

7. C. McCabe, V. Adamowicz, R. Boadway, D. Breznitz, C. Cotton, N. de Marcellis-Warin, S. Elgie, E. Forget, R. Gold, E. Jones, F. Lange, S. Peacock, & L. Tedds, Renewing the social contract: Economic recovery in Canada from COVID-19, *RSC Policy Briefing*, Royal Society of Canada COVID-19 Task Force, Dec 2020.

8. M. Agranov, C. Cotton and C. Tergiman, Persistence of power: Repeated multilateral bargaining with endogenous agenda setting authority, *Journal of Public Economics*, 184: 1-15, 104126, 2020 (lead article)

9. L. Corazzini, C. Cotton and T. Reggiani, Delegation and coordination with multiple threshold public goods, *Experimental Economics*, 23: 1030-1068, 2020

10. C. Cotton, F. McIntyre, A. Nordstrom and J. Price, Correcting for bias in hot hand analysis: Analyzing performance streaks in youth golf, *Journal of Economic Psychology*, 75b: 1-10, 2019

11. C. Cotton and C. Li, Clueless Politicians: On Policymaker Incentives for Information Acquisition in a Model of Lobbying, *Journal of Law, Economics & Organization*, 35: 425-456, 2018

12. R. Boleslavsky and C. Cotton, Limited capacity in project selection: Competition through evidence production, *Economic Theory*, 65: 385-421, 2018

13. R. Boleslavsky, C. Cotton and H. Gurnani, Demonstrations and price competition in new product release, *Management Science*, 63: 2016-2026, 2017

14. C. Cotton and A. Dellis, Informational lobbying and agenda distortion, *Journal of Law, Economics & Organization*, 32: 762-793, 2016

15. C. Cotton, Competing for attention: Lobbying time constrained politicians, *Journal of Public Economic Theory*, 18: 642-665, 2016

16. L. Corazzini, C. Cotton and P. Valbonesi, Donor coordination in project funding: Evidence from a threshold public goods experiment, *Journal of Public Economics*, 128: 16-29, 2015

17. R. Boleslavsky and C. Cotton, Grading standards and education quality, *American Economic Journal: Microeconomics*, 7: 248-279, 2015
    Featured in an AEA *Research Highlight* and in our column at *Vox-EU*

18. R. Boleslavsky and C. Cotton, Information and extremism in elections, *American Economic Journal: Microeconomics*, 7: 165-207, 2015
    Featured in my column at *The Washington Post* and in the press at *IB Times*, *Inverse*, *PsychCentral*, *Milenio* and *Discovery News*

19. S. Campos, C. Cotton and C. Li, Deterrence effects under Twombly: On the costs of increasing pleading standards in litigation, *International Review of Law and Economics*, 44: 61-71, 2015

20. C. Cotton and C. Li, Profiling, screening and criminal recruitment, *Journal of Public Economic Theory*, 17: 964-985, 2015

21. C. Cotton, C. Li, F. McIntyre and J. Price, Which explanations for gender differences in competition are consistent with a simple theoretical model? *Journal of Behavioral and Experimental Economics*, 59: 56-67, 2015

22. C. Cotton, Submission fees and response times in academic publishing, *American Economic Review*, 103(1): 501-509, 2013

23. C. Cotton, F. McIntyre and J. Price, Gender differences in repeated competition: Evidence from school math contests, *Journal of Economic Behavior and Organization*, 86: 52-66, 2013
    Featured in articles at *Forbes*, *Vox-EU*, and *Huffington Post*

24. C. Cotton, Pay-to-play politics: Informational lobbying and contribution limits when money buys access, *Journal of Public Economics*, 96: 369-386, 2012

25. C. Cotton and C. Liu, 100 horsemen and the empty city: A game theoretic exploration of deception in Chinese military legend, *Journal of Peace Research*, 48: 217-223, 2011
    Featured in article at *U.S. News & World Report*

26. C. Cotton, Multiple bidding in auctions as bidders become confident of their private values, *Economics Letters*, 104: 148-150, 2009

27. C. Cotton, Should we tax or cap political contributions? A lobbying model with policy favors and access, *Journal of Public Economics*, 93: 831-842, 2009 (lead article)

Books

Forthcoming 2024: I am the editor of a forthcoming book on the broad impacts of COVID-19 in Canada. It will be published by McGill-Queen's University Press as its 2024 volume in its State of the Federation series

Select Academic Working Papers

1. C. Cotton, B. Hickman, J. List, J. Price, and S. Roy, Productivity Versus Motivation in Student Effort: Evidence from a Structurally-Motivated Field Experiment, R&R at *Journal of Political Economy*

2. R. Boleslavsky, B. Carlin and C. Cotton, A Model of Challenge Funds: How Funding Availability and Selection Rigor Affect Project Quality, R&R at *European Economic Review*

3. L. Corazzini, C. Cotton, E. Longo and T. Reggiani, Pro-Rich and Progressive: Policy Selection and Contributions in Threshold Public Goods Experiments, R&R at *Journal of Public Economics*
4. A. Nordstrom and C. Cotton, The impact of a severe drought on education: More schooling but not more learning, R&R at *American Educational Research Journal*
5. C. Cotton and E. Rafferty The Broader Impacts of Covid-19 in Canada, An Introduction, forthcoming chapter in McGill-Queen's University Press book
6. R. Boleslavsky, B. Carlin and C. Cotton, Competing for Capital: Auditing and Credibility in Financial Reporting
7. G. Canavire-Bacarreza, C. Cotton, M. Jetter, and A. Montoya Agudelo, Polarized Education Levels and Civil War
8. C. Cotton, A. Nordstrom and Zachary Robb, Out-pedaling the poverty trap: The effect of bicycles on education in Zimbabwe
9. C. Cotton, B. Hickman, and J. Price, Affirmative action, shifting competition, and human capital accumulation: A comparative static analysis of investment contests

   Works in progress include several ongoing projects using experiments to explore collective action and cooperation among strangers (with Luca Corazzini and others), research on how incentives and support shape study effort and learning (with Brent Hickman, John List, and others), research on increasing the integration of evidence within organizations, and explorations of misinformation, cancel culture, and political divides.

Select Expert Reports & Policy Briefs

1. Cost-Benefit Analysis of the S4T Savings Groups Program, with F. Temblay and Z. Robb, *World Vision Canada*, 2023.
2. Cost-Benefit Analysis of Positive Parenting Training, with K. Safar, *World Vision Canada*, 2023.
3. Approaches to the cost-benefit analysis of Technical and Vocational Education and Training (TVET) programs, expert report on behalf of the US gov Millennium Challenge Corporation, 2023.
4. Charting a Future for Emerging Infectious Disease Modelling in Canada, with M. A. Lewis. P. Brown, C. Colijn, L. Cowen, T. Day, R. Deardon, D. Earn, D. Haskell, J. Heffernan, P. Leighton, K. Murty, S. Otto, E. Rafferty, C. Hughes Tuohy, J. Wu, H. Zhu (2023), *NSERC Emerging Infectious Disease Modeling* white paper, 2023.
5. Evidence-Based Decision-Making at World Vision Canada, with R. Bahn, B. Kashi, and N. Muntasir *World Vision*, 2023.
6. Cost Benefit Analysis of the Unlock Literacy program model, with H. Fox, *World Vision Canada*, 2023.
7. The Return on Healthy School Feeding: Impacts, Considerations, and Design Factors, with S. Carillo, S. Hamilton, B. Kashi, and Z. Robb, *World Health Organization*, 2021.
8. Value for Money Analysis of the IGATE-T Girls' Education Challenge project in Zimbabwe, with J. MacKinnon, A. Nordstrom, Z. Robb, and L. Wallace, *UK FCDO* and *World Vision UK*, 2021.
9. IGATE-T Community Based Education Study in Zimbabwe, with A. Nordstrom, Z. Robb, R. Sampson, S. Veenstra, and L. Wallace, *UK FCDO* and *World Vision UK*, 2021.
10. Endline Evaluation of the IGATE-T Girls' Education Challenge project in Zimbabwe, with H. Britt, J. MacKinnon, A. Nordstrom, Z. Robb, S. Veenstra, and L. Wallace, *UK FCDO* and *World Vision UK*, 2021.
11. Building the Canadian Shield: A New Strategy to Protect Canadians from COVID and from the fight Against COVID, A Policy Proposal, with M. Agnew, T. Ayinde, A. Beaulieu, C. Colijn, M.

Crowe, I. Dhalla, J. Ferbey, R. Greenhill, B. Haggart, B. House, R. Imgrund, J. Jebwab, J. Khangura, J. Kwong, C. McCabe, A. Morris, J.-P. R. Soucy, and A. Tuite, *COVID Strategy Choices Group, Global Canada*, December 2020.

12. The Economic Costs of Delayed Policy and Delayed Vaccines, with B. Crowley, *Limestone Analytics COVID-19 Policy Brief* and *JDI Public Policy Paper*, 2021.
13. New Variants of COVID-19: What Are the Economic Costs? with B. Crowley, B. Kashi, H. Lloyd-Ellis, and F. Tremblay, *Limestone Analytics COVID-19 Policy Brief* and *JDI Public Policy Paper*, 2020.
14. Will the Canadian Shield Lockdown Policy Save Jobs in Ontario? with B. Crowley, B. Kashi, H. Lloyd-Ellis, and F. Tremblay, *Limestone Analytics COVID-19 Policy Brief* and *JDI Public Policy Paper*, 2020.
15. COVID-19 Planning for 2021: Comparing the Economic Impact of Alternative Recovery Scenarios, with B. Crowley, B. Kashi, H. Lloyd-Ellis, and F. Tremblay, *Limestone Analytics COVID-19 Policy Brief* and *JDI Public Policy Paper*, 2020.
16. Malawi in 2025: Emerging from Crisis? A Scenario Planning and Economic Analysis of Malawi's Economy, with C. Brady, B. Crowley, S. Davis, C. Farquharson, B. Kashi, H. Lloyd-Ellis, and F. Tremblay, *Limestone Analytics* and *Malawi National Planning Commission*, 2020.
17. Cost-Benefit Analysis of Interventions to Improve Primary Education Quality in Malawi (Report and Policy Brief), with B. Kashi, J. MacKinnon, J. Makuwira, A. Nordstrom, L. Wallace, and B. Wong, *Limestone Analytics* and *Copenhagen Consensus Center*, 2020.
18. Cost-Benefit Analysis of Interventions to Decrease Secondary Education Dropout Rates in Malawi (Report and Policy Brief), with N. Kanyongolo, B. Kashi, J. MacKinnon, A. Nordstrom, L. Wallace, and B. Wong, *Limestone Analytics* and *Copenhagen Consensus Center*, 2020.
19. Determinants of community economic resilience to COVID-19 in Canada, with B. Crowley, C. Farquharson, H. Lloyd-Ellis, and L. Rawling, *Eastern Ontario Leadership Council*, 2020.
20. Bicycle Education Empowerment Program Evaluation, with A. Nordstrom and S. Davis, *World Vision UK*, 2020.
21. Midline Evaluation of the IGATE-T Girls' Education Challenge project in Zimbabwe, with S. Davis and A. Nordstrom, *UKAid/DFID* and *World Vision UK*, 2019.
22. Impact Evaluation of the Youth Ready project in El Salvador and Honduras, with Z. Kurzawa and F. Tremblay, *World Vision Canada*, 2019.
23. Impact Bond Feasibility Study for addressing nutrition and stunting in Lesotho, with S. Davis, B. Kashi and Z. Kurzawa, *World Vision International* and *UNICEF*, 2019.
24. Opinion on Campaign Finance Policy, *Ministry of Attorney General of British Columbia*, 2018.
25. Evaluation of a prenatal supplement adherence program in Bangladesh, with Z. Kurzawa, and N. Mazurkewich, *Nutrition International*, 2018.
26. Baseline Evaluation of the IGATE-T Girls' Education Challenge project in Zimbabwe, with A. Nordstrom, J. Mackinnon and B. Kashi, *DFID UK* and World Vision UK, 2018.
27. Evaluation of the IGATE girls empowerment program in rural Zimbabwe, with B. Kashi and J. Nanowski, *World Vision International*, 2017.
28. Financing SMEs: How to Evaluate Impact, with B. Kashi and A. Galvin, *World Vision Canada*, 2017.
29. The Public School Academy Funding Gap: Revenue Disparities between Charter Schools and Traditional Public Schools in Michigan, with P.L. Anderson and S.D. Watkins, *Michigan Chamber Foundation*, 2003.

30. Fiscal Analysis of Michigan's Schools, with P.L. Anderson and S.D. Watkins, *Michigan Chamber Foundation*, 2003.
31. Workforce Development Study, with P.L. Anderson and C. LeNet, *State of North Carolina, Department of Commerce*, 2002.
32. Funding Inequality of Michigan's Public Schools, with P. Anderson and I. Geckil, *Equity in Education Foundation*, 2001. Presented at the U.S. White House.
33. Failing Schools in Michigan: The Surprising Scale, with P. Anderson, *Choices for Children Foundation* and *State of Michigan, Senate Committee on Education*, 2001.
34. Narrative on city housing and economic distress in Detroit for HUD Renewal Community application, *City of Detroit* and *U.S. Department of Housing and Urban Development*, 2001.
35. Fiscal Analysis of the 'Link Michigan' Broadband Proposal, with P.L. Anderson and I.K. Geckil, *Michigan Telecommunications Association*, 2001.
36. Effects on the City of Pontiac of the Opening of Ford Field, with J. LeBaron and V. Wrotslavsky, *BBK Ltd.* and *Detroit Lions, Inc.*, 2001.
37. Local economic development land use studies prepared for various clients from 2001-2003 including the City of Norfolk, VA, the City of Fort Wayne, IN, and Berrien and Cass Counties, MI.

Select Op-Eds and Blog Articles

1. "Measuring the impact of drought on education by combining development project data with satellite imagery," with Ardyn Nordstrom, *Limestone Impact Blog*, October 5, 2022
2. "Developing new methods to estimate the benefits of savings groups," *Limestone Impact Blog*, Sept 14, 2022
3. "Where can funding make the biggest difference? Malawi Priorities project ranks social sector investments," *Limestone Impact Blog*, Aug 5, 2022
4. "If you build it, will they eat it? Understanding plant based meat investment risks," *Limestone Impact Blog*, Apr 13, 2022
5. "Effective maternal and child nutrition programs require healthcare worker training," with Z. Kurzawa, *Limestone Impact Blog*, Apr 6, 2022
6. "Does digitizing government payments increase financial inclusion among the poor?" *Limestone Impact Blog*, Apr 5, 2022
7. "Unintended consequences of Bill 124s public sector wage restrictions during COVID-19," with S. Senkaiahliyan, *Economics and Policy*, Jan 24, 2022
8. "Shutdown policy ignores economic consequences in order to minimize Covid-19 infections at any cost," *Economics and Policy*, Apr 29, 2020
9. "Dear Florida, Can NY borrow some ventilators? The U.S. needs better coordination of medical equipment across states," with N. Renwick, *Economics and Policy*, Apr 8, 2020
10. "The NYTs is wrong. More people should walk up escalators," *Economics and Policy*, Apr 5, 2017
11. "The impact of Trudeau's cash-for-access fundraising," *IRPP's Policy Options*, February 2, 2017 [link]
12. "Lack of government research funding biases policy to favor special interests," *Economics and Policy*, Dec 27, 2016
13. "Campaign finance reform and the market for access," *Economics and Policy*, Aug 26, 2016
14. "Campaign finance reform not enough: More public research funding also needed," *Economics and Policy*, Apr 1, 2016

15. "Be scared of politicians who refuse to disclose information," *Economics and Policy*, Mar 10, 2016
16. "How the long American campaign can make candidates more extreme," The Monkey Cage at *The Washington Post*, May 8, 2015 [link]
17. "The unrecognized benefits of grade inflation," with R. Boleslavsky, *VoxEU.org*, Aug 16, 2014 [link]
18. "Can gender differences in competition explain the achievement gap?" with F. McIntyre and J. Price, *VoxEU.org*, Oct 21, 2010 [link]
19. "How corporate money will reshape politics: Help for challengers?," Room for Debate at *The New York Times*, Jan 21, 2010 [link]

Conferences, Workshops & Departmental Visits

Conference Organizer

June 2024 Canadian Economic Association Annual Conference
organizer for public economics sessions (upcoming)

Nov. 2023 Canadian Public Economics Group (CPEG) Annual Meeting, Queen's University
Local organizer

June 2023 Canadian Economic Association Annual Conference (organizer for public economics and broader impact of Covid sessions)

Jan 2023 "Charting a Future for Emerging Infectious Disease Modelling in Canada"
Co-applicant for the NSERC EIDM network leadership workshop at the Banff Intl. Research Station (BIRS)

June 2022 Canadian Economic Association Annual Conference (public economics organizer)

June 2021 North American Summer Meetings of the Econometric Society
Paper selection committee for *both* the Microeconomic Theory group and the Applied Microeconomics group.

June 2021 Canadian Economic Association Annual Conference (public economics organizer)

Nov. 2020 Canadian Public Economics Group (CPEG) Annual Meeting, Online Conference
Co-organizer with Arnaud Dellis and Maria Gallego

June 2020 Canadian Economic Association Annual Conference (public economics organizer; cancelled)

June 2019 Canadian Economic Association Annual Conference (public economics organizer)

Nov. 2018 Workshop on the Economics of Strategic Communication and Persuasion with Applications to Evidence-based Public Policy; co-organizer with Ming Li and Jian Li

June 2018 When Business and Politics Collide: Joint Conferences on Organizational Economics and Political Economics, Queen's University; organizer of the political economy conference

June 2018 Canadian Economic Association Annual Conference (public economics organizer)

Nov. 2017 Canadian Public Economics Group (CPEG) Annual Meeting, Queen's University
Primary organizer and chair of the scientific committee

Oct. 2017 JDI conference on sustainable development to mark the 40th anniversary of the Hartwick Rule; Queen's University, co-organizer with John Hartwick

Public Lectures

"Understanding what the real barriers are to improving academic performance," invited talk at Queen's University alumni event in New York City, June 2023

"Road to Recovery: Resilience," Queen's University panelist for public event considering the future beyond COVID-19 as part of the Road to Recovery series, Oct 2021

"The Economic Costs of COVID-19: Bringing together economic and health projections to inform policy," COVID Corner Anniversary Edition: Vaccines vs. Variants, Cumming School of Medicine, University of Alberta, national webinar reaching 1500 healthcare professionals and policymakers, Mar 2021

"Maximizing Your Organization's Impact Through Innovative Financing," John Deutsch Institute Public Lecture Series, Toronto, Canada, 2019

"Promises and Pitfalls of Innovative Financing," workshop for international development program staff, Global Affairs Canada, Ottawa, Canada, 2019

"Predicting the 2008 Election," University of Miami Dialog for Democracy Public Lecture Series, Coral Gables, Florida 2008

Invited departmental seminars: Baruch College CUNY; Binghamtom University SUNY; Brigham Young University; Clemson University; Cornell University; Florida Atlantic University; Florida International University; McMaster University; Michigan State University; North Carolina State University; Notre Dame University; Queen's University; Queen's School of Business; Queen's School of Medicine; Ryerson University; Simon Fraser University; Stanford University, GSB; Texas A&M University; Université Laval Université du Québec a Montreal; University of Alberta; University of Brescia; University of British Columbia-Okanagan; University of Chicago, Harris School of Public Policy; University of Guelph; University of Iowa; University of Louisville; University of Miami; University of Montreal; University of Padua; University of Pittsburgh; University of Toronto; University of Washington; Western University; Wilfrid Laurier University

Conference Presentations: American Economic Association; Association of Public Economic Theory; Canadian Economic Association; Canadian Public Economic Group; Caribbean game theory conference at the U Netherlands Antilles; CIREQ Conference on communication and persuasion; CIREQ & JDI Conference on communication and persuasion; Cornell Political Economy Conference; Econometric Society, North American Meetings; Econometric Society, World Congress; Economic Science Association, European Meetings; Game Theory Society, World Congress; International conference on game theory at Stony Brook; Midwest Economic Theory; Miami Economic Theory Conference; Ottawa School of Economics, Inaugural conference; Public Choice Society, World Congress; Québec Political Economy Conference at Mont Ste Anne; Québec Political Economy Conference at Mont Tremblant Strategy and the Business Environment Conference at UT Austin; Tournaments contests & relative performance evaluation conference at NCSU; UQAM, CIRPÉE Political Economy Conference

Talks or workshops for governments & NGOs: Government of Canada, Global Affairs; Government of Ontario, Ministry of Labour, Training, and Skills Development; National Bank of Rwanda; Nutrition International; One Society Network; USAID, Africa Bureau; World Vision, Canada; World Vision, UK

Editorial Responsibilites

Reviewer for Journals

Top 5 Econ Journals: American Economic Review; Econometrica; Journal of Political Economy; Quarterly Journal of Economics; Review of Economic Studies; *Other Journals:* AEJ: Economic Policy; AEJ: Microeconomics; American Political Science Review; B.E. Journal of Economic Analysis and Policy; B.E. Journal of Theoretical Economics; Business and Politics; Canadian Journal of Economics; Economic Bulletin; Economic Inquiry; Economic Journal; Economic Theory; Economica; Economics and Politics; Economics Letters; European Economic Review; European Journal of Political Economy; Games; Games and Economic Behavior; International Economic Review; Journal of Economic Theory; Journal of Economic Behavior and Organization; Journal of Economics & Management Strategy; Journal of the

European Economics Association; Journal of Experimental Economics; Journal of Law, Economics and Organization; JPE: Microeconomics; Journal of Politics; Journal of Public Economics; JPE: Microeconomics; Labour Economics; Manchester School; Marine Corps University Journal; Mathematical Social Sciences; National Tax Journal; Public Choice; Public Finance Review; Rand Journal of Economics; Review of Economics and Statistics; Review of Industrial Organization; Regional Science and Urban Economics; Scottish Journal of Political Economy; Southern Economics Journal; Springer Nature; Sustainability; Theoretical Economics

Reviewer for Book Publishers and Funding Organizations

Agency for Science, Technology and Research, A*STAR (Singapore); FONDECYT (Chile); Institute of Economic Studies (IES-Prague); National Science Foundation (USA); W.W. Norton & Company; Pearson: Higher Education; Routledge; Social Science and Humanities Research Council of Canada (SSHRC)

Teaching & Advising

Program Creation

Certified Professional Impact Associate (CPIA) program at Queen's University (http://cpia.queensu.ca/)
Co-creator of a professional program designed to teach staff of NGOs and government agencies about incorporating evidence and evaluation into the design and implementation of their programs and policies

Education Finance, Public Financial Management and Innovative Financing training program
U.S. Agency for International Development (USAID), Africa Bureau, Washington D.C.
Team Lead for the development and piloting of a series of courses for USAID education staff about public and private financing of development projects and education systems

Undergraduate Courses Taught

Development Economics (Queen's); Intro Macroeconomics (honours and non-honours, Miami); Game Theory (Miami & Queen's)

Econ Graduate Courses Taught

Game Theory (PhD core, Miami); Public Economics (MA/PhD, Queen's); Development Economics (MA/PhD, Queen's); Information & Experimental Economics (PhD, Queen's)

MPA / PMPA Courses Taught

Economics and Cost-Benefit Analysis (Queen's); Program Evaluation (Queen's); Economic Capstone (Queen's)

Professional Programs

Co-developed and taught the Certified Professional Impact Analyst (CPIA) program at Queen's

Lead for the development, piloting, and teaching of Education and Public Financial Management courses at USAID, Washington, D.C. (USAID University; LEAP III funding)

Ph.D. and Postdoc Supervision

Current

- Moshi Alam, Postdoc, Economics, Queen's U, 2021-2024; co-supervisor with Steve Lehrer
- Leena Yara, Ph.D., Education, Queen's U, 2024 (expected). committee
- Abid Alam, Ph.D, Economics, Queen's U, 2026 (expected); supervisor
- Chenkai (Jerry) Liang, Ph.D, Economics, Queen's U, 2027 (expected); supervisor
- Zemar Hakim, Ph.D, Economics, Queen's U, 2028 (expected); supervisor

Past

- Nabil Afodjo, Postdoc, Economics, Queen's U, 2021-2023; co-supervisor with Maggie Jones

- Fredric Tremblay, Postdoc, NSERC One Society Network and Queen's U, 2021-2023; co-supervisor with Huw Lloyd-Ellis
- Ardyn Nordstrom, Ph.D., Economics, Queen's U 2022; supervisor
  dissertation: "Evaluating Education: An Economics Analysis of Education in Rural Zimbabwe"
  placement: Assistant Professor, School of Public Policy, Carleton University
- Fredric Tremblay, Ph.D., Economics, Queen's U, 2021; supervisor
  dissertation: "Savings Groups: Model, Welfare and Design"
  placement: NSERC One Society Network Postdoc
- COVID-19 Research Project Supervision, for Mitacs rapid response grants, 2021:
  Supervisor or co-supervisor for six-month research projects conducted by Ph.D. students Ludovic Auger, Baiyou Chen, Rebecca Dafoe, and Mahtab Hanzroh
- Jason Adams, Ph.D., Economics, Queen's U, 2020; supervisor
  dissertation: "Essays on immigration and other social policies in Canada"
  placement: Researcher, Employment and Social Development Canada
- Maggie Jones, Ph.D., Economics, Queen's U, 2018; co-supervisor
  dissertation: "An economic analysis of the treaty right to education"
  placement: Assistant Professor, University of Victoria; currently, Emory University
- Alexander McLeod, Ph.D., Economics, Queen's U, 2017; co-supervisor
  dissertation: "Price Signals"
  placement: Florida; currently School of Information, University of Michigan
- Richard Ishac, Ph.D., Queen's U, Economics, 2017; co-supervisor
  dissertation: "Authority, communication and discrimination in agency models"
  placement: Economist, National Bank of Canada
- Cheng Li, Ph.D., Economics, U Miami, 2015; supervisor
  dissertation: "Essays in political economy and public policy"
  placement: Assistant Professor, Mississippi State Univ.; currently Zhongnan University

M.A. and B.A. supervision, Queen's University

- Currently working with eight MA students on the early stages of their MA essays for 2024.
- Amit Sidhu, 2023; M.A. research: "Assessing the Impacts of Londons Ultra Low Emission Zone on Congestion, Pollution, and Bike Volume"
- Lakshmi Anandaraj, 2022/23; B.A. undergraduate research fellowship research: "Impact of COVID-19 disruptions on labour market inequality"
- Brock Mutic, 2021-23; B.A. undergraduate research assistant research: "Public Health Decision Making in Times of Crisis"
- Shane Brimacombe, 2022; M.A. research: "Differences in Returns to Education Between Visible and Non-Minorities in Canada"
- Christine Wu, 2021; M.A. research: "Water Collection Times and Women's Labour Market Outcomes: Evidence from India"
- Zachary Robb, 2021; M.A. research: "Bicycles as a means of empowerment and economics development: Evidence from Zimbabwe"
- Hunter Powell, 2021; M.A. research: "The politics of COVID vaccination opinions and beliefs: differences across red and blue states"
- Deaglan Jakob, 2021; M.A. research: "How politics affect regional immigration"
- Jason Yiu, 2021; M.A. research: "Partner match quality and personal finances"
- Antonio Di Marco, 2019; M.A. research: "How excise taxes affect the decision to smoke for younger and older adults"
- Emily Zong, 2018; M.A. research: "Investment Strategies of Sovereign Wealth Funds"

- Maxime Le Moullec, 2018; M.A. research: "Displaying balances in red, negative numbers increases payments on credit card debt: Experimental evidence"
- Warren Ferguson, 2018; M.A. research: "Retirement Decisions of Canadian MPs"
- Kiran Toor, 2018; M.A. research: "Evaluating the relative effectiveness of retirement savings nudges"
- Karen Chu Sam Loo, 2018; M.A. research: "Understanding nepotism as cooperation among kin"
- Younes Abulhawa, 2018; M.A. research: "Store Brands and the Consumer Perception"
- Emily Shorrock, 2018; M.A. research: "Investigating the effects of the interest rate on Canada student loans"
- Marcus von Massow, 2018; M.A. research: "Efficiency and bias in the NBA draft"
- Nikola Milutinovic, 2018; M.A. research: "Evidence of the 'double-dividend' effect from Canada's carbon taxes"
- Shelly Kaushik, 2017; M.A. research: "Voting behavior by age and generation: Canadian elections from 1965 to 2015"
- Thomas Hindle, 2017; M.A. research: "Loss aversion, policy stickiness, and its effect on public policy"
- Elliott Windfeld, 2017; M.A. research: "Dirty taxes: An analysis of the expected impact of Alberta's new carbon tax"
- Isabella Mira, 2017; M.A. research: "The signaling value of deciding to become a citizen"
- Jacob Smiley, 2017; M.A. research: "Approximating the relationship of urban form and economic outcomes"
- Dayna Bartlett, 2017; M.A. research: "Evaluating the effect of longer license suspensions on impaired driving"
- Christine Truong, 2016; M.A. research: "The impact of minimum wage on body mass index in Canada"
- Lachlan Jay MacKinnon, 2016; M.A. research: "Descriptive accounts of Canadian lobbying, 1996-2016"
- Yiannis Kipouros, 2016; M.A. research: "Labour market outcomes for high school graduate of Ontarios double cohort"
- Jeffrey Hicks, 2015; M.A. research: "Tobacco taxes in Canada: An Analysis of Elasticities and Salience"; Awarded the *2015 Scarthingmoor Prize* for the best M.A. essay in economics
- Victor Brinic, 2015; M.A. research: "A critical analysis of Ontario works directives and regulations"
- Alex Fontaine, 2015; M.A. research: "The impact of commuting burden on life satisfaction"

This is exhibit 'B' referred to in
affidavit of Christopher Cotton
sworn before me, this 6th
day of June 20 24

A COMMISSIONER FOR TAKING

Opinion on Covid-19 pandemic and policy impacts on Alberta businesses

Prepared for: the Government of Alberta

Subject: Rebecca Marie Ingram and Christopher Scott, carrying on business as The Whistle Stop Café v. His Majesty the King in Right of Alberta Court of King's Bench Action No. 2301 12271

June 6, 2024

Christopher Cotton, Ph.D.
Professor of Economics, Queen's University, Kingston, Ontario
cc159@queensu.ca | http://www.christophercotton.ca/

Table of Contents

Figures and Tables

I. Introduction

I.A. Instructions and Certification

1. I have been asked by the Respondent, His Majesty the King in right of Alberta, to provide my expert opinion to the Court with respect to economic issues that may arise in this proposed class action lawsuit, specifically with respect to the application for certification of this action as a class proceeding.

2. I understand and acknowledge that as an expert providing opinion evidence, my role is to assist the Court. This role includes the duty to provide fair, objective, impartial, and independent assistance to the Court. My expert opinion report, and my opinions contained within it, are provided in accordance with this duty and I confirm I am willing and able to comply with this duty. I understand that my duty to the Court includes not only my expert report, but also extends to any testimony I may be required to give in support of my expert report.

3. This report is included as Exhibit B in the affidavit asserting these claims.

I.B. Objective of Report / Opinions Sought

4. I was asked to provide an expert opinion report addressing the following issues that may be relevant to the Certification Application:

(i) From March 17, 2020, until the present, what factors may have existed or currently exist to determine or affect whether a business operating in Alberta suffered losses, including and in addition to any Public Health Orders referred to in Appendix A of the Statement of Claim?

(ii) To what extent, if any, would the factors identified in response to the above question affect different industries and sectors of businesses operating in Alberta from March 17, 2020, until the present?

(iii) Is there a manner in which it is possible to determine on a class-wide basis whether any of the factors you identify in response to the above questions, either singularly or jointly, may have caused or contributed to any losses suffered by a business operating in Alberta from March 17, 2020, until the present?

(iv) Is there a manner in which it is possible to determine on a class-wide basis what portion of losses, if any, suffered by a business in Alberta between March 17,

2020, and the present was caused solely by the Public Health Orders of the Chief Medical Officer of Health referred to in Appendix A?

(v) Is it possible to determine, on a class-wide basis, whether any losses a business may have occurred during a portion of time within the class period were sustained, shifted, negated, or otherwise affected during the remainder of the class period?

(vi) Are there any further relevant economic issues within my expertise that, in my opinion, are raised by the Action or the certification application?

I.C. Expert Identification and Qualifications

5. My name is Christopher Cotton, Ph.D. I am a Full Professor in the Department of Economics at Queen's University, where I hold the Jarislowsky-Deutsch [Endowed Research] Chair in Economic & Financial Policy. I hold cross-appointments with the Queen's School of Policy Studies and the Queen's School of Medicine, in addition to my primary appointment in economics.

6. Other academic and professional appointments include serving as Director of the John Deutsch Institute for the Study of Economic Policy at Queen's University (since 2016), Scientific Director of the Canadian Public Economics Group (since 2018), Research Director at Limestone Analytics (since 2017), Assistant Professor of Economics at the University of Miami School of Business Administration (2008-2014), and co-Director of the One Society Network for emerging infectious disease modeling (2021-2024).

7. I earned my undergraduate degree in economics from Michigan State University and my M.A. and Ph.D. degrees in economics from Cornell University. Much of my research focuses on how data, information, analysis, and evidence influence policy; collective action and policymaking in complex environments with competing interests; and how to measure the broader economic and social impacts of policies and programs. My research has appeared in leading peer-reviewed academic journals such as the *American Economic Review*, *Journal of Public Economics*, *Management Science*, *Journal of Labor Economics*, the *Canadian Journal of Economics*, and the *American Economic Journals*.

8. Since March 2020, much of my research and academic policy engagement has focused on understanding the non-health impacts of Covid-19 and pandemic policies. This includes work to understand the impact on education outcomes, businesses, and the workforce, including their employment status, income, and working hours. It also includes collaborations with some of Canada's leading epidemiologists and public health researchers to understand the dynamic relationship between economic and public health outcomes and how they are jointly affected by policy.

9. In the early months of the pandemic, I was one of the senior members of a research team developing new, more responsive methods for quickly and accurately estimating the economic costs of different lockdown and recovery scenarios. This research resulted in the Short-Term Underutilized Dynamic Input-Output (STUDIO) model, which allows us to estimate the local- and sector-specific costs and benefits of alternative epidemiological and public health scenarios, lockdown policies, and recovery efforts. I review this model in more detail in later sections of this opinion. This model has been peer-reviewed and published in the *Canadian Journal of Economics*.

10. This research led to significant grant funding and follow-up projects using our framework to measure the impact of alternative policy proposals and scenarios. Related work includes:

a. Queen's University nominee for the 2022 Governor General Award based on my research on the economic impacts of Covid-19.

b. Invited member of the Royal Society of Canada Taskforce on Covid-19's working group for economic recovery from 2020-2021.

c. Economic modeling lead for Global Canada's Covid Strategic Choices Group from 2020-2021.

d. Economic modeling lead for the $2.2m federally funded "Looking Glass" project, which combined health, economic, and risk analyses for local policy decisions. This was funded through a Canada Digital Technology Supercluster grant, 2020-2021.

e. Research Director for Limestone Analytics, a Kingston-based consulting firm that conducted analyses using the STUDIO model for various government groups.

f. Co-Director of the One Society Network (OSN, 2021-2024) housed at the Institute for Health Economics at the University of Alberta. Funded by the Natural Sciences and Engineering Research Council of Canada with support from the Public Health Agency of Canada, the OSN supported collaborative research between epidemiologists, economists, and other social science and public health researchers across Canada.

g. Co-editor for a forthcoming volume of papers on the broader impacts of Covid-19 to be published as the 2024 volume of the State of the Federation book series for McGill-Queen's University Press.

h. I delivered several research presentations at various institutions on measuring the economic impact of pandemics and Covid-19 policy. My media engagements included interviews with the CBC and The Globe and Mail,

multiple appearances on Global News Canada, and public lectures at Queen's and the University of Alberta.

11. Much of my Canada-focused research on Covid-19 has included estimates for the Province of Alberta. Additionally, I coauthored a fit-for-purpose analysis of Alberta policy for the Institute for Health Economics at the University of Alberta, co-directed the One Society Network for the future of pandemic research through the Institute for Health Economics at the University of Alberta, and was a panelist and presenter for the Covid Corner Anniversary Edition webinar: Vaccines vs. Variants through the Cumming School of Medicine, University of Alberta, reaching 1500 healthcare professionals and policymakers.

12. My CV is attached as the previous exhibit, Exhibit A, under the same affidavit.

II. Summary of Opinions

9. This opinion concerns whether businesses suffered losses due to the Chief Medical Officer of Health (CMOH) orders implemented during the Covid-19 pandemic and whether it is feasible to determine whether individual businesses suffered such losses and estimate the value of these losses on a class-wide basis.

Fundamental challenges

10. There are two primary challenges that any class-wide assessment of losses due to CMOH orders faces.

11. First, the CMOH orders were just one of the many changing and interconnected factors affecting the business environment, customer behavior, and firm profits when the CMOH orders were implemented. No empirical method can credibly disentangle the losses associated with the CMOH orders from other factors with high accuracy.

12. This inaccuracy is a concern whether we are working to estimate the impact of the lockdowns at an aggregate level, using industry-wide data or detailed data on many firms over time, or if we are working to empirically estimate the impact on an individual firm basis by considering changes in outcomes and trends that correspond to the turning on and off of specific policies.

13. Second, firm experiences during Covid-19 were highly individualized. This means that even if one could reasonably estimate average losses within an industry or subsector due to CMOH orders, these estimates will remain inaccurate predictors of the losses faced by individual businesses. In most subsectors, individual firms have experienced losses (or gains) that have been widely different than the average, even when controlling for other observable characteristics like firm size.

Evaluating firm-level losses

14. An assessment of firm losses will benefit substantially from an analysis of the firm's own detailed data on sales, costs, investments, production, and other factors affecting their profits.

15. This includes high-frequency data on prices and transactions to assess on a daily basis how the changes in measures and trends correspond to the timing of the implementation and relaxation of CMOH orders. It also includes accounting for changes in strategies, production, and costs, information on the share of sales from in-person and in-province customers, descriptions of how their operations were impacted directly by the lockdowns (distinguishing, for example, essential and non-essential businesses), and financial data.

16. This data can be used, along with an assessment of how lockdowns likely contributed to broader impacts on the sector, to estimate the firm's losses that may be attributed to the CMOH orders in particular.

17. Analysis of individual firms can help ensure that the assessment of whether they faced losses due to the CMOH orders and the estimated value of any losses is more accurate than is otherwise possible. Such estimates will never be perfect, but they would be more accurate than relying on industry-level assessments with limited data on the individual experiences of different firms.

Class-wide assessments

18. Conducting such estimates of individual firm losses on a class-wide basis presents its own challenges.

19. The wide variation in individual firm experiences means that no one-size-fits-all algorithm can accurately estimate the losses for individual businesses across all subsectors or individual experiences. The factors and considerations that must be accounted for to assess the losses of one business may differ from those needed to assess the losses of other businesses.

20. Using an algorithm or set of algorithms applied systematically across the class to estimate individual business losses will not be accurate. Thus, there is a significant tradeoff between a method's accuracy and scalability.

21. I consider what a class-wide estimation method may look like, recognizing that such an estimate is necessarily less accurate than estimates at the individual firm level.

22. On a class-wide basis, one could formulate an algorithm for estimating losses using a fixed set of individual firm data. The individual firm data could be overlaid with data on trends at the industry or subindustry level and location-specific factors. The algorithm may also incorporate differences in operations, investments, costs, and activities that may be formulated for different firm types to understand how different factors typically contribute to profit.

23. Constructing different algorithms for different subsectors of firms or operational models (e.g., online vs. in-person retail) will be better than relying on a single model for an entire industry. Rather than construct one model of sales, costs, investments, and other profit drivers for grocery stores and clothing stores, it would be beneficial to model those types of retail separately. Similarly, it would be better to develop separate profit models for full-service restaurants and partial-service eating establishments.

24. Additionally, the more data models incorporate from individual firms, the better. Accounting for more details on a firm's characteristics and changes experienced under Covid allows the estimated losses to differ based on individual firm descriptors.

25. This must include firm locations, subsector, and size at minimum. However, the models become more accurate as they can account for factors like the share of sales coming from online, the share of sales from out of province, changes in production and investments, and changes in costs, revenues, and financial statements.

26. The outcomes of such a system will allow one to estimate whether businesses faced losses due to CMOH policy and to estimate these losses.

27. However, there remains a question about the feasibility of this approach at a class-wide level. Ensuring accuracy in the individual business loss estimates requires detailed analyses and modeling at the subsector level and the incorporation of sufficient details on individual business operations and outcomes before and during Covid-19. There may be few efficiency savings compared to conducting a detailed analysis of individual firms, and the approach will be less accurate than one that allows for customizing the assessment at the firm level.

Other considerations

28. Throughout the report, I highlight several additional points.

29. Covid-19 resulted in substantial losses to businesses during the first half of 2020. After 2020, however, the evidence strongly suggests that businesses have earned greater profits than expected had Covid-19 not occurred. For many sectors, these later gains outweigh the initial losses. As such, it is not clear that the typical business in Canada "suffered losses" due to Covid-19 when the study period extends to include more than just 2020.

30. This claim only holds universally for some businesses, as there was substantial variation in individual business experiences. During the first wave of the pandemic, some businesses reported increases in revenues, even as other businesses in their sector saw substantial declines. Similarly, not all sectors experienced increased profits in later years, with some sectors like "Arts, Entertainment, and Recreation" continuing to see lower profits than before the pandemic through 2023.

31. Just as was the case for estimating losses due to CMOH orders, estimating the losses individual businesses faced due to Covid-19 as a whole is done best on a firm-by-firm basis.

III. Overview of Business Losses During and After Covid-19

32. Before providing opinions on the questions of interest, it is helpful to provide relevant background for subsequent sections. I formalize the concept of losses in the context of Covid-19 and this opinion, provide an initial overview of the data and evidence around the impact of Covid-19 (and related policies and changes) on businesses in Canada and discuss the individualized nature of firm experiences during the pandemic.

III.A. Defining Losses

33. In forming opinions about measuring the losses faced by businesses in Alberta, it is necessary to precisely define what it means for a business to "suffer losses."

34. For this opinion, I define "suffered losses" as "experienced reduced profits or valuation" compared if Covid-19 had not occurred or a specific policy or set of policies had not been implemented.

35. This definition has two key features worth discussing. First, it focuses on profits and valuation. Second, it defines losses relative to a counterfactual scenario.

36. The first feature is in contrast to the *Statement of Claim* (paragraph 59), which categorizes the losses faced by a plaintiff as

a. loss of profit;
b. loss of revenues;
c. loss of rents;
d. extra expenses incurred;
e. loss of property;
f. loss of customer base; and
g. loss or termination of employees.

37. The Statement of Claim list of losses is too broad and imprecise for several reasons, including the following:

a. There is substantial overlap in the categories. For example, a reduction in customer base likely implies a reduction in revenue, which contributes to a reduction in profits.

b. Several of the losses on the list are likely to be partially offset by other factors. For example, a reduction in customer base and the corresponding loss of revenue is likely offset by reduced expenses; a loss or termination of employees is likely offset by reduced wages.

c. There is no clearly defined counterfactual against which losses are measured. The Statement of Claim appears to measure losses relative to a world without

Covid-19 rather than relative to a world with Covid-19 but no CMOH orders. However, this is not explicit.

38. In the following sections, I focus on quantifying lost profits and documenting factors contributing to the losses. I focus less on calculating changes in valuation. However, the methods introduced for estimating the impact on profits could be applied to other aspects of balance sheets to observe changes in equity or assets and liabilities, for example. These factors, together with profit trends, could, to some extent, be used to estimate the longer-term impacts on valuation.

39. Note that focusing on "lost profits" does not ignore the other factors discussed in the statement of claim but assumes that profits reflect damage caused to businesses by the other factors. Throughout the discussion, I treat lost types (b)-(g) from the statement of claim as contributors to past and future profits rather than reliable measures of business losses in and of themselves.

40. As discussed in Section IV, many factors contribute to any losses suffered by Alberta businesses. It is, therefore, essential to specify what the losses are being defined relative to. In this section, I primarily focus on methodologies for estimating losses to businesses relative to their expected trends without Covid-19. I also discuss how one might approach estimating losses associated with specific factors. Sections VI and VII provide details on the technical approaches to estimating losses caused by Covid-19 and the CMOH orders.

III.B. Counterfactuals and the Estimation of Impact

41. When estimating the impact of Covid-19 in aggregate, one would ideally compare the observed outcomes with outcomes that would have occurred in the absence of Covid-19. Similarly, when estimating the impact of a specific policy or set of policies (e.g., the CMOH orders), one would ideally compare the observed outcomes with outcomes that would have occurred with Covid-19 but without the policies.

42. In other words, the impact is defined as the difference between what occurred and what would have occurred under a "counterfactual" scenario that we do not observe. We can never know with certainty what would have happened without Covid-19 or in the absence of a policy or other change that was implemented. Therefore, researchers estimate counterfactuals based on available data and evidence to serve as a "best guess" for what would have occurred without the pandemic or specific policies.

43. The impact of Covid-19 (or the specific policies) is estimated by comparing businesses' observed outcomes with their expected outcomes under the estimated counterfactual. If we knew the true counterfactual with certainty, then we would be confident in our impact estimates.

44. Any such analysis is only as good as the counterfactual estimate. To the extent that the estimated counterfactual is inaccurate, our impact estimates will also be inaccurate. The more uncertainty there is about the counterfactual, the more uncertainty there is around the estimated impact.

45. Researchers have developed experimental, empirical, and modeling methods to estimate counterfactuals against which outcomes can be compared to estimate impact. The best approach typically depends on the available data and the nature of the event or policy being evaluated. In later sections, I review the most promising methods for estimating the counterfactuals needed for the impact evaluation of Covid-19, both at the economywide level and the level of individual businesses.

46. To estimate a no-Covid counterfactual, the best approach typically involves using trends from before the pandemic to project outcomes since 2020 if Canada and Alberta had continued along the pre-Covid path in the absence of the pandemic. Estimating a counterfactual to study the impact of one or more individual components or policies (e.g., CMOH orders) may use both trends around the implementation (and removal) of the policies and comparisons across locations that may have faced different local implementation.

47. For illustrative purposes, much of my discussion of factors affecting businesses and the impact on different sectors of the economy uses the average outcomes from the three years before Covid-19 as a rough approximation of the "no-Covid" counterfactual. Where it is evident that there were significant increasing or decreasing trends during this period, I treat the continuing trend from 2020 through 2023 as a rough counterfactual.

48. It is important to emphasize that these are rough estimates to facilitate understanding and that Section VI outlines rigorous approaches to provide more reliable and accurate no-Covid counterfactual estimates.

III.C. Trends in Business Financial Performance Including Profits

49. For the figures below, I analyze Statistics Canada's quarterly data, aggregating the financial reports from all businesses in Canada by quarter from Q1 2017 through Q4 2023.[1] I adjust the values for inflation using the average quarterly consumer price index and then convert the dollar values into indexes, where the average inflation-adjusted value from 2017-2019 is set to 100.

50. Figure III.1 shows the quarterly trends in various profit indicators, including

a. Operating profits - revenue minus expenses, not including taxes, costs of debt, etc.

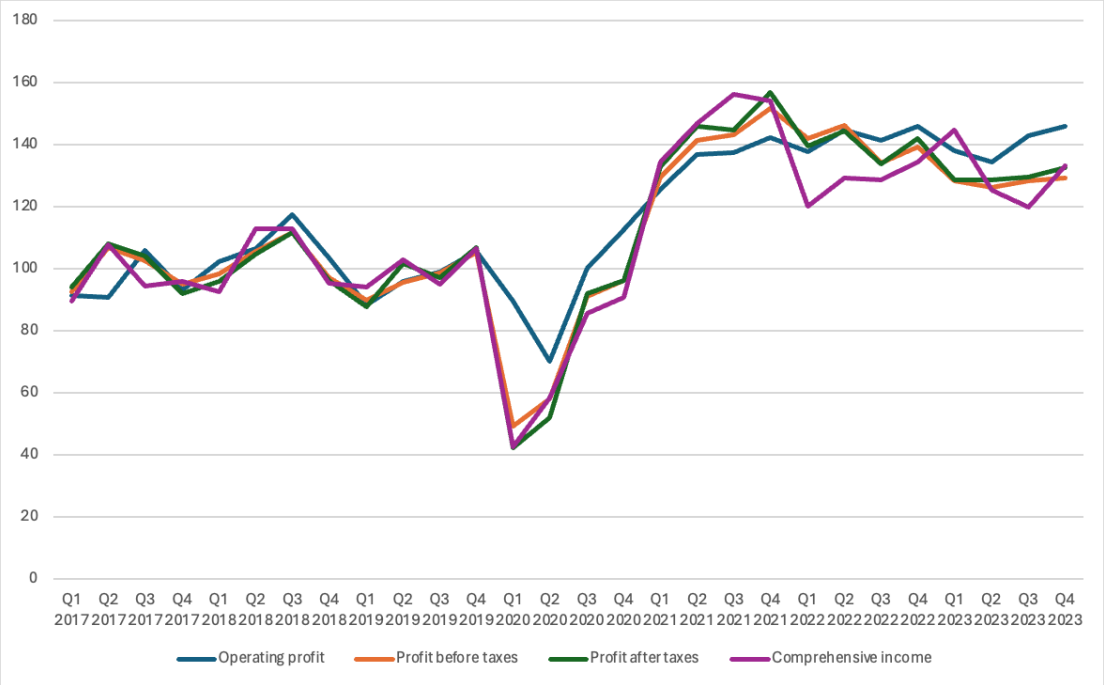
[1] Statistics Canada. Table 33-10-0224-01 Quarterly balance sheet, income statement and selected financial ratios, by total all industries, non seasonally adjusted (x 1,000,000)
https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3310022401

b. Profits before taxes – operating profits minus debt costs, etc., but not taxes.

c. Profits after taxes – account for debt costs, etc., and taxes.

d. Comprehensive income – adjusts profits for unrealized income, such as changes in the value of assets or investments that have not yet been sold.

Figure III.1: Quarterly Nationwide Business Profits (indexed to 2017-19 avg, inflation-adjusted)[2]



Source: Author analysis of Statistics Canada data

51. Given the relative stability in profits from 2017 to 2019, we can, for illustrative purposes, use the average profit levels from this period (equal to 100) to estimate the no-Covid counterfactual in later years. Had Covid-19 not occurred, the prediction is that industry profits would continue to fluctuate moderately around the pre-Covid average (100 in the figure) in later periods.

52. The image shows a substantial change in profits from the 2017-19 trends, starting with the onset of Covid-19 in Q1 2020. In the first half of 2020, aggregate profits declined substantially and rapidly. This was followed by a recovery in the second half of 2020. Then, since 2021, aggregate profits have settled substantially higher than the pre-Covid levels.

53. I use this illustrative example of how Canadawide profits changed over time to highlight some key challenges in estimating the impacts of Covid-19 and related policies.

[2] ibid

54. First, the trends in aggregate profits mask differences across industries, geographies, and individual businesses. One key challenge that a class action faces is to determine a method for approximating losses on a class-wide level that can reasonably account for the differences across individual businesses.

55. Second, while it is reasonable to assume that the decline in profits in 2020 may be broadly attributed to Covid-19, many factors associated with Covid-19 contributed to this decline. So many things were changing in Alberta, Canada, and the world during the early months of Covid-19 that isolating the effect of any one or subset of factors is much more challenging than identifying the broad impact of the pandemic, inclusive of all the individual factors of influence. This does not mean such an analysis is impossible; there are methods for estimating the impact of individual components. But, careful thought must be given to the likely reliability of such methods in this case.

56. Third, Figure 1 shows that the general losses in profits faced by businesses in 2020 have typically been more than offset by gains in profits since 2021. It is reasonable to attribute this overall profit gain to the pandemic, with the individual factors and policies contributing to changes in the business environment in a way that led to higher aggregate profits after 2020. Again, this is an aggregate effect that does not represent the experience of individual businesses. But, it clearly illustrates intertemporal effects that need to be accounted for when estimating losses of Covid-19 or specific pandemic policies.

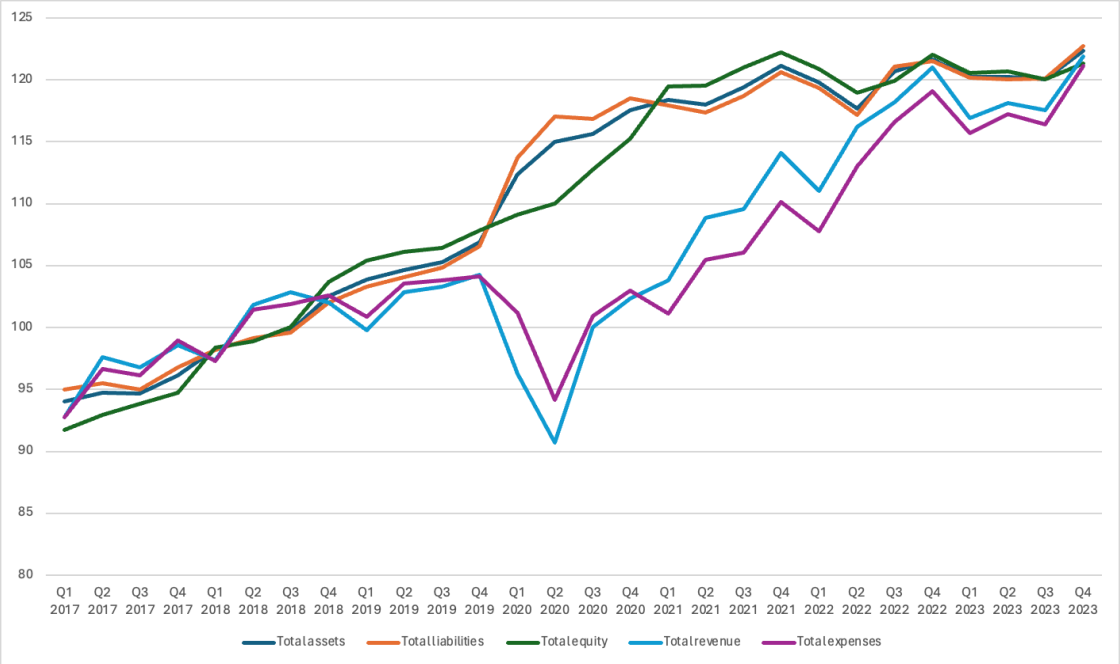
57. All three of these factors contribute to the complexity of the problem of estimating individual business losses (or gains) in profits, especially on a class-wide basis.

Other Financial Details

58. Businesses' losses are not only affected by their lost profits during the observation period but also by changes in their long-term valuation or fundamentals that contribute to future profits. These dynamics add another layer of complexity when estimating business losses, which Section VIII discusses.

59. Figure III.2 shows the quarterly trends in several financial statement indicators, including total assets, liabilities, equity, revenues, and expenses. Some of these components directly contribute to business profits in the quarter in which they occur (e.g., expenditures and revenues), while others (e.g., assets, liabilities) are affect future profits.

Figure III.2: Quarterly nationwide financial performance (indexed to 2017-19 avg, inflation-adjusted)[3]



Source: Author analysis of Statistics Canada data

60. For each financial measure, the trend three years before the pandemic was relatively linear, positive, and increasing. In these cases, the pre-Covid trend can still be used to estimate a counterfactual or best guess as to how these measures would have evolved since Q4 2019 without Covid-19. A rough application of this approach suggests that the pandemic caused substantial differences in these financial indicators from what would have occurred without Covid from 2020 to through 2022, with a return to expectations starting in 2023.

61. One notable observation is that revenue and expenses moved together very closely until Q1 2020, when revenue first fell significantly more than costs but then grew faster than costs, resulting in several years in which businesses operated more efficiently than prior to the pandemic.

62. Another important observation is that while the increase in liabilities outpaced the increase in assets (and equity) in 2020, this was temporary and does not represent a long-term increase in liabilities relative to other factors. Based on this graph, there is no reason to believe that businesses are in a weaker financial position than they were previously.

Other Data

63. Although data from financial statements and business profits may represent the best indicators of business losses during Covid-19, such data is not necessarily reported at a granular enough level to facilitate impact analysis, particularly the impact analysis of individual

[3] ibid

program components. Researchers have also relied on other data, including real-time mobility data, high-frequency financial transaction data, monthly work hours and GDP estimates, and detailed business sales data to help estimate the impacts of various factors on the economy.

64. As I discuss in the following sections, such data can help us better understand the impacts of Covid-19. However, it does not necessarily solve the critical challenges of estimating the losses to Alberta businesses from Covid-19 policies. For example, not all of the data is available in Alberta, and it does not typically allow us to directly observe firm profitability or overall financial performance, limiting its ability to estimate losses. While this data may, to varying degrees, enable the estimation of the impact of policy on sales or production, these are just some of the factors that contribute to business profitability.

III.D. Business Entry and Exit

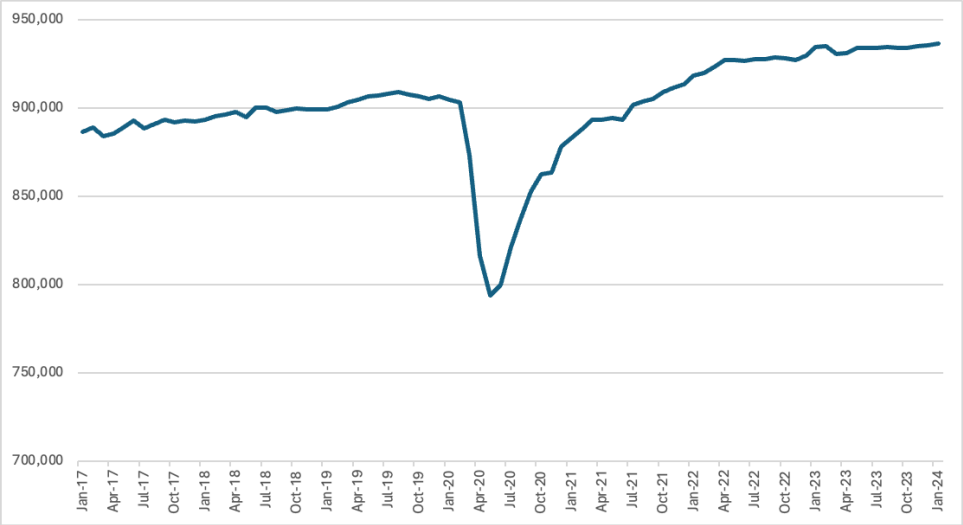
65. One factor that may affect individual business losses due to Covid-19 is whether the business survived the pandemic or exited due to the pandemic or pandemic policy. If the closure of businesses led to the consolidation of business among more efficient firms or an increase in market power amongst survivors, this could also contribute substantially to the increase in business profits since 2020.

66. Some evidence suggests that such factors may be present. A National Bureau of Economic Research paper, for example, showed that the businesses in the US that were already performing poorly before the pandemic were more likely to close.[4] Furthermore, Canada saw a substantial decline in the number of active businesses at the beginning of the pandemic and did not fully recover to pre-pandemic levels until the end of 2021, a trend I illustrate in Figure III.3.[5] The illustrated decline represents temporary and permanent closures, accounting for new business entries.

[4] A. Bartik et al. "Measuring the labor market at the onset of the Covid-19 crisis" (July 2020) NBER working paper 27613 https://www.nber.org/papers/w27613

[5] Statistics Canada, Table 33-10-0270-01, "Experimental estimates for business openings and closures for Canada, provinces and territories, census metropolitan areas, seasonally adjusted" https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3310027001

Figure III.3. Canada-wide number of active businesses by month, 2019-2023[6]



Source: Statistics Canada

67. I analyzed business closures and openings using Statistics Canada data to explore this trend further. Around April 2020, there was a substantial spike in business closures, including both temporary and permanent closures, and a decline in business openings. However, this was a temporary phenomenon, with business closure rates in the later months of 2020 (with the expectation of November) and the following years generally falling below the pre-Covid rates, with the entry and reopening rates also recovering.

68. Table III.1 reports an index I constructed comparing the average monthly value of the different indicators across years. Each indicator's average monthly value from 2017 to 2019 is set to 100.

Table III.1. Canada business monthly opening and closing data (indexed to 2017-19 avg)[7]

	2017	2018	2019	2020	2021	2022
Total Active Businesses	99	100	100	101	98	102
Total Openings	97	101	102	113	103	105
New Entrants	101	100	99	89	105	109
Reopenings	96	101	103	127	102	102
Total Closures	97	102	101	120	97	103
Permanent Exits	98	100	102	102	94	102
Temporary	97	102	101	130	100	103

Source: Statistics Canada and author's analysis

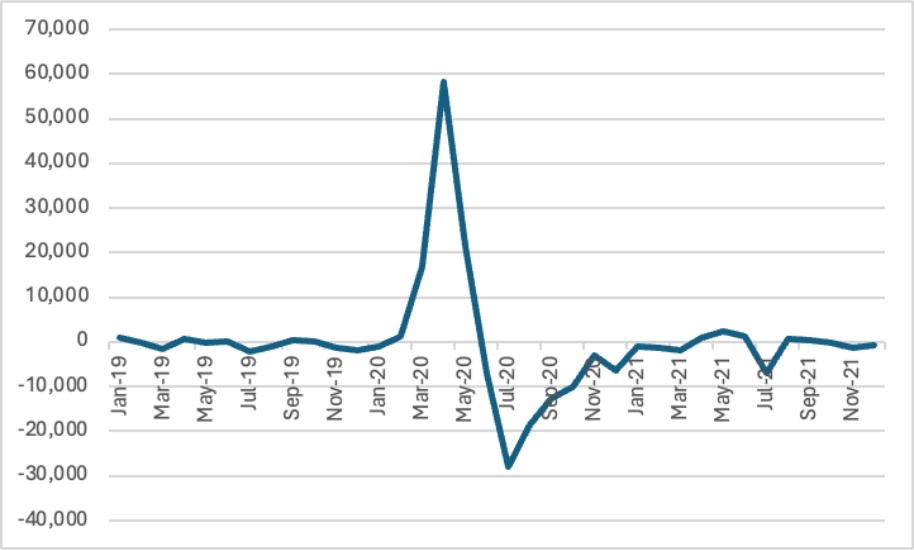
[6] ibid
[7] Author analysis from ibid. Stats Can Table 33-10-0270-01 has an apparent indiscrpency of undocumented adjustment in November 2018, where values for multiple indicators are substantially higher than any trends or documentation suggests they should be. To account for this, I replace Nov 2018 values with an average from adjacent months.

69. The table shows that while permanent entries fell in 2020, they were offset by significantly higher entries in 2021 and 2022.

70. Permanent exits were relatively stable in 2020 but have been lower on average since the pandemic than before. This is mainly driven by significantly fewer businesses exiting in 2021 than expected.

71. In contrast, there was a significant increase in temporary closures and reopenings. This reflects the substantial fluctuation in these values across months, with a spike in temporary closures in spring 2020 followed by an approximately six-month period in which more businesses were reopening than temporary closing. Figure III.4 illustrates the monthly fluctuation in net closures or the temporary closures minus reopenings in that period.

Figure III.4. Net New Temporary Closures by Month[8]



Source: Author analysis of Statistics Canada data

72. Overall, the data is consistent with businesses that would have closed even without the pandemic closing sooner than they otherwise would have. However, it is not consistent with the pandemic driving substantially more firms out of business. If anything, fewer businesses permanently closed in 2020 and 2021 in total than would have otherwise been expected.

73. The temporary closure and reopenings and their impact on total active businesses indicate that businesses faced a volatile environment. A significant number of businesses closed temporarily. As the financial statement data above indicates, these periods of closure likely corresponded to declines in revenues and costs.

[8] ibid.

74. Less clear is the extent to which this volatility and the temporary closure of so many businesses may have contributed to lasting impacts on the business environment, the permanent loss of customers, and the long-run profits of individual businesses.

75. For example, without more detailed individual firm data, we cannot observe how the temporary closure of smaller in-person retailers in spring 2020 may have led customers to permanently shift shopping habits to larger retailers that may have remained open or online outlets.

III.E. Substantial Differences Between Individual Firm Experiences

76. In Section V, I show substantial differences in the impact of Covid-19 across industries. This suggests that, at a minimum, estimation of business losses needs to be done separately for different industries. However, this would be an oversimplification. There are substantial differences in the impact of Covid-19, not just across industry or subindustry but between individual businesses within each sector.

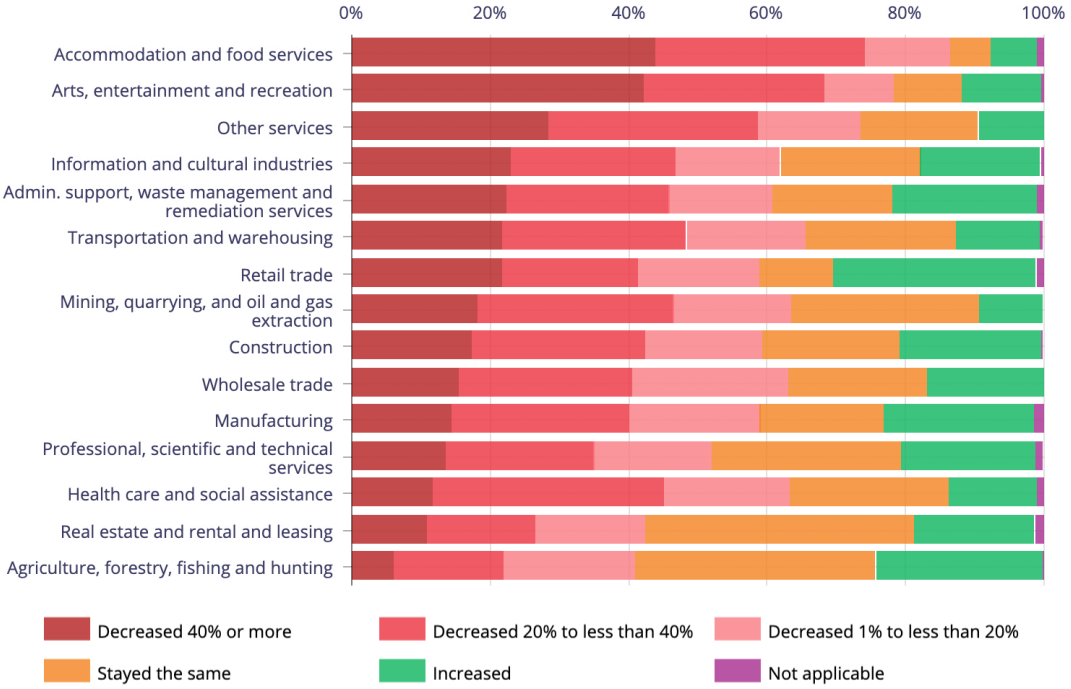
77. This evidence clearly shows that businesses had no one-size-fits-all experience during the pandemic, even among those in the same locations and industries.

78. Some differences in losses due to Covid-19 or specific policies are consistent with patterns that are predictable in general terms, while others depend on a highly individualized experience. Much of this report is concerned with the degree to which the losses can potentially be predicted on a class-wide basis.

79. Figure III.5 is from the Bank of Canada, presenting an analysis of Statistics Canada's "Canadian Survey on Business Conditions" from the end of 2020.[9] [10] The Canadawide data come from business self-reports on how their revenues changed due to the pandemic. The figure shows how some businesses reported that Covid-19 increased revenues while others reported that the pandemic led to very large decreases in revenue.

[9] "Canadian Survey of Business Conditions" (2020) Statistics Canada www.statcan.gc.ca/en/survey/business/5318
[10] T. Grieder et al. "Covid-19's impact on the financial health of Canadian businesses: An initial assessment" (2021) Staff Analytical Note 2021-8 Bank of Canada www.bankofcanada.ca/2021/05/staff-analytical-note-2021-8/

FIGURE III.5. Distribution of reported changes in revenue by sector as a result of the pandemic[11]



Source: Bank of Canada and Statistics Canada

80. The figure illustrates that while most businesses in most sectors said they experienced a decline in revenue due to the pandemic, this was not universally true across sectors. Furthermore, there was a substantial difference between businesses within a sector, with some businesses reporting constant or increased revenues even in industries where many other businesses experienced a substantial decline in revenues.

[11] ibid

IV. Factors Contributing to Business Losses

81. This section provides an opinion in response to Question (i):

> *From March 17, 2020, until the present, what factors may have existed or currently exist to determine or affect whether a business operating in Alberta suffered losses, including and in addition to any Public Health Orders referred to in Appendix A of the Statement of Claim?*

82. The previous section provides an overview of profits and finances following the onset of Covid-19 while arguing that although general trends exist across and within industries, there is also substantial heterogeneity among individual businesses.

83. In this section, I expand on the insights from Section III, outlining a range of factors that likely affected businesses' losses during Covid-19. First, I discuss how general sentiment and external factors may have impacted markets and businesses. Second, I discuss how CMOH orders and other government restrictions may have contributed to losses. These first two discussions mainly consider things from an aggregate or average level. Third, I discuss which factors likely contributed to differences in the individualized business experience under Covid.

IV.A. General Impacts of Covid-19

84. Many factors likely contributed to the economic and financial losses during Covid-19. Substantial contributors include the following.

85. CMOH orders affecting firm production and consumer behavior—Provincial policy and CMOH orders contributed to changes in customer demand and a firm's ability to produce products and provide services. Lockdown restrictions and stay-at-home orders prevented customers from visiting retailers, restaurants, and personal service establishments. They also prevented employees from working in person and affected the ability to work or the types of operations that were feasible.

86. Reduced demand for other reasons—While some customers stayed home because of the CMOH orders, many others stayed home and reduced their economic engagement due to other factors, including:

a. Public messaging by public health units, leaders, and the media—Before the implementation of public health orders and lockdowns, there were already public calls to stay home, avoid unnecessary contact, and contribute to the collective efforts to "flatten to curve" and prevent the healthcare system from being overwhelmed. These calls were accompanied by widely reported experiences in New York City and Italy, where hospitals were being overwhelmed and bodies piling up. These public calls and pleas to do one's part

and stay home should be viewed as separate from the CMOH orders that mandated that people stay home.

b. General fear, anxiety, and uncertainty regarding the pandemic—During the early weeks and months of the pandemic, there was substantial public fear about the transmission of the disease, the ability to control the spread of Covid-19 to prevent health care systems from being overwhelmed, and the risk factors associated with the disease. Much of the population was scared or concerned and sought to avoid in-person interactions before the CMOH orders were implemented.

c. Economic uncertainty—During the early weeks and months of the pandemic, uncertainty about the disease also affected uncertainty about markets, the economy, and the business environment. Economic uncertainty contributes to reduced consumer sentiment or confidence, as people generally respond to economic uncertainty by cutting back their spending and increasing savings to prepare for a possible future shock to their income.

87. The impact of these factors on consumer demand should not be understated. The following subsection reviews evidence showing that there was already a substantial change in consumer behavior driven by these factors before formal CMOH orders were implemented.

88. Transforming business environments—Throughout the pandemic, there were large transformations in markets to which businesses adapted. This includes changing customer wants and needs, the advancement and incorporation of new technology, changing expectations regarding travel and in-person meetings (e.g., firms that used to send someone across the country for an in-person meeting are likely now holding such meetings virtually), and other factors.

89. Reduced willingness to work and changing workforce productivity—There was a significant reduction in the labor force's willingness to work during the pandemic. Several factors contributed to this, including employee concerns about contagion and safety and the need to provide care for family members who were at home (which is affected by school closures and shifts to online learning for children). Such factors may have contributed to production and service disruptions and increased labour costs for firms. I discuss these factors in more detail below.

90. Similarly, new technology, changing workplace environments, employee stress, increased working from home, shift to online schooling of children (largely a Ministry of Education decision), and other factors may have affected labor productivity.

91. Changing operational costs—Typically, firms that saw a reduction in production or sales also experienced a reduction in operational costs, as illustrated in Figure III.2 above. However, firms would have also faced some increased costs of conducting business activities during the

pandemic, such as the need to invest in new safety equipment or technology for online business or higher costs of labour or other inputs.

92. Global economic shock and reductions in out-of-province supply and demand—These and other factors were present not only in Alberta but globally. This contributed to a global economic downturn in 2020, which substantially affected consumer and firm sentiment, cross-province and international trade, and the broader supply and demand of products.

93. Supply chain issues—Substantial supply chain issues, often originating outside of Alberta, disrupted production or increased production costs in some sectors during the pandemic.

94. Vaccine availability—The distribution of vaccines likely affected both consumer demand and firm production. It reduced the uncertainty and fear of public and face-to-face interactions for many individuals, likely increasing the willingness of many people to shop or travel, and affecting the types of interactions available within firms.

95. These underlying factors affect supply and demand in product, service, and labour markets. They affected production, investments, costs, and revenue, transformed markets, and ultimately impacted business profits and valuation.

Key factors for determining business losses

96. The most direct measures of business losses come from the firm's quarterly financial statements, including profits and factors affecting valuation. These data are available at an aggregate level through Statistics Canada and were used in the analysis of firm profits that I presented in Section III.[12] This data presents different measures of profits by industry over time and data on assets, liabilities, equity, and other factors.

97. Reported quarterly, however, the data is typically not frequent enough to analyze changes in outcomes around specific factors, such as policy. Monthly data on hours worked by industry and GDP, as well as real-time mobility data and high-frequency financial transaction data, are typically more suitable for assessing the impact of specific policies but require assumptions to map into firm profit estimates.

IV.B. Relative Importance of CMOH Orders

98. Factors that likely affected business profits and were either defined by or driven primarily by the CMOH orders include:

[12] Stats Can, Table 33-10-0270-01, supra.

a. Restrictions on businesses' ability to produce and sell goods and services, including temporary closures to non-essential businesses, and capacity limits and distancing requirements for in-person activities.

b. Reduced demand caused by stay-at-home orders and travel restrictions preventing customers or employees from traveling to points of business activity or customers choosing not to go out due to mask mandates.

c. Reduced employee productivity or willingness to work caused by work-from-home mandates and in-person school closures.

d. Supply chain disruptions attributable to CMOH orders impact on suppliers within the province.

e. Costs to businesses associated with complying with CMOH orders, such as supporting employee shifts to working from home and retrofitting workspaces.

Potential positive effects of CMOH orders

99. It is important to acknowledge that not all impacts of the CMOH orders on businesses were necessarily negative.

100. To the extent that the CMOH orders reduced contagion and contributed to the flattening of the curve, they may have prevented higher mortality rates or economic losses. The experiences in New York City and Italy, among other places, during the early weeks of the pandemic highlight the potentially catastrophic impacts of society not collectively reducing transmission before the healthcare system became overwhelmed. To the extent that the CMOH orders contributed to avoiding catastrophe, all businesses may have been better off with the orders than without them.

101. For the most part, the discussion in this report assumes that the CMOH orders did not prevent a drastically worse outcome from occurring. However, in March 2020, many policymakers thought the CMOH orders may be playing such a role.

102. Similarly, to the extent that the CMOH orders contributed to the transformations to the economy and business environments, they likely also contributed to the higher profits since 2021 (see Figure 1 above).

103. Research has also shown that moving quickly to relax restrictions and reopen the economy can be more costly to an economy than maintaining initially longer and stricter lockdown restrictions.[13] Stronger and longer up-front restrictions can reduce the likely need for future rounds of restrictions. In general, it is better for an industry to experience fewer but more

[13] C. Cotton et al. "Quantifying the economic impacts of Covid-19 policy responses on Canada's provinces in (almost) real time" (2022) 55 *Can J Econ* 406. https://doi.org/10.1111/caje.12567

intense lockdowns and then be allowed to reopen fully rather than go through a cycle of on-again-off-again restrictions.[14] [15]

104. Furthermore, orders such as mask mandates likely positively impacted customer demand, on average. Because it was a mandate, individual businesses could avoid adopting a mask mandate being interpreted as taking a political stance and potentially driving away a portion of their customers. At the same time, mask requirements increased other customer's feelings of safety and willingness to engage in commerce. Even if some customers do not go out because they find mask-wearing uncomfortable, the empirical evidence suggests that the net impact of mask mandates on consumer activity was positive.[16]

105. Finally, Section C.iii., below, clearly shows that individual businesses had wildly different experiences during the pandemic. Many businesses likely benefited from the CMOH orders, even as others lost profits. For example, orders to close all but "essential" businesses likely increased customers shopping at businesses deemed essential relative to situations in which all businesses were allowed to remain open. Similarly, the closure of most in-person businesses likely shifted demand to online retailers.

Relative impact of CMOH orders on short-term outcomes

106. Researchers have contributed substantial effort to disentangle the impact of different factors on behavior during the pandemic. Of particular interest has been the research disentangling the losses associated with policy, including local or regional lockdown restrictions, from the change in consumer or employee behavior due to fear of Covid or other factors that would have occurred even without policy.

107. Here, I discuss the importance of the CMOH orders relative to other factors contributing to the economic losses faced by businesses in 2020. This discussion assumes that the CMOH orders were not instrumental in avoiding a greater economic disaster (see the brief discussion under the previous header).

108. Most of this evidence comes from rigorous research conducted in other countries, particularly the US. I see no reason to believe that the insights from this work would be qualitatively different in Alberta. However, the specific percentages should be considered a very rough estimate of what a more rigorous analysis for Alberta would likely show.

[14] M. Agnew et al. "Building the Canadian Shield: A new strategy to protect Canadian from Covid and from the fight against Covid" (Dec 2020) Covid Strategic Choices Group, Global Canada https://www.global-canada.org/covid-strategic-choices
[15] C. Cotton et al. "Will the Candian Shield Lockdown Policy Save Jobs in Ontario" (Jan 2021) Limestone Analytics and Global Canada https://www.global-canada.org/covid-strategic-choices
[16] C. Dunphy et al. "The Differential Impact of Reopening States With and Without Covid-19 Face Mask Mandates on County-Level Consumer Spending" (2022) Pub Health Reports 137(5) 1000. https://doi.org/10.1177/00333549221103816

109. While provincial government policy and the CMOH orders likely contributed to the losses suffered by businesses in Alberta during Covid-19, in most cases, they are unlikely to have been the primary driver of business losses relative to the many other factors.

110. A University of Chicago study used cellular phone location data combined with state and county-level variation in the timing and intensity of Covid-19 policies to compare how individual behavior depended on local disease levels versus government policy.[17] They conclude that large declines in consumer traffic generally started to happen before official restrictions were in place. While consumer traffic decreased by 60 percentage points during the initial period of the pandemic, the legal restrictions were, on average, responsible for only a seven percentage point decline in consumer traffic. This means that the legal restrictions accounted for less than 12% of the sizable decline in consumer traffic across all locations in the US during the first wave of the pandemic.

111. A *PNAS* study came to similar conclusions, showing that, generally, people started staying at home *before* public health orders came into effect during the first wave of the pandemic and that the government policies were not responsible for most of the decline in sales that occurred during the lockdowns of 2020.[18] They also reanalyze other data sets, showing how previous analyses that identified larger effects of lockdown policies were flawed. This is not to say that the government policies had no adverse impact on businesses; they were just not the primary factor driving changes in consumer behavior during the early pandemic. They conclude that the government mandates had "only modest effects on behavior, and small but adverse effects on the economy." A National Bureau of Economic Research paper drew similar conclusions that "Shelter-in-place orders drove only a small share of job losses."[19]

112. Another study used cross-state variation in policy and daily data on business and economic outcomes and Covid-19 deaths to assess the impact of different policies. They found that mandated "closures accounted for approximately 8% of the observed decrease in consumer spending, 16% of the observed decrease in business revenue, and 9.5% of the observed decrease in employment."[20]

113. A study using high-frequency data on credit card purchases in the US shows that the stringency of local "non-pharmaceutical restrictions" (public health orders) contributed to decreasing expenditures, but at a significantly smaller scale than factors such as the prevalence of Covid at the local level.[21]

[17] A. Gooslbee and C. Syverson "Fear, lockdown, and diversion: Comparing drivers of pandemic economic decline 2020" (2021) *J Pub Econ* 104311. www.sciencedirect.com/science/article/pii/S0047272720301754
[18] A. Fowler et al. "Evaluating the effects of shelter-in-place policies during the Covid-19 pandemic" (2021) *PNAS* 118(15) e2019706118 doi.org/10.1073/pnas.2019706118
[19] A. Bartik et al. supra
[20] C. Dunphy et al. "The Impact of Covid-19 State Closure Orders on Consumer Spending, Employment, and Business Revenue" (2022) J Pub Health Man & Prac 28(1) 43 doi.org/10.1097/PHH.0000000000001376
[21] A Horvath, B Kay, and C Wix "The Covid-19 shock and consumer credit: Evidence from credit card data" (2023) J of Banking & Fin 152 106854 https://doi.org/10.1016/j.jbankfin.2023.106854

114. A study of localized lockdown policies in Chile suggests that the reduction in economic activity in areas with localized lockdowns was twice the reduction seen in other municipalities not under lockdown.[22] However, this should be treated as an upper bound of the impact of mandated lockdowns, as there are confounding factors (such as uncontrolled risk factors and attitudes) that likely correlate with both the likelihood of lockdown and economic activity without a restriction. The above studies using mobility data attempted to address these concerns by tracking the spontaneous cutbacks in activities in the days leading up to the implementation of formal restrictions.

115. Another avenue of research considered how the pandemic impacted employment willingness to work. One study, for example, documented people's willingness to work and desired work hours during the pandemic, showing substantial declines in labour supply.[23] The decline in willingness to work may reflect at least in part people's efforts to avoid exposure to Covid in the workplace. However, it also reflects increased caretaker responsibilities for children or other family members, some of which may be driven by school closures or other lockdown policies. The paper documents how these factors contribute to tightening the labor market, affecting business labour costs and the ability to maintain or hire employees during reopening periods.

116. Such insights are supported by other research showing that retirements, exists from the labour force and reduced willingness to work among those in the labour force contributed to a tight labour market, even during periods of significantly reduced hours and job loss, and added to the difficulty in business recovery efforts.[24]

117. In another piece of rigorous empirical research supporting such insights, researchers from the Federal Reserve Board and Cambridge University studied the impact that both spontaneous and mandatory social distancing had on labor services and the US GDP. They conclude that "spontaneous social distancing was no less costly than mandated social distancing" or that the cutback in work not driven by formal government restrictions was at least as costly to the economy as those caused by government mandates.[25]

Where and when were CMOH orders were likely most impactful?

118. They would have had a more significant direct impact on firms for which production or sales required on-site or in-person activity. They are likely to directly impact firm production and revenues less in settings where production and sales could be done remotely. Such firms could more easily accommodate shifts to work from home during the pandemic's early stages,

[22] K. Asahi et al. "The effect of Covid-19 on the economy: Evidence from an early adopter of localized lockdowns" (2021) J Glob Health11: 05002 doi.org/10.7189%2Fjogh.10.05002
[23] J. Faberman, A. Mueller, and A. Şahin, "Has the Willingness to Work Fallen during the Covid Pandemic?" (2022) *Labour Econ* 79 102275 https://doi.org/10.1016/j.labeco.2022.102275
[24] E. Forsythe et al. "Where have all the workers gone? Recalls, retirements, and reallocation in the Covid recovery" (2022) *Labour Econ* 78 102251 https://doi.org/10.1016/j.labeco.2022.102251
[25] M Bodenstein, G. Corsetti, and L. Guerrieri, "Social distancing and supply disruptions in a pandemic" (2022) *Quantitative Econ* 13(2) 681 https://doi.org/10.3982/QE1618C

offer greater flexibility to employees at later stages, and were less likely to be subjected to later-stage orders.

119. Regarding timing, the orders were generally the most broad and restrictive during the first wave of the pandemic, starting in March 2020. During the initial weeks, however, there was, on average, a high willingness to follow public health recommendations to stay home and limit in-person interactions. As the evidence above suggests, the formal lockdown orders likely only contributed to a relatively small share of the initial reduction in economic activity during this period.

120. However, as the lockdowns continued, it became clear that the spread of the disease could likely be constrained through more targeted and less restrictive lockdown measures, and the relatively broad public support for the CMOH orders started to weaken. It was around this time that some of the public health messaging around Canada shifted from a call to "flatten the curve" to a discussion regarding "zero Covid" or the eradication of the disease.[26] At the same time, many economists, businesses, and local leaders were calling for at least a partial reopening of the economy, whether through relaxed or better-targeted restrictions.[27] At this point, mandated lockdown policies constrained a growing share of customers and businesses, and it is likely that eliminating, relaxing, or better-targeting restrictions, at least in communities with low rates of Covid, would increase economic activity.[28]

121. Such a narrative is consistent with insights from studies of real-time financial transactions. A study from the US showed that the impact of local disease severity on expenditure decreased substantially between April and July 2020. This suggests that people became more willing to engage in commerce as the pandemic went on, for any local level of contagion.[29]

122. Similarly, a study using high-frequency financial transaction data from the first wave of the pandemic in Spain provides evidence that the relaxation of lockdown restrictions had a larger impact on increasing expenditure than the initial imposition of the restrictions had on decreasing it.[30] This is consistent with the idea that when lockdown mandates were initially implemented, much of the population was already choosing to stay home or limit their interactions without the order and that the mandate did relatively little to further reduce interactions. But, over the course of the initial lockdowns in Spain, "the curve" was successfully flattened, public concern regarding the pandemic relaxed, and people's willingness to engage

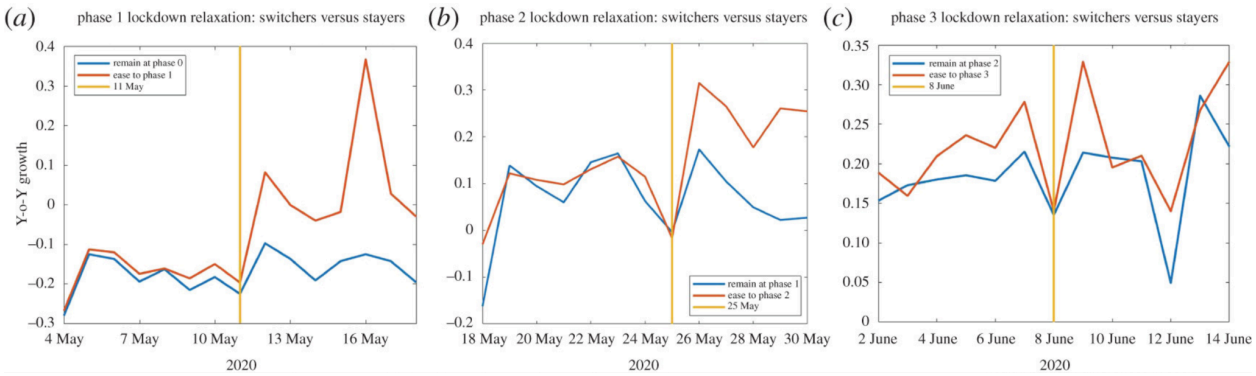
[26] In late April 2020, Dr. Theresa Tam, Canada's chief public health officer, address the possibility of relaxing lockdown measures by saying, "Even a young person might get severely sick or get into the ICU, so it's not a concept that should be supported." This was very different than the messaging a month prior that focused primarily on flattening the curve. R. Patel "Canada's top doctor warns against relying on herd immunity to reopen economy" (25 Apr 2020) CBC News www.cbc.ca/news/politics/herd-immunity-should-not-be-supported-tam-says-1.5545332
[27] C. McCabe et al. "Renewing the Social Contract: Economic Recovery in Canada from Covid-19" (Dec 2020) *RSC Policy Brief,* Royal Society of Canada rsc-src.ca/sites/default/files/Econ%20PB_EN_3.pdf
[28] ibid.
[29] Horvath et al. (2023) supra
[30] V Carvalho et al. "Tracking the COVID-19 crisis with high-resolution transaction data" (2021) Royal Soc Open Science https://doi.org/10.1098/rsos.210218

in commerce increased. By the time lockdown mandates were lifted, they were effectively constraining demand much more significantly than when first implemented.

123. Similarly, during the later waves of the pandemic, an increasing number of people and firms were constrained primarily by the mandated orders. However, during these later waves, the restrictions were generally targeted toward specific activities and had a smaller impact overall.

124. Figure IV.1 presents a graph from this study showing how expenditures changed around the date on which lockdown restrictions were relaxed (moving from phase 0 to phase 1 to phase 2 to phase 3) in some locations.

Figure IV.1. Changes in daily expenditure around phasing out of lockdown restrictions in Spain[31]



Source: Carvalho et al. (2021)

125. A value of zero (0) depicted on the vertical axis corresponds to a counterfactual expectation based on 2019 data. Graph (a) shows that when locations were in phase 0 or the reopening strategy, expenditures in these locations remained between 10 and 20 percent below baseline, increasing to baseline levels in the days after the location moved from phase 0 to phase 1 reopening. Graph (b) illustrates how a similar jump in expenditure existed when a location transitioned to Phase 2 of reopening. There was less of a clear impact in the transition to Phase 3. It is worth noting that the market was also seeing higher expenditures than in 2019 by the time that transitions to phases 2 and 3 occurred.[32]

IV.C. Factors affecting the individual business experience

126. There is no one-size-fits-all narrative to describe the various experiences of individual businesses during Covid-19. There was substantial variation in performance and the likely impact experienced because of different factors at the individual firm level.

127. Examples of factors that lead to differential effects across businesses include:

[31] ibid
[32] ibid

a. Industry, subindustry, business type, and location.

b. Customer profile and their customers' responses and attitudes to Covid-19.

c. Business model and management systems, processes, and approach.

d. Manager and employee profile.

e. Financial strength, including cash and credit access.

f. Other business risk factors and fundamentals going into Covid.[33]

g. Other factors that may affect their agility in the face of changing customer or client demand and business environments.

h. Stability of their supply chain and susceptibility to shortages due to the economic and productivity shocks associated with the pandemic.

i. Essential business status and ability to remain open during lockdowns.

j. The degree to which business operations are in person, remote, and online, and the ability and willingness to efficiently shift to a different type of operation.

k. The type of interaction that sales require for in-person businesses.

l. Location including distance to the border, local community prevalence of Covid-19, population density and risks, and sentiment towards Covid-19.

m. Small business owner age, needs of family members, personal risk factors, and other factors that may affect retirement or workload decisions.

n. Ability to temporarily or permanently lay off staff in terms of union or labour market agreements and costs of rehiring or training.

o. Lost investments and business opportunities that would have gone forward but were taken off the table during Covid-19 due to the changing global business environment and increased risks and uncertainty.

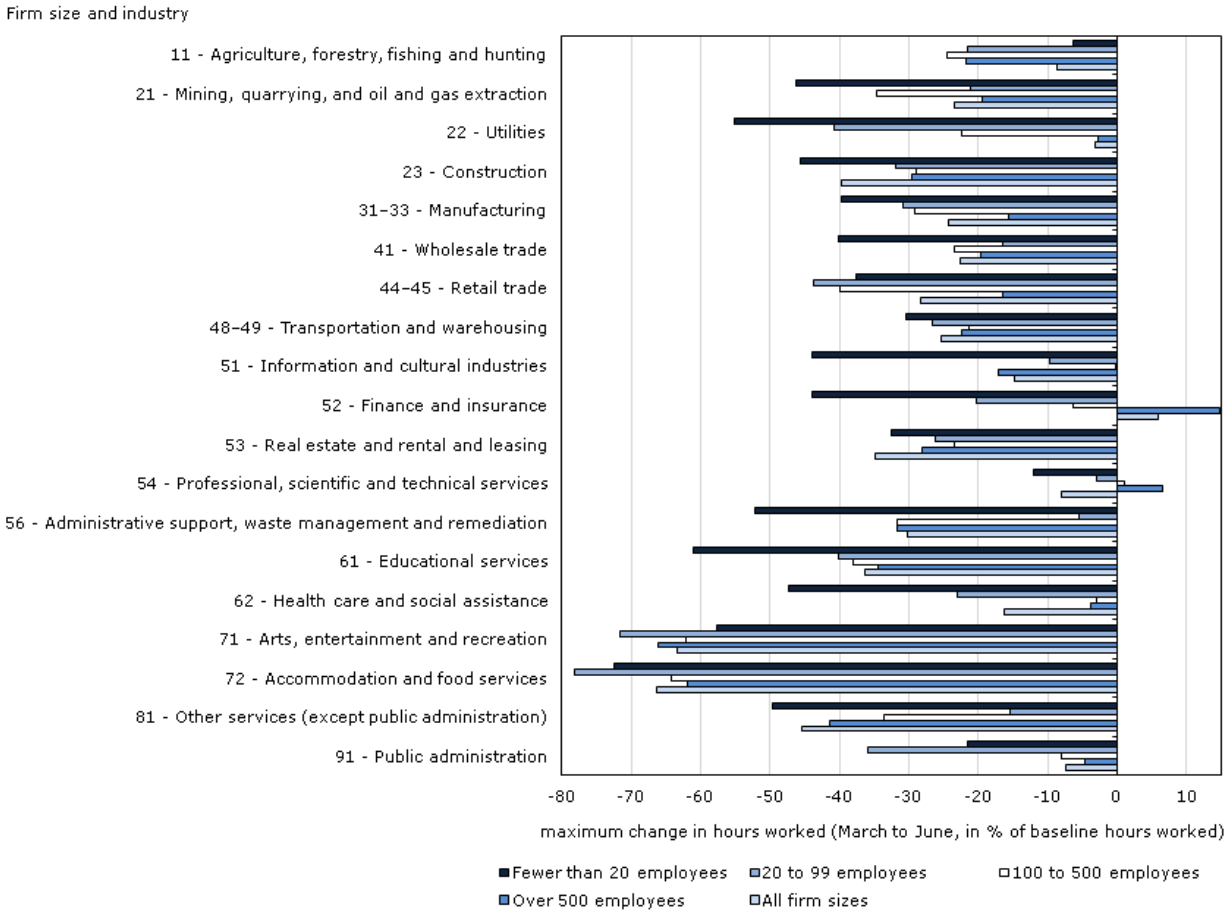
128. Below is a selection of evidence on how specific business characteristics correlate with performance during the pandemic. Most of these examples are from published analyses of data from other countries, most frequently the US.

129. Firm size – The number of employees matters in different ways in different industries.

[33] Businesses that were already performing poorly before the pandemic were more likely to close in the US. A. Bartik et al. "Measuring the labor market at the onset of the Covid-19 crisis" (July 2020) NBER working paper 27613 https://www.nber.org/papers/w27613

130. Figure IV.2 breaks down the Statistics Canada Labour Force Survey data on reduced hours worked (Table V.5 below) by the number of employees, showing wide variation in percentage reduction in maximum reduced productivity during the first wave of the pandemic. The figure shows varying effects across businesses of different sizes, and the relationship between business size and output is inconsistent across sectors. As reflected in Figure IV.1, business size is likely correlated with several factors impacting a business' resilience in the face of the pandemic.

Figure IV.2. Canada-wide maximum monthly reduction in hours worked compared to pre-Covid, by business size and industry[34]



Notes: The maximum reduction in hours worked was obtained by comparing the loss in hours worked in each month (March to June 2020) relative to their respective baselines (i.e., the average from 2017 to 2019 for that month) and taking the month with the largest reduction in hours worked. This was calculated for each industry and firm size. A positive number means that, for each month, the number of hours worked from March to June 2020 exceeded the baseline hours worked.

131. Firm types within sectors – Empirical evidence shows the pandemic tended to shift consumer traffic to smaller, less crowded stores, away from busier venues, and from

[34] D. Grekou "How did the Covid-19 pandemic affect the hours worked in Canada? An analysis by industry, province and firm size" (2021) *Stat Can, Econ Soc Rep.* https://doi.org/10.25318/36280001202100100005-eng

non-essential to essential businesses, including away from bars and full-service restaurants and to grocery stores and food delivery or take out services.[35]

132. I explore industry differences in detail in Section D.

133. Customer characteristics – Customer, owner, and employee socioeconomic and demographic characteristics correlate with business resilience. A Harvard University-based research team assembled a new database of granular-level, real-time business data to study how different subgroups faired during the pandemic.[36] They show that declines in spending were primarily driven by sharp declines among higher-income customers, significantly reducing the revenue of local businesses in affluent areas. While high-income workers tended to experience a quick recovery following the initial economic declines, lower-wage workers, especially those working in high-income communities, experienced longer-lasting declines in labor supply. Others have found similar results.[37]

134. These insights are consistent with the idea that there was substantial heterogeneity between individual consumers' willingness to shop, dine out, or otherwise engage in in-person activities and commerce during the pandemic. Some consumers (e.g., lower income, more rural populations) were more willing to engage in normal in-person activities throughout the pandemic or more quickly after the initial collective efforts to flatten the curve.

135. The impact of CMOH orders on customer demand for an in-person business would have depended on the share of customers willing to shop at the business in person ahead of the relaxation of initial lockdown restrictions or during future periods of lockdowns. This share may depend on customer demographics, location, and date, with larger shares of the population typically willing to engage at later dates.

136. Owner characteristics – Other work calls attention to other groups, showing that among small businesses, those run by mothers with younger children saw relatively large declines in productivity and operations.[38] Others show greater and longer-duration declines in work among minority ethnic and demographic groups in the US, due at least in part to large declines in sectors disproportionately employing people from these groups.[39]

137. Community characteristics – In 2020, I looked at local-level predictors of economic losses in communities across Canada, identifying local characteristics that predicted above-average local resilience and above-average local risks to economic losses.[40] These

[35] Goolsbee and Syverson, supra, and Figure V.6 below.
[36] R. Chetty et al. "The Economic Impacts of Covid-19: Evidence from a New Public Database Built Using Private Sector Data" (2024) QJE 139(2): 829 https://doi.org/10.1093/qje/qjad048
[37] V Carvalho supra
[38] C. M. Kalenkoski & S. Wulff Pabilonia "Impacts of Covid-19 on the self-employed" (2022) *Small Bus Econ* 58: 741-768. https://link.springer.com/article/10.1007/s11187-021-00522-4
[39] K. Couch, R. Fairlie, and H. Xu "Early evidence of the impacts of Covid-19 on minority unemployment" (2020) *J Pub Econ* 192 104287 https://doi.org/10.1016/j.jpubeco.2020.104287
[40] H. Lloyd-Ellis et al. "Economic Resilience Analysis Report" (2021) Limestone Analytics and the Eastern Ontario Leadership Council.

findings are not at the level of individual businesses but rather at the level of local communities. Table IV.2 summarizes the key risk and resilience factors identified in the analysis. It highlights that the characteristics of the local region of the business can affect the local market conditions faced, including the magnitude and duration of the economic downturn.

Table IV.2. Community resilience and risk factors[41]

Resilience: Local characteristics correlated with lower economic losses		Risks: local characteristics correlated with higher economic losses	
Initial downturn (April 2020)	Recovery (Sept 2020)	Initial downturn (April 2020)	Recovery (Sept 2020)
- Large population - Large pre-pandemic remote workforce - Industrial diversity - High education levels	- High education level - High median income - High share of low income households pre-pandemic	- Old population - High median income - Large share of small businesses (fewer than 20 employees)	- High percentage of people speaking neither French nor English - Large share of small businesses (fewer than 20 employees) - Large population

Source: Limestone Analytics report

Key factors for determining business losses

138. Earlier in this section, I discussed how financial and profit data provide the most direct measures of business losses and how combining such data with labour market productivity, GDP, and mobility data can help, to some extent, estimate the losses associated with some specific factors, such as lockdown orders. However, such data primarily facilitates estimation at the aggregate level or across industries, not for specific firms.

139. At the level of an individual business, the firm's financial statements can help identify losses. However, establishing counterfactuals for individual firm performance without Covid-19 or a set of policies is typically more challenging and less accurate than doing so at an economywide or sector aggregate level.

140. Assessing losses at the individual firm level, either due to Covid-19 in aggregate or due to specific policies or sets of policies, will be most accurate when it relies on a combination of industry-level impact estimates, the individual firm financial statements, and detailed information on the individual firm's experiences leading into and during Covid-19.

141. I provide more details on the data and methods required in Sections VI and VII.

[41] ibid

IV.D. Interconnectedness of Firms and Industries

Impacts on one sector, location, or firm spill over to affect others

142. In understanding the differential effects of the pandemic and related factors across industries or firms, it is essential to understand the following:

a. All firms and industries are interconnected through supply chains, workers, and customers. A change that directly impacts one sector of the economy or type of business will indirectly impact other sectors and businesses.

b. Alberta-based sectors and businesses are connected with each other and with those in other provinces and countries.

143. As a point of illustration, consider the substantial reductions in global demand for oil brought on by a worldwide reduction in travel, transportation, and production. These changes originating from outside Alberta substantially impacted the revenue and profits of oil producers in Alberta. It would be incorrect to assume that these changes did not also impact the losses faced by other businesses within Alberta. The decline within the oil and gas industry, a large contributor to the Alberta economy, would have led to less money in the pockets of those affiliated with the industry and, therefore, less business for some of those who sell to the industry as suppliers and service providers, and less business for those who sell to the employees in the industry who may have lost work hours or jobs due to the global decline. The cycle continues with those experiencing the first wave of indirect impacts, seeing a decline in revenue and, thus, reducing their own demands for goods and services. Eventually, all industries are affected to some degree even though the initial (and largest) impact was focused on the oil sector.

144. Such insights are not limited to external shocks to the oil sector but to any other policy or shock impacting any area of the economy. The costs of a government-mandated closure to restaurants and bars, for example, is not only experienced by the restaurants and bars and their employees but are also felt by the suppliers and service providers to these restaurants and bars, and then the suppliers and service providers to the other suppliers, and so on until all sectors are affected to some degree.

145. The key insights can be summarized by:

a. Not all losses for a business or within a sector can be attributed to the policies or shocks that directly impacted that business or sector, and

b. Not all of the costs associated with a policy or shock are incurred by the businesses directly targeted by that policy or shock.

146. This means that one should not fully attribute the total losses in profits or economic activity we measure for one set of businesses to the policies and shocks that directly affected those businesses.

147. This also means that many of the losses experienced by businesses in Alberta are likely attributable to factors originating outside of Alberta, such as a decline in out-of-province demand for Alberta goods and services. A global economic decline will not only affect Alberta businesses that sell to out-of-province consumers but will spill over to affect all sectors of the Alberta economy.

IV.E. Conclusions regarding opinion

148. Government mandated restrictions were only one of the sets of factors contributing to business losses during Covid. When they were initially implemented during the first wave of the pandemic, the evidence suggests that they had a relatively small impact on sales, for example, compared to other factors present in the economy.

149. However, as the pandemic went on, people tended to become less uncertain or scared of the disease and more willing to engage in public interactions and commerce. During these later stages, lockdowns were more likely to be a constraining factor in individual consumer or firm decisions. However, it was also during these later periods that lockdowns were typically more targetted and less-impactful overall.

150. Overall, there was no one-size-fits-all experience for businesses in Alberta, even within the same subsector. The factors that affected one business' sales, strategy, costs, and profits during the pandemic were not necessarily the same factors that affected other businesses in their sector or community.

V. Differential Impacts of Covid-19 by Industry

151. This section provides an opinion in response to Question (ii):

> *To what extent, if any, would the factors identified in response to the above question affect different industries and sectors of businesses operating in Alberta from March 17, 2020, until the present?*

152. This section presents estimates and projections from past research as illustrative examples. Much of this past research presents estimates from the first year of the pandemic for Canada as a whole. While I highlight some evidence specific to Alberta or that extends beyond 2020, such evidence should be viewed as rough estimates or illustrative trends.

153. In Section VI of this document, I describe rigorous methodologies that can produce more accurate estimates of reduced economic activity and business losses due to the pandemic and specific pandemic policy specifically on industries and businesses in Alberta. Conducting comprehensive new analyses is beyond the scope of the current report but is available upon request.

154. The following estimates come from various public reports by Statistics Canada and the Bank of Canada and some of my past published research.

V.A. Overview of Differential Impact

155. Substantial differences existed in the impact of Covid-19 on individual businesses. We observed wide differences in changes to productivity, revenue, and profits during Covid-19 across sectors and subsectors of the economy. Even within the same sector or subsector of the economy, there were heterogeneous experiences, with some businesses emerging as winners facing substantially higher profits and others as losers facing sustained losses or going out of business.

156. Some industries, such as wholesale and resale trade, saw profits remain relatively stable in 2020, followed by substantial gains in profits from 2021 to 2023. However, this does not mean that all wholesale and retail trade businesses were net winners during the pandemic, as some faced significant losses or shut down operations. This was partly determined by the market served, types of products sold, and financial health leading up to the pandemic.

157. Other sectors, such as "Arts, entertainment, and recreation" and "Accommodations and food services," saw substantial and persistent losses compared to expectations had Covid-19 not occurred. But, again, these losses were different across businesses in each sector and depended substantially on individual business characteristics.

158. Overall, the evidence presented in the following subsections illustrates substantial variation in losses among businesses in Alberta.

V.B. Changes in Profits by Sector

159. First, I provide a high-level analysis of business profit data from Statistics Canada in Table V.1. This analysis breaks out the aggregate values and trends presented in Section B.iii by industry. The following table reports aggregate business profits and losses by sector and year from 2017 to 2023. The values come directly from the relevant Statistics Canada summaries of the Quarterly Survey of Financial Statements and are unadjusted for inflation, which I account for in a later table.[42]

Table V.1. Canadawide business profits by sector by year ($millions)[43]

	2017	2018	2019	2020	2021	2022	2023
Agriculture, forestry, fishing & hunting	9,447	7,620	2,896	1,060	14,971	9,335	13,642
Oil and gas extraction & support activities	3,716	-8,676	-1,816	-38,314	34,000	53,370	33,165
Mining and quarrying (except oil & gas)	3,899	6,504	4,905	-2,749	9,942	9,794	8,569
Utilities	4,694	4,865	7,103	4,421	4,419	5,901	6,632
Construction	16,477	23,681	21,495	27,006	34,704	32,693	31,239
Manufacturing	54,568	61,994	63,270	30,653	65,025	69,896	63,844
Wholesale trade	26,166	30,144	22,464	27,239	38,369	44,981	47,594
Retail trade	18,653	17,539	15,390	17,978	28,195	31,593	34,777
Transportation and warehousing	20,895	21,923	24,522	4,780	13,762	21,440	26,153
Information and cultural industries	12,411	11,631	10,661	9,779	10,919	7,468	9,366
Real estate and rental and leasing	34,753	39,466	32,354	30,253	56,470	61,286	54,114
Professional, scientific and technical services	19,591	21,214	24,334	20,134	28,067	31,121	32,673
Administrative and support, waste management & remediation services	7,122	6,720	7,843	6,745	8,897	9,429	10,375
Educational, health care and social assistance services	19,189	19,565	19,436	19,789	23,253	25,244	26,281
Arts, entertainment and recreation, and accommodation & food services	5,534	6,178	4,800	1,007	4,462	3,496	5,165
Repair, maintenance and personal services	2,893	3,559	3,375	3,265	4,154	4,271	5,150
Finance & insurance industries	103,661	125,747	130,882	110,127	184,990	175,217	168,169
All industries	363,667	399,675	393,910	273,173	564,599	596,535	576,908

Source: Author aggregation of Statistics Canada Quarterly Survey of Financial Statements data

160. While this data is for all of Canada, it illustrates trends that affect businesses in Alberta. In the following subsections, I break out GDP and productivity data for Alberta to explore how overall economic losses in Alberta may differ from those in Canada as a whole.

[42] Statistics Canada. Quarterly Survey of Financial Statements. 2017-2023. https://doi.org/10.25318/3310022601-eng, https://doi.org/10.25318/3310000701-eng
[43] ibid

161. Changes in long-term profits are the best indicator of business wellbeing. The business losses due to Covid-19 and related policies are reflected in lower long-term profits compared to a counterfactual without Covid. However, changes in profits do not necessarily occur in the same periods in which the declines in economic output, revenue, or averse policies occurred that led to the losses in profits. This means that changes in profit may take longer to be realized in the data, and the changes we observe are more difficult to link directly to Covid-19 and specific policies.

162. Some changes in profits are due to changes in sales revenue or costs of production or operations. Other changes in profits reflect changes in the values of assets, for example, changes in the value of reserves or inventories due to changing global market prices. In the latter case, some firms may have some flexibility regarding when such changes are reflected on their balance sheets. I illustrate the trends in this complementary data in Section B.iii.

163. Table V.2 provides an alternative presentation of the profit data in which I adjust for inflation and index to the 2017 to 2019 average profit. The table groups the different industries into four categories, dependent on how their profits changed in and since 2020.

a. Struggling since the pandemic: These industries experienced a decrease in profits in 2020 compared to the three-year average from 2017-2019. They have also experienced lower profitability on average since 2020, although Manufacturing had two years of profitability at pre-pandemic levels, and both Transportation and Warehousing have, by 2023, returned to roughly pre-pandemic levels of profitability.

b. Low profits or losses followed by increased profitability: These industries experienced a decrease in profits in 2020 but earned higher profits from 2021-2023 than they did on average in the three years before the pandemic.

c. Little impact followed by increased profitability: These industries saw little to no decline in profits in 2020 compared to the pre-pandemic average and have seen higher profitability from 2021-2023.

d. Increased profitability throughout: Industries in this category saw an increase in profitability in 2020 and continued higher profitability.

Table V.2. Canada-wide business profits, grouped by initial decline and overall profitability[44]

	2017-19 Avg	2020	2021	2022	2023	20-23 Avg
All industries	100	67	135	133	124	117
Struggling since the pandemic: Decrease in profits in 2020 and an overall decline in profits since						
Arts, entertainment and recreation, and accommodation & food services	100	17	75	55	78	57
Transportation and warehousing	100	20	56	82	97	65
Information and cultural industries	100	80	87	56	67	74
Manufacturing	100	49	100	101	88	86
Utilities	100	76	73	92	99	87
Low profits or losses followed by increased profitability: Decresed profits in 2020, but higher average since						
Administrative and support, waste management & remediation services	100	89	113	113	119	111
Professional, scientific and technical services	100	88	119	124	125	117
Finance & insurance industries	100	87	142	126	116	121
Real estate and rental and leasing	100	81	146	149	126	128
Agriculture, forestry, fishing & hunting	100	15	207	121	170	130
Mining, quarrying, and oil & gas extraction	100	-1387	1436	1933	1229	1803
Little impact followed by increased profitability: Less than a 5% change in profit in 2020 and higher profitability since.						
Educational, health care and social assistance services	100	97	110	112	112	110
Repair, maintenance & personal services	100	95	117	112	130	116
Wholesale trade	100	99	135	148	150	136
Retail trade	100	100	151	158	168	147
Increased profitability throughout: Increased profits in 2020 and continued higher profitability since.						
Construction	100	125	156	137	126	139

Source: Author analysis of Statistics Canada Quarterly Survey of Financial Statements data

164. Tables V.1 and V.2 show that overall business profits in Canada declined by approximately 33 percent in 2020 compared to the three-year average before the pandemic and then increased substantially in 2021, remaining substantially above the pre-pandemic levels through 2023. Average annual profits since the beginning of 2020 have been 17 percent higher than in the three years leading up to the pandemic after adjusting for inflation.

165. However, not all businesses and industries experienced a substantial increase in aggregate profits. While some industries saw substantially higher profits after (and in some

[44] ibid

cases during) the pandemic, other industries experienced lower profits in this period compared to before the pandemic.

166. A popular perception is that businesses such as stores, restaurants, gyms, spas, salons, and hotels experienced substantial losses during the pandemic. For restaurants, gyms, and hotels, this perception is consistent with the aggregate industry data, as these businesses are categorized within the "Arts, entertainment, and recreation" and "Accommodations and food services" industries (combined in the profit data) which is the industry category that saw the most considerable aggregate profit losses from 2020 to 2023.

167. The data is less consistent with this perception for retailers and personal service providers, on average. Personal service providers are categorized under "Repair, maintenance, and personal services" (which in other data sometimes falls under "other services"), an industry that saw a modest decline in profits in 2020 and higher profits in 2021 to 2023. On average, stores and other retail firms experienced no decline in 2020 Canadawide and saw substantially higher profits from 2021 to 2023.

Limitations of financial data for impact analysis

168. As I discuss previously, although business financial data (i.e., profits, assets, liabilities, equity) provides the best direct indicators of business well-being, there are several concerns with relying on only them to identify the impact of Covid-19 and related policies. Of particular concern is that business financial data is typically only reported quarterly, meaning that changes from one quarter to the next include all of the Covid-19 factors that were present within a period or turned off or on during that period. While this may be reasonable for the analysis of the aggregate effects of Covid-19 versus a world in which Covid-19 did not exist, it is not granular enough to accurately assess specific policies.

V.C. Changes in Other Economic and Business Measures

169. In this section, I review other measures of economic and business performance. The outcomes in this section are less direct measures of business gains and losses compared to the profit and financial data I reviewed above. However, they provide rich insights into how Covid-19 affected the businesses and business environment, contributing to firm profits.

Changes in economic output

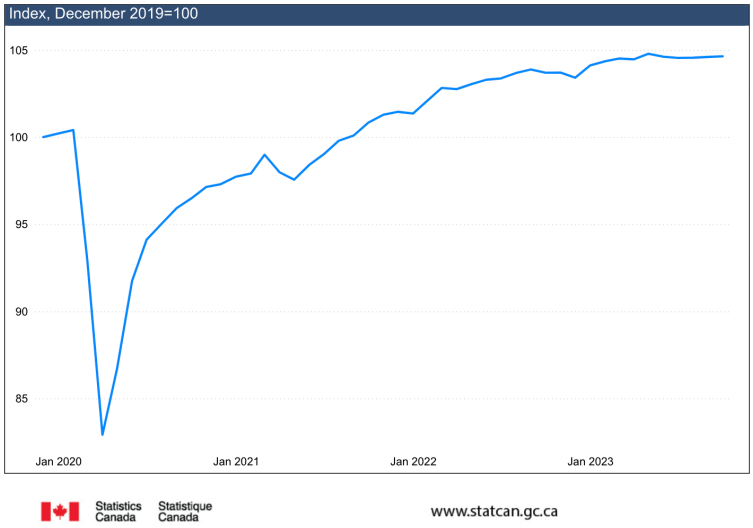
170. One of the contributors to changes in firm profits is the change in production.

171. *Gross Domestic Product (GDP)* is the monetary value of goods and services *produced* in an economy in a given period at prevailing prices. GDP is different than sales or revenue, as not all production is sold in the same period it is produced. Rather, it measures the overall income expected to be generated by production in a period that will eventually be distributed through wages, inventory accumulation, rents, and profits. It contributes to short-run profits

(production contributing to current sales) and longer-run profits (production contributing to future sales).

172. Figure V.1 presents a Statistics Canada graph of total GDP by month for Canada, illustrating a significant decrease in economy-wide production with the onset of Covid-19 that did not again reach pre-Covid levels until the second half of 2021, more than a year after the beginning of the pandemic.

Figure V.1. Canadawide real GDP by month
(seasonally adjusted, indexed to Dec 2019 values)



173. One can break down the monthly GDP data to the industry and province levels. Table V.3 presents the Statistics Canada GDP estimates by industry for Alberta, aggregated by year. The estimates are in constant 2017 dollars across years and the figures are in millions (i.e., the value needs to be multiplied by 1,000,000 to provide the correct estimate). I added a final column showing the GDP difference between 2019 and 2020.

Table V.3. Alberta GDP by industry by year ($million, inflation-adjusted to 2017 dollars)[45]

	2019	2020	2021	2022	2023	Diff 2019 to 2020
Agriculture, forestry, fishing & hunting	6,605	7,059	5,513	7,435	6,501	455
Mining, quarrying, and oil & gas extraction	60,055	53,808	58,730	63,259	64,707	-6,247
Utilities	4,998	4,783	4,654	4,694	4,693	-215
Construction	27,535	23,724	26,522	28,462	26,953	-3,811
Manufacturing	25,864	23,414	24,723	25,258	25,799	-2,450
Wholesale trade	15,497	14,516	15,367	16,297	16,714	-981
Retail trade	14,327	13,761	14,624	14,716	15,342	-566

[45] Author analysis from Statistics Canada "Gross domestic product (GDP) at basic prices, by industry, provinces and territories, growth rates (x 1,000,000)" tables.

	2019	2020	2021	2022	2023	Diff 2019 to 2020
Agriculture, forestry, fishing & hunting	6,605	7,059	5,513	7,435	6,501	455
Transportation and warehousing	17,611	14,476	14,977	16,176	16,750	-3,135
Information and cultural industries	7,361	7,017	7,163	7,414	7,550	-343
Real estate and rental and leasing	38,676	38,408	39,324	40,139	40,862	-268
Professional, scientific, and technical services	16,879	16,440	16,705	17,555	17,866	-440
Administrative and support, waste management & remediation services	8,378	7,024	7,318	7,606	7,656	-1,354
Educational services	13,415	12,689	12,992	13,344	13,695	-726
Health care and social assistance	20,994	19,971	21,366	21,997	22,814	-1,023
Arts, entertainment, and recreation	2,039	1,233	1,194	1,478	1,582	-805
Accommodation & food services	7,353	5,065	5,512	6,717	7,161	-2,288
Other services (except public admin)	6,533	5,664	6,112	6,595	6,805	-869
Public administration	17,284	17,110	17,468	17,504	18,079	-174
Finance & insurance industries	13,907	13,964	14,546	14,724	14,857	57
Total (all industries)	326,213	300,801	314,850	331,489	336,300	-25,412

Source: Statistics Canada and author's own analysis

174. The table shows the scale of each industry in Alberta. However, a better indication of the pandemic's impact on an industry is the percentage of changes in that industry's economic output rather than total value differences. I consider an alternative presentation that standardizes the scale across industries to illustrate the relative trends when controlling for an industry's initial size.

175. For Table V.4, I transform the Statistics Canada GDP estimates into an index, with the average value from the three years before the pandemic set to 100. A value of 105 implies that the industry GDP for that year is 5% above the pre-Covid average, while a value of 95 implies that the industry GDP for that year is 5% below the pre-Covid average.

Table V.4. Alberta GDP by industry by year indexed to the 2017-19 average (inflation-adjusted)[46]

	2019	2020	2021	2022	2023	% change 2019-2020
Agriculture, forestry, fishing & hunting	102	109	85	114	100	6.9
Mining, quarrying, and oil & gas extraction	102	91	99	107	109	-10.4
Utilities	105	101	98	99	99	-4.3
Construction	95	81	91	98	93	-13.8
Manufacturing	101	91	96	98	100	-9.5
Wholesale trade	103	97	102	109	111	-6.3
Retail trade	101	97	103	104	108	-3.9

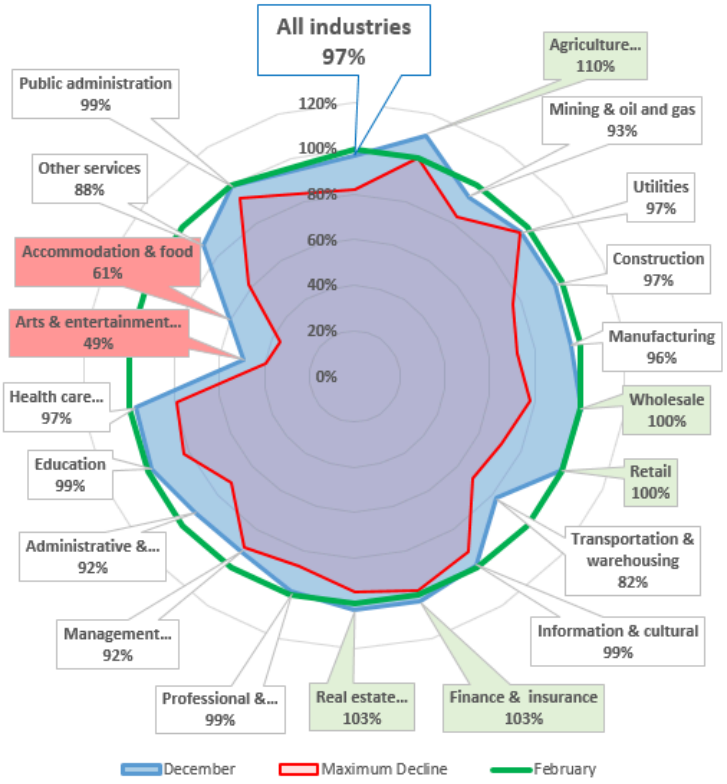
[46] Author analysis from Statistics Canada "Gross domestic product (GDP) at basic prices, by industry, provinces and territories, growth rates (x 1,000,000)" tables.

	2019	2020	2021	2022	2023	% change 2019-2020
Agriculture, forestry, fishing & hunting	102	109	85	114	100	6.9
Transportation and warehousing	104	86	89	96	99	-17.8
Information and cultural industries	101	96	98	102	104	-4.7
Real estate and rental and leasing	102	101	104	106	108	-0.7
Professional, scientific and technical services	100	98	99	104	106	-2.6
Administrative and support, waste management & remediation services	100	84	87	91	91	-16.2
Educational services	102	96	99	101	104	-5.4
Health care and social assistance	102	97	104	107	111	-4.9
Arts, entertainment and recreation	100	61	59	73	78	-39.5
Accommodation & food services	100	69	75	91	97	-31.1
Other services (except public admin)	98	85	92	99	102	-13.3
Public administration	98	85	92	99	102	-1.0
Finance & insurance industries	100	101	105	106	107	0.4
Total (all industries)	101	93	97	102	104	-7.8

Source: Statistics Canada and author's own analysis

176. Figure V.2 provides an alternative visual presentation of GDP declines following the onset of the pandemic in Canada.

Figure V.2. GDP Peak Declines and December 2020 levels relative to February 2020[47]



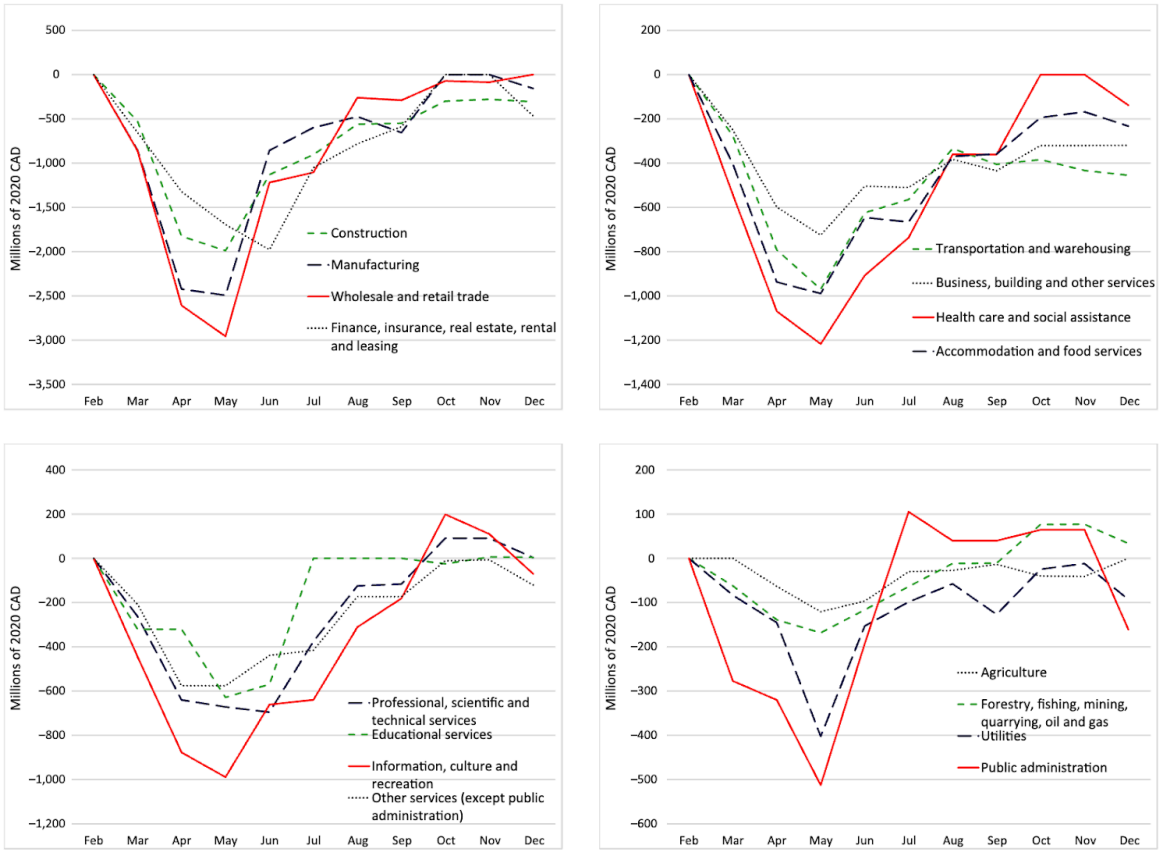
Source: Statistics Canada

177. More sophisticated approaches are available to estimate counterfactual output by industry by month, which I present in Section VI. Figure V.3 presents the results from such an analysis applied across Canada for 2020, showing differences in estimated GDP by industry compared to a monthly counterfactual estimated using seasonally adjusted industry trends and data from ahead of Covid.

178. The y-axis of each graph is not to the same scale, with the industries depicted in the top-left quadrant graph experiencing the greatest aggregate losses and the industries depicted in the bottom-right quadrant graph experiencing the smallest aggregate losses. The general patterns are consistent with the Alberta data.

[47] Image from Statistics Canada "Gross domestic product by industry, December 2020" (2021-03-02) *The Daily* https://www150.statcan.gc.ca/n1/daily-quotidien/210302/dq210302b-eng.htm

Figure V.3. Declines in industry GDP relative to no-Covid counterfactual, Canada, 2020[48]



Source: Cotton et al. (2022)

179. These tables and figures show how economic output changed across industries during Covid-19.

180. Table V.4 and Figures V.2 and V.3 show that the "Accommodation and food services" and "Arts, entertainment, and recreation" industries saw the largest declines in terms of share of GDP and did not fully recover to pre-Covid levels through 2023. These sectors involve substantial customer travel or in-person customer interactions.

181. However, as Table V.4 shows, these industries did not see the largest GDP decline in total value, as the industry size is relatively small compared to some others. "Mining, quarrying, and oil & gas extraction," "Construction," "Transportation and warehousing," and "Manufacturing" all saw a larger total annual industry GDP in 2020. These sectors largely require in-person work and would have seen a decline in production during lockdowns.

182. Again, it is interesting that wholesale and retail trade as an industry, despite significant declines during Spring 2020, recovered by the end of the first year and only saw a modest

[48] C. Cotton et al. "Quantifying the economic impacts of Covid-19 policy responses on Canada's provinces in (almost) real time" (2022) 55 *Can J Econ* 406. https://doi.org/10.1111/caje.12567

decline in overall production on average over the entire year. This is consistent with a shift in production between different businesses in the sector.

183. The above data and pre-Covid/post-Covid analysis provide insight into the impact of the pandemic and pandemic policy on economic output and the income generated within each industry. They illustrate a substantial decline in economic activity after the onset of Covid-19, with significant differences in magnitude and duration across industries. In 2020 alone, Alberta had a total GDP of more than $25 billion lower than in 2019. Even by the end of 2023, some sectors and subsectors, especially "Arts, entertainment, and recreation," continued to have lower GDP than in 2019.

Changes in Hours Worked by Sector

184. It is important to recognize that the decline in production documented above contributes to both a decline in products and services sold (or available for future sale) but also a decline in working hours and other costs associated with production. In this way, it contributes to declines in both revenue and costs.

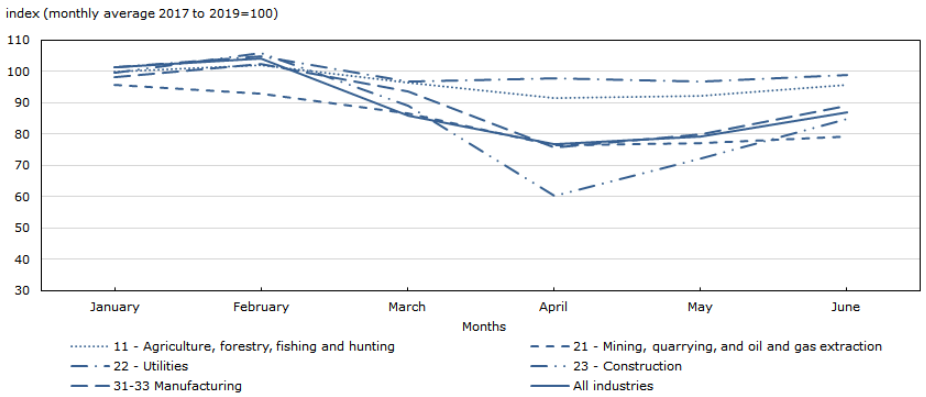
185. First, I review trends in hours worked. Figure V.4 depicts the Statistics Canada estimated changes in hours worked by sector by month compared from February to June 2020 during the first wave of the pandemic for Canada.[49]

186. The average monthly hours worked from 2017-19 is indexed at 100. Therefore, a value of 60 on a chart indicates that the total hours worked was only 60% of the average 2017-19 value, a 40% decline.

[49] Grekou (2021) supra

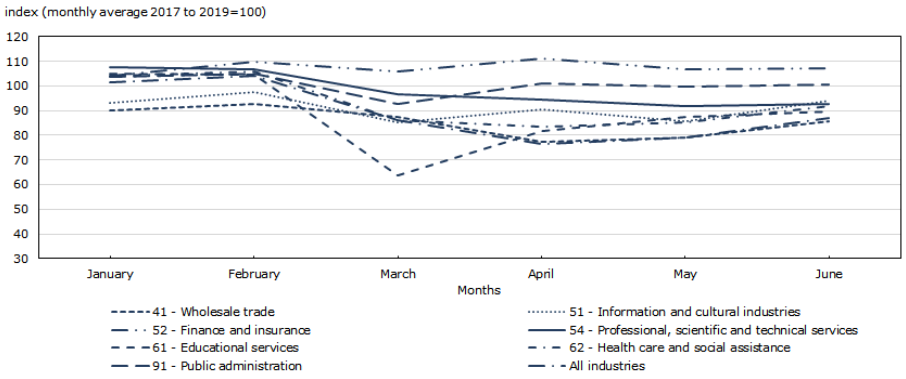
Figure V.4: Decline in industry GDP relative to pre-Covid values, Jan-June 2020[50]

Chart 1
Evolution of hours worked by industry—Goods-producing sector



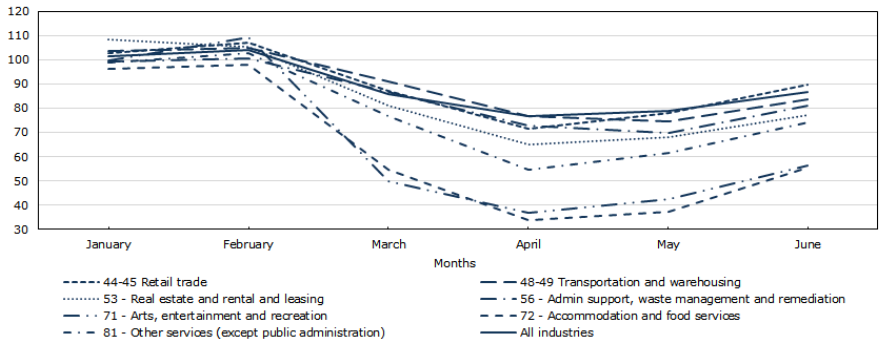
Sources: Statistics Canada's Labour Force Survey and author's calculations.

Chart 2
Evolution of hours worked by industry—Panel 1 for services sector (relatively moderately hit)



Notes: These are industries with a maximum of reduced hours lower than 25% of their baselines. Education was the exception.
Sources: Statistics Canada's Labour Force Survey and author's calculations.

Chart 3
Evolution of hours worked by industry—Panel 2 for services sector (relatively severely hit)



Note: These are industries with a maximum of reduced hours higher than 25% of their baselines.
Sources: Statistics Canada's Labour Force Survey and author's calculations.

Source: Statistics Canada

[50] ibid

187. Figure V.4 shows substantial variation in percentage change in work by sector following the onset of the pandemic. The "Arts, entertainment, and recreation" and "Accommodation and food services" industries experienced the largest percentage declines in work. In contrast, the "Utilities" and "Finance and insurance" industries saw the smallest declines after the onset of the pandemic.

188. Table V.5 depicts the minimum monthly hours worked observed from March 2020 to June 2020 by sector for both the province of Alberta and Canadawide. The table combines Statistics Canada data and my own comparative analysis.[51]

189. The first line of table data shows that the 'Agriculture, forestry, fishing & hunting' industry saw monthly hours work as low as 30.5% below the pre-Covid industry average within Alberta and as low as 8.7% below the pre-Covid average across Canada as a whole. The percentage decline in Alberta is 3.5 times that of the Canadawide decline in that industry. A ratio of 1.0 means Alberta performed at the national average; above 1.0 means Alberta performed worse than the national average; and below 1.0 means Alberta performed better than the national average in that industry. The last column of the table indicates that Alberta fared the 9th best in that industry out of Canada's ten provinces, meaning that eight provinces fared better and one fared worse.

Table V.5. Maximum monthly percentage decline in hours worked by industry, March-June 2020[52]

	Alberta	Canada	AL/CA	Rank of 10 provinces
Agriculture, forestry, fishing & hunting	-30.5	-8.7	3.5	9th
Mining, quarrying, and oil & gas extraction	-17.7	-23.5	0.8	1st
Utilities	-15.7	-3.3	4.8	4th
Construction	-32.6	-39.8	0.8	6th
Manufacturing	-21.3	-24.2	0.9	4th
Wholesale trade	-27.6	-22.7	1.2	6th
Retail trade	-34.4	-28.3	1.2	9th
Transportation and warehousing	-26.0	-25.3	1.0	5th
Information and cultural industries	-26.6	-14.8	1.8	4th
Real estate and rental and leasing	-30.2	-34.9	0.9	3rd
Professional, scientific, and technical services	-17.7	-8.0	2.2	9th
Administrative and support, waste management & remediation services	-19.5	-30.3	0.6	3rd
Educational services	-18.8	-36.4	0.5	2nd
Health care and social assistance	-15.5	-16.3	0.9	5th
Arts, entertainment, and recreation	-39.0	-63.3	0.6	2nd

[51] ibid
[52] ibid

	Alberta	Canada	AL/CA	Rank of 10 provinces
Agriculture, forestry, fishing & hunting	-30.5	-8.7	3.5	9th
Accommodation & food services	-64.7	-66.2	1.0	4th
Other services (except public admin)	-42.8	-45.4	0.9	5th
Public administration	-12.1	-7.3	1.7	7th
Finance & insurance industries	-5.7	+5.9	-1.0	7th

Source: Statistics Canada and author's analysis

190. Within Alberta, the data is again consistent with wide variation in reduced work across sectors while highlighting that the reductions may differ substantially across locations.

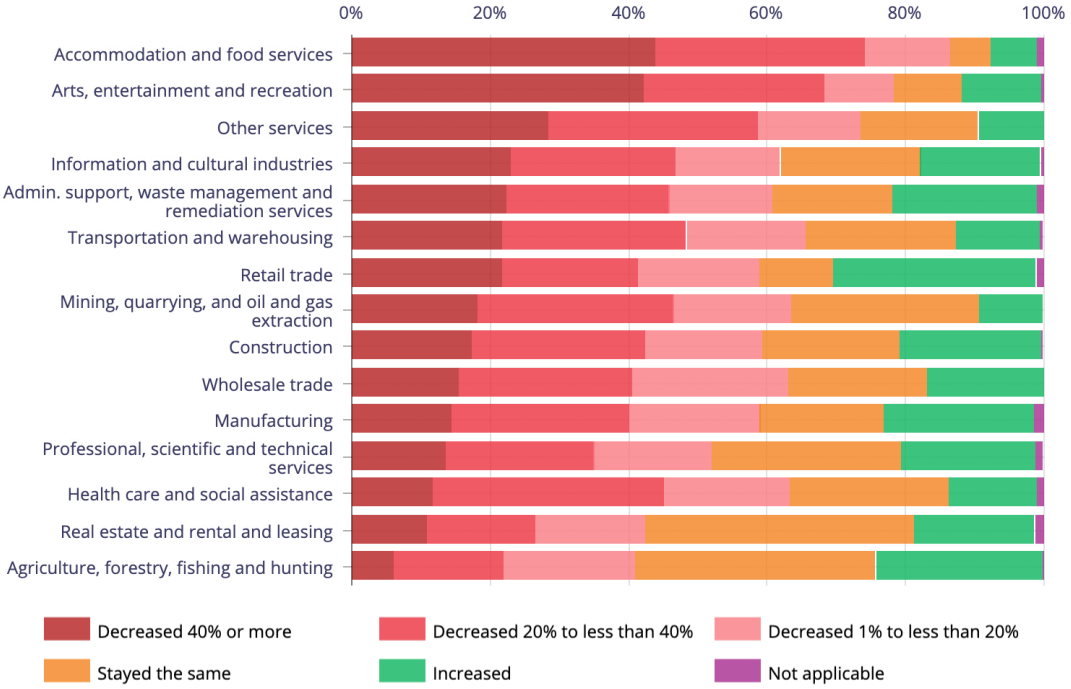
191. The decline in work in Alberta's "Arts, entertainment, and recreation" industry was substantially below the national average. In contrast, the decline in work in Alberta's "Accommodation and food services" industry was approximately equal to the national average. These industries tend to have experienced the largest reductions in work and suspension of operations during the first wave of Covid-19.

Changes in Sales and Revenue

192. Figure III.5 in Section III presents an analysis of Statistics Canada's "Canadian Survey on Business Conditions" from the end of 2020.[53] [54] The Canadawide data come from business self-reports on how their revenues changed "as a result of the pandemic." I reproduce that figure again here.

[53] "Canadian Survey of Business Conditions" supra
[54] T. Grieder et al. supra

Figure V.5. Reported changes in revenue by sector as a result of the pandemic[55]



Source: Bank of Canada and Statistics Canada

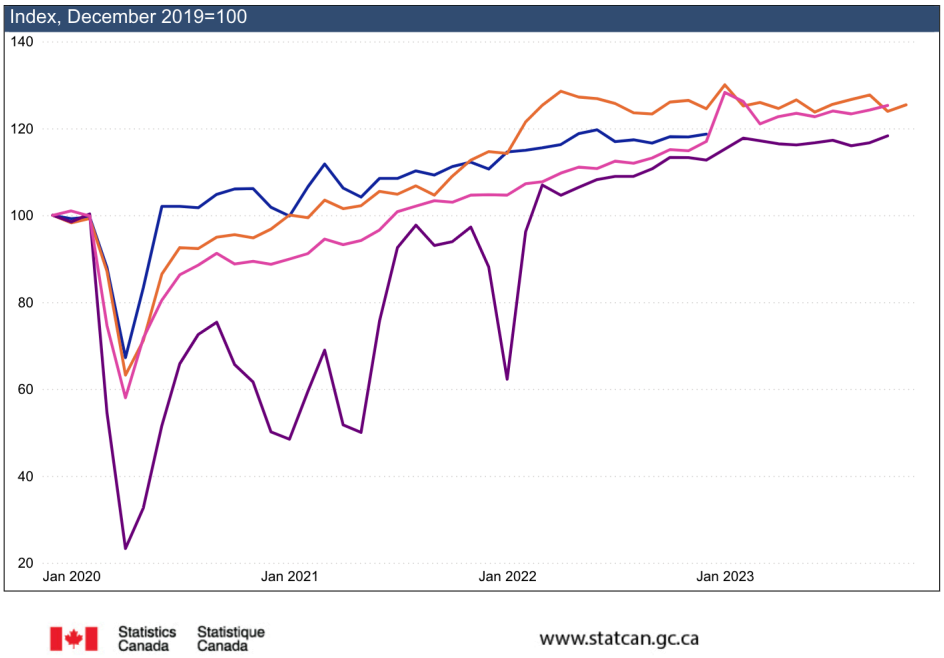
193. The figure shows how some businesses reported that Covid increased revenues while others reported that Covid-19 led to very large revenue decreases and how these reports differed across and within industries.

194. The industries requiring in-person customer interactions or travel saw the largest reported revenue decline. This includes "Accommodation and food services," "Arts, entertainment, and recreation," and "Other services" (including personal care services such as salons). However, the large declines were not uniformly across the industries.

195. Figure V.6 depicts a Statistics Canada graph comparing monthly sales at full-service restaurants, limited-service eating establishments, and retail and manufacturing establishments since December 2019. Although both full-service and limited-service restaurants are included in the "Accommodation and food services" industry, the full-service restaurants faced much larger lost sales during the first wave of the pandemic, saw further declines during later waves, took longer to recover to pre-pandemic levels, and have seen less growth in sales since that time compared to partial-service establishments. Partial-service establishments followed trends more similar to other industries that saw an initial decline followed by a less-volatile recovery path (though it took partial-service eating establishments longer than retailers and manufacturers to recover to pre-pandemic levels).

[55] ibid

Figure V.6. Canadawide sales by restaurant sub-category since Dec 2019[56]



Blue: Retail trade sales; Orange: Manufacturers' sales
Purple: Sales at full-service restaurants; Pink: Sales at limited-service eating places

196. The figure illustrates how specific types of businesses may have had substantially different experiences during Covid-19. Some subcategories, such as full-service restaurants and others with sales models or operational models they could not convert to online sales or remote work, had very different experiences than others in the same broader industry.

197. It is important to remember, however, that a decline in revenue cannot be directly mapped into a decline in business profits and valuation, as the revenue decline is typically at least partially offset by a decline in costs.

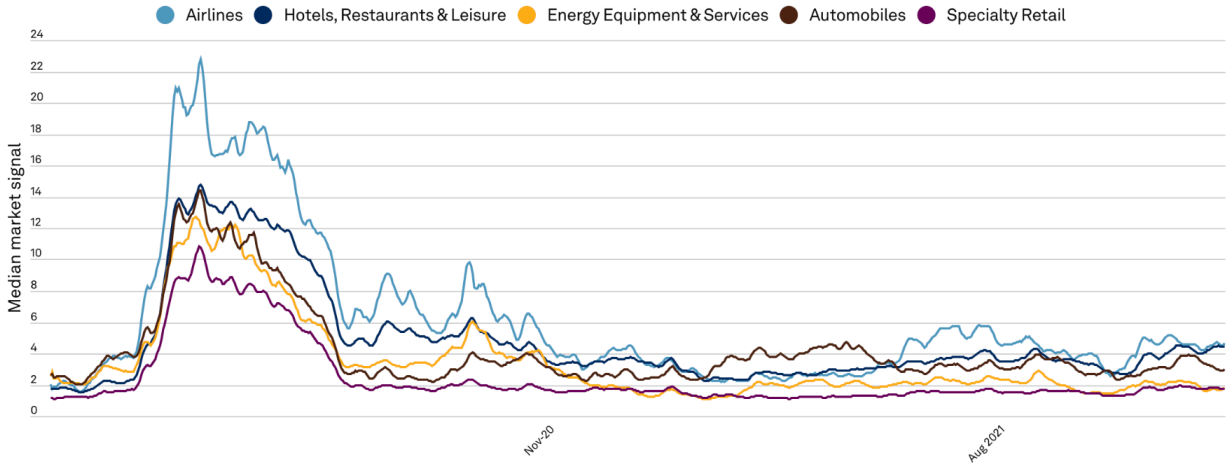
Risks of default and closures

198. In Section B, I review more detailed financial data and trends in business closures. In this section, I take a closer look at the industry level.

199. S&P Global conducted a default risk analysis by type of business (subsector) using real-time data. Figure V.7 presents

[56] Stats Can, "Canadian Economic Dashboard and Covid-19" updated Nov 2023. https://www150.statcan.gc.ca/n1/pub/71-607-x/71-607-x2020009-eng.htm

Figure V.7. S&P's Probability of Default Market Signal Analysis (worldwide)[57]



Notes: 5-day moving average median PD for each respective industry (global data). Classification based on 6-digit Global Industry Classification Standard. Equity Real Estate Investment Trusts and Real Estate Management & Development are combined at industry group level. Electric Utilities, Gas Utilities, Multi-Utilities and Water Utilities are combined at industry group level.
Source: S&P Global Market Intelligence. As of January 15, 2022. For illustrative purposes only.

Source: S&P Global

200. The S&P analysis shows substantial increases in default risk, particularly during the first half of 2020, for Airlines, Hotels, Restaurants, Leisure activities, Energy equipment & services, Automobiles, and Specialty retail.

201. Table V.6. presents values for the S&P projected default probabilities in January 2020 and January 2022 for the industries that experienced the subsectors that experienced the largest percentage increases in default risk during this period.[58] Many industries on the list saw risks increase to levels similar to what would have been considered more risky industries ahead of the pandemic. The industries already considered risky ahead of the pandemic (e.g., hotels, restaurants, leisure, and airlines) saw their risks increase to very high levels during the two years.

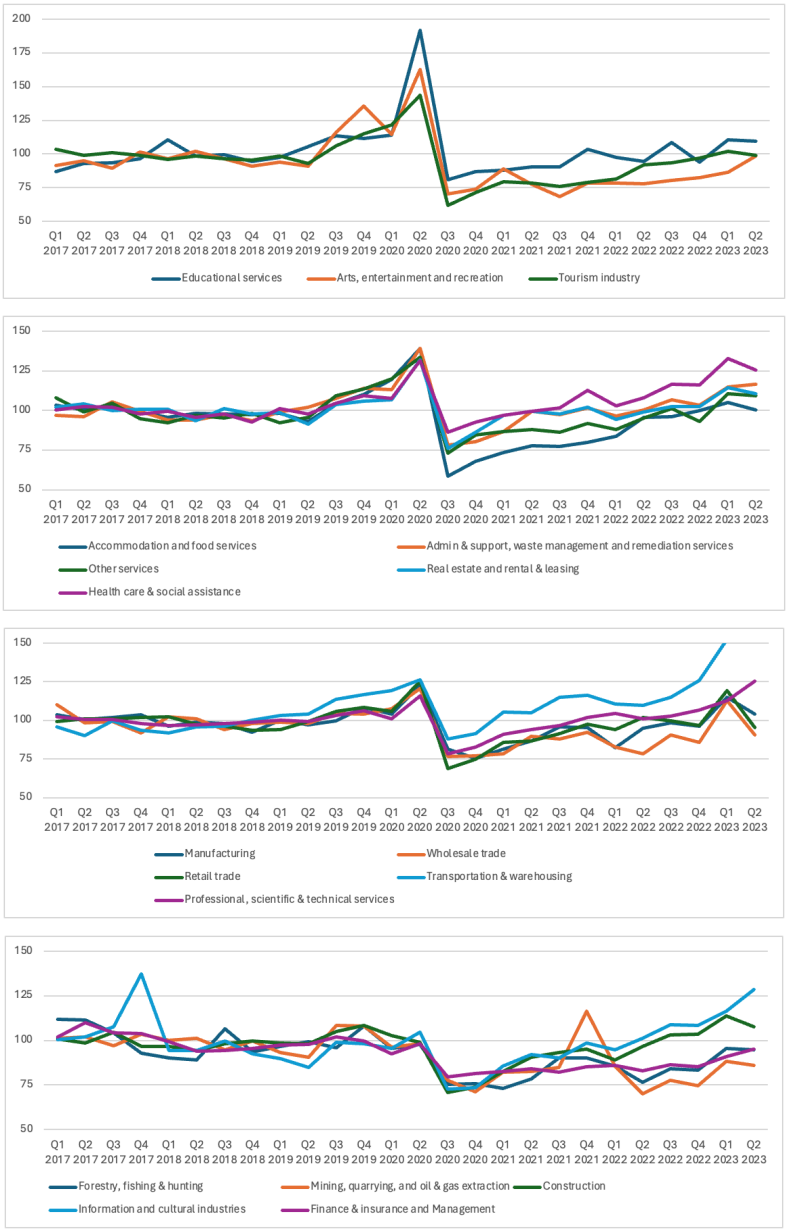
Table V.6. Industries with the highest default probability increase after two years (S&P)[59]

	Jan 2020	Jan 2022	Change
Food & Staples Retailing	0.73%	1.60%	+119%
Leisure Products	0.63%	1.39%	+119%
Multiline Retail	0.75%	1.83%	+145%
Internet & Direct Marketing Retail	1.56%	3.87%	+149%
Diversified Consumer Services	0.69%	1.72%	+149%
Interactive Media & Services	0.42%	1.07%	+154%
Hotels, Restaurants & Leisure	1.75%	4.48%	+155%
Airlines	1.75%	4.79%	+174%
Road & Rail	0.38%	1.05%	+178%

[57] L. Vidovic "Industries Most and Least Impacted by Covid-19 from a Probability of Default Perspective" (Jan 2022) S&P Global Market Intelligence https://www.spglobal.com/marketintelligence/en/news-insights/blog/industries-most-and-least-impacted-by-covid-19-from-a-probability-of-default-perspective-january-2022-update
[58] ibid
[59] ibid

202. Next, I present my own analysis of Statistics Canada's business exit data, illustrating trends in permanent closures to businesses by industry.[60] The figure categorizes industries based on their declines during Spring 2020, with exits indexed to the 2017-19 average.

Figure V.8. Business permanent exists by industry (indexed to pre-Covid avg)[61]



Source: Author analysis of Statistics Canada data

203. The analysis shows the largest increase in exits in the "Tourism" and "Arts, entertainment, and recreation" sectors. Perhaps more surprising is the inclusion of educational

[60] Statistics Canada. Table 33-10-0270-01 Experimental estimates for business openings and closures for Canada, seasonally adjusted https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3310027001
[61] ibid

services on the list, as temporary school closures should not necessarily lead to permanent school closures. However, the category also includes professional training services, tutoring, and, in some cases, substitute teachers.

V.D. Conclusions regarding opinion

204. There was substantial variability in lost profits, expenditures, and productivity across sectors. Sectors like "Arts, entertainment and recreation" and "Accommodation and food services" saw a substantial decline in profits and production in 2020, and have struggled to recover since then. However, not all sectors experienced losses in 2020, and many saw increased profits in future years.

205. However, I also document big differences between different types of businesses within sectors. This suggests that the industrywide trends mask substantial differences between the experiences of individual businesses within the sectors. There were shifts in market allocation and sales between different types of businesses, essential business status, or the ability to respond quickly to changing market conditions.

206. Overall, accounting for a business's sector is important for understanding the losses (or gains) it faced during the pandemic. But this is just one determining factor in a complex economy where many factors contribute to individual experiences.

VI. Estimating the Impact of Covid-19 on Business Losses

207. This section provides an opinion in response to Question (iii):

> *Is there a manner in which it is possible to determine on a class-wide basis whether any of the factors you identify in response to the above questions, either singularly or jointly, may have caused or contributed to any losses suffered by a business operating in Alberta from March 17, 2020, until the present?*

208. I interpret this question as asking whether it is possible to systematically determine if businesses experienced a decline in profits because of Covid-19 as a whole or because of CMOH orders or other individual factors.

VI.A. Challenges for understanding impact

209. This question is more challenging than it may appear on the surface for several reasons.

a. There are dynamic effects in which factors that initially result in losses may facilitate increased profits in later periods that would not have otherwise been possible.

b. There is substantial heterogeneity in reported losses across businesses, even when comparing those in the same sector and controlling for observable characteristics of the firms.

c. Few factors had a uniformly negative impact on all businesses. Typically, factors that hurt some businesses benefit others. For example, policies that prevent customers from shopping at certain businesses drove them to increase their expenditures at others.

d. Many changes were happening simultaneously, making it difficult or impossible to isolate the impact of individual factors. Isolating the impact of a single factor or set of factors requires exogenous variation in the presence, timing, or intensity of that factor, separate from similar changes in other factors.

e. As discussed in Section IV.D, there is substantial interconnectedness between businesses and industries in an economy. Even those businesses not directly affected by a policy or impact factor will feel its effect through supply chains or shifts in customer behavior.

f. Available data is far from ideal. Firm profit and financial data are typically reported quarterly, which does not allow for the analysis of the real-time interactions between variables. More frequently available data, on the other hand, may facilitate estimating the impact of specific policies or other factors on customer behavior, sales, or production, measures related to but not direct

indicators of business profit or valuation. Thus, such data requires methods and models for interpreting changes in observed outcomes into firm losses.

210. Given these challenges, it is impossible to establish that all businesses suffered damages due to Covid-19 as a whole or due to specific policies or other factors. Even within a subsector or business type category, it will often be the case that some businesses suffered losses while others did not. This is particularly true given that losses are considered "since March 20, 2020," which includes periods since 2021 when profits have been higher.

211. In this section, I discuss methods for using provincewide data to estimate the effects of Covid-19 as a whole and for estimating the impacts of individual factors and the data required. With some margin or error, such analyses could identify which industries and business types experienced losses on average.

212. I am confident in one's ability to apply these tools to estimate the aggregate or average impacts of Covid-19 as a whole. However, I am not confident in one's ability to identify the impact caused by individual factors, such as the CMOH orders, with any degree of confidence or accuracy on a class-wide basis.

213. First, the approaches can only do so much to isolate the impact of individual policies or factors on outcomes. Even if an analysis used ideal panel data on businesses in Alberta to estimate the impact of a given factor, we will still have concerns about the simultaneity of and interaction between different factors, as well as the dynamic interactions. Dealing with such concerns will require a series of assumptions. Our predictions will not be correct on average if our assumptions about the interactions between different factors are inaccurate. Such issues will result in less precise estimates of impact.

214. Second and most importantly, no matter how precise and detailed our analysis, estimating the losses for individual businesses remains problematic. One could feed into the analysis individual firm characteristics (e.g., subsector, firm size, profits prior to the pandemic), and the model will estimate the typical loss experienced by a business of those characteristics.

215. Such a method for estimating individual firm losses is only valid to the extent that all firms that look similar on paper experienced the pandemic in the same way. But, we have seen that individual business experience can differ widely, even within the same subsector or among otherwise similar firms.

216. The class action includes all businesses in Alberta that potentially suffered damages due to the CMOH orders. This includes businesses across all subsectors, market segments, operational models, firm characteristics, etc. While it may be feasible to identify some industry segments where all firms suffered similar damages and, therefore, the average losses predicted by a model for that segment are accurate at the individual firm level, this is generally not feasible. Trying to estimate damages on a class-wide basis for such a diverse class of

businesses will result in overestimating damages for some firms and underestimating damages for others.

217. This is particularly problematic given that the losses businesses experienced due to Covid-19 are potentially very large. Even though the losses caused by specific factors such as policy are smaller, they may still be substantial. As such, even a small degree of inaccuracy in the individual firm predictions could correspond to a large dollar value discrepancy. The substantial discrepancies that I expect would be present with a class-wide estimate of damages that do not adequately account for a firm's individual experience could result in substantial discrepancies in the awarded values. Any such method will likely award some businesses substantially more than the damages they faced while awarding others substantially less.

VI.B. Estimating Impacts of Covid-19 and Related Factors

218. The discussion in Section B provides an overview of how one may use the trends leading into Covid-19 to estimate a counterfactual of what would have happened in more recent years had Covid-19 not occurred.

219. There are sophisticated approaches to estimating a counterfactual and evaluating impact that apply rigorous econometric methodologies. They typically use a combination of the following complementary approaches:

a. Time series analysis, considering how outcomes change over time as events occur or policies are switched on and off. For example, we can use the data prior to March 2020 to estimate trends in markets and firm profits that would have occurred in the absence of Covid-19, and then compare the outcomes that did occur at later dates to our predictions for what would have occurred without Covid. Similarly, we can consider how consumer behavior or mobility data changes with the introduction or relaxation of lockdown orders.

b. Cross-location or cross-firm comparisons, taking advantage of variation in the exposure to or intensity and timing of different policies across locations or firms to estimate the impacts of these policies. Such approaches are better suited for the analysis of factors or poliies, rather than Covid-19 as a whole.

c. Structural modeling, calibration, and simulation of firm or market behavior. This process involves building a model of demand or supply using input-output tables or adapting general equilibrium models or the economy to account for the introduction of lockdown policies and predict the broader impacts on economic output, sales, or other factors.

Econometric methods

220. The different techniques proposed below offer methods for predicting the impact of Covid-19 and related policies. These can be done by looking at changes in trends before and after the event or as policy is turned on and off, comparing outcomes across firms or locations exposed to different factors, or both.

221. Each of the following methoffersffer specific strengths for isolating and quantifying the impact of Covid-19 in aggregate or specific factors such as mandated lockdowns. The choice of method depends on the nature of the data, the complexity of the relationships among variables, and the specific research questions at hand. It also depends on differences in trends we expect across industries or subgroups in the analysis and whether one is working towards a single model of Alberta economy or estimating different models for individual sectors or subsectors. By applying advanced econometric techniques, researchers and legal experts can provide robust, evidence-based assessments of the average impacts of significant events on business performance.

222. One effective method is the Interrupted Time Series Analysis (ITSA). This approach involves examining the pre-pandemic and post-pandemic trends in firm profits to isolate the impact of Covid-19. ITSA works by modeling the level and slope of the time series data before and after the intervention (in this case, the onset of the pandemic). By incorporating a dummy variable that represents the period affected by Covid-19, researchers can estimate changes in firm profits' level (immediate impact) and trend (long-term impact) due to the pandemic. This method is beneficial because it allows for a clear visual and statistical comparison of how the intervention has altered the trajectory of the time series data.

223. ITSA is one of the most straightforward and easy-to-implement methods discussed here. It is ideal when one has a clear intervention point, such as the onset of Covid-19, and aims to measure changes in firm profits, revenues, or expenses before and after this event. ITSA is straightforward and visually intuitive, suitable for comparing pre- and post-Covid-19 periods within a single time series. It is beneficial when the main interest is examining the immediate and subsequent changes attributable to the pandemic within a single outcome variable.

224. While ITSA approaches can be done on aggregate data with few but frequent observations, panel data that follows many firms over time could facilitate more rigorous analysis. Panel data techniques, such as Fixed Effects and Random Effects models, control for unobserved heterogeneity by examining multiple firms over time. This helps isolate the effects of Covid-19 and related policies on firm performance while accounting for firm-specific characteristics and time-invariant factors. By leveraging the richness of panel data, researchers can better understand how different firms are affected by the pandemic, distinguishing between general trends and specific responses, thus providing more accurate and nuanced estimates of the impact on firm profits.

225. When analyzing the impact of specific policies, one can use panel data combined with difference-in-differences analyses across locations with and without the policies or that differ in terms of the timing or intensity of policy implementation to isolate the impact of the relevant policies. However, such methods only work when policy variation is not driven by differences in underlying factors such as contagion or risk factors.

226. There are alternative approaches, however, which incorporate more structure into constructing a counterfactual. An Autoregressive Integrated Moving Average (ARIMA) model with Intervention Analysis is well-suited for handling time series data while accounting for various components like trends, seasonality, and autocorrelation. The ARIMA model's strength lies in its ability to model complex time-dependent structures, potentially providing a method to distinguish the pandemic's effects from underlying trends and patterns. Additionally, the model can be applied to panel data of individual firm observations to incorporate panel data techniques to control for unobserved heterogeneity across firms and over time, further enhancing the robustness of the analysis.

227. Vector Autoregression (VAR) is another method for studying the impact of a shock and is particularly well suited for analyzing interdependencies between multiple time series variables. VAR models allow researchers to capture the dynamic relationships between firm profits, industry-specific factors, and macroeconomic variables over time, to the extent that data is available tracking firm and industry characteristics over time within Alberta. By treating each variable as endogenous and regressing it on its own lags and the lags of other variables, VAR can show how shocks, like Covid-19, propagate through the system and affect different variables. Impulse response functions (IRFs) from VAR models illustrate the impact's time path, while variance decomposition analysis highlights the relative importance of different factors.

228. While VAR is likely a more complex approach than necessary for estimating the aggregate impact of Covid-19, it may be particularly well suited for exploring the impacts of different factors introduced, or policies turned on and off over time. An advantage of a VAR technique is that it identifies interdependencies between factors, which are essential for assessing the longer-term impacts of policy as other factors change.

Data considerations

229. For each of these methods, the larger the data ets, and the more granular, detailed, and frequent the individual observations available for calibrating or estimating, the more precise the resulting estimates will be.

230. While some approaches, including ITSA, can be applied to macroeconomic data, including time series of industry averages, most analyses benefit from micro-level data. In particular, a panel data set following a large sample of individual firms over time would greatly strengthen the analysis.

231. A large anonymized dataset reporting individual firm profits by quarter is potentially available by application through Statistics Canada. Such financial data is excellent for assessing the aggregate impacts of Covid-19, as it tracks profits, assets, and liabilities. However, it is not well suited for assessing individual factors, for which more frequent data is needed.

232. In other countries, researchers have constructed real-time sales or mobile phone (e.g., customer) location data to assess how policies contributed to outcomes related to but not directly translated into firm profits.

233. To the extent that a detailed panel of firm-level data tracking financial performance, sales, employment, or other outcomes of interest is available, it is feasible to conduct an analysis that controls for different firm characteristics. For example, an analysis can potentially control for firm size, location, pre-pandemic profits, detailed subsector or product description, and other factors. By accounting for such factors, the analyses can add these as dimensions of firm type used to predict losses.

234. Analyzing data from multiple firms across time makes it possible to identify trends and patterns that are not apparent when considering only aggregate or purely time-series data. For instance, firms within the same subsector may experience similar external pressures but differ significantly in their responses based on firm size, financial health, and management structures. Panel data techniques enable the differentiation of these responses, to the extent that they are reflected in the data, to see how specific subsectors and firm characteristics modulate the pandemic's impact on profits and other financial measures.

235. Such factors can increase the accuracy of any firm-level predictions generated by the model. However, even with such methods, there will be variation between firms with similar observable characteristics.

VI.C. Estimating impacts of Covid-19 on individual firms

236. The analyses described above are well suited to estimate average or general impacts, including how the impact tends to depend on observable firm characteristics. However, it is essential to acknowledge that such analyses represent average impacts on firms of a given type, not the impact on any individual firm.

237. Aggregating data to determine average effects helps in understanding broader trends and making generalizable conclusions, but it also abstracts away from the specific conditions and strategies of individual firms. For instance, while the average small manufacturing firm might have seen a significant decline in profits due to Covid-19, some individual firms might have pivoted successfully to new markets or products, experiencing growth instead.

238. Thus, while these average impacts provide useful guidance, they can be wildly off from what actually happened to specific firms. This variability highlights the limitations of relying solely on aggregate data for making predictions or strategic decisions. Firms within the same

subsector or size category can have vastly different outcomes based on their unique circumstances, competitive strategies, and operational efficiencies. Therefore, conclusions drawn from panel data analysis should take account of this inherent variability.

239. To accurately estimate the impact of Covid-19 on an individual firm, it is essential to examine the firm's own data and experiences rather than relying solely on estimates of the typical impact similar firms faced in Alberta.

240. A detailed examination of the firm's own financial data before and during the pandemic is essential. This involves analyzing comprehensive financial statements, including revenues, expenses, and profits, to establish a baseline of the firm's performance before the pandemic. Analysts can quantify the financial impact by comparing this baseline with the financial outcomes during the pandemic. Key metrics to focus on include changes in revenue streams, increased costs due to operational adjustments, and any shifts in capital investments or cash flows directly attributable to the pandemic.

241. In addition to the quantitative financial data, it is important to consider the strategic decisions and actions taken by the firm in response to the pandemic. These decisions might include cost-cutting, supply chain management changes, or shifts to remote work and digital platforms. By documenting these actions and assessing their direct financial implications, analysts can isolate the losses specifically caused by Covid-19. This approach ensures that the calculated losses reflect the overall financial downturn and the specific impacts of the pandemic-related strategies and disruptions.

242. Furthermore, qualitative data from interviews with management and staff can provide insights into the firm's operational challenges and strategic responses during the pandemic. These insights can help validate the financial data and ensure that the calculated losses accurately reflect the real-world impacts of Covid-19. For instance, understanding how supply chain disruptions or changes in consumer behavior specifically affected the firm can provide a more nuanced picture of the financial losses. Combining detailed financial analysis with qualitative insights offers a comprehensive view of the pandemic's impact, ensuring that the calculated losses are precise and reflect the firm's unique circumstances.

VI.B. Conclusions regarding opinion

243. There are sufficient empirical methodologies for estimating the aggregate losses to businesses in Alberta due to Covid-19 across all industries or by sector. These methods rely on industry-level time series data or panel data incorporating observations from many firms, using pre-Covid data to form a "best guess" or counterfactual estimate for what would have most likely occurred within each industry without Covid-19.

244. These methods can be adapted to study individual factors contributing to the aggregate loss. For example, they can potentially be used to estimate the impacts of a policy

or set of policies by comparing differences in trends in days before and after a policy is turned off and on, or by comparing differences in locations with and without exposure the policy.

245. Despite the potential for such analysis, I identify many challenges to applying them to disentangle the impact of different factors on outcomes during Covid. While it may be possible to identify the short-term impacts of individual factors on sales or work hours (e.g., how relaxing a lockdown affects sales), it is much less likely that could credibly identify their longer-term dynamic effects (e.g., how pent-up demand during the lockdown period contributed to the post lockdown increases). Furthermore, the granularity of the data requirements for such analysis generally prevents their use for assessing changes in profits or other financial measures required to measure firm losses.

246. Even if methods and data existed to complete a credible, accurate analysis at the industry or subindustry level, such estimates would predict the aggregate or average losses faced by businesses of different types. This is helpful for understanding overall impacts and can tell us what characteristics made businesses more or less resilient to the pandemic. However, the estimates will *not* provide accurate estimates of individual firm losses.

247. Given the concerns, I do *not* believe that it is possible to estimate the impact of Covid-19 at the firm level on a class-wide basis with an acceptable degree of accuracy without expending substantial effort building a detailed understanding of the specific experiences faced by businesses in different subsectors and locations and incorporating detailed information on the firm's own experiences over time.

248. Nor do I believe that it is generally possible to conclude whether a business suffered damages on a class-wide basis for most sectors or subsectors without this additional level of detailed analysis at the subsector and firm levels.

249. Ultimately, the only way to accurately assess business losses associated with the pandemic is to value these losses at the firm level, relying heavily on firm-level financial data and details regarding their own experiences.

250. In Section VII, I discuss these points further in the context of assessing the impact of CMOH orders. There, I argue that any assessment of CMOH order impacts at the firm level requires combining industry or subindustry-level analysis with firm-level data and analysis.

VII. Determining the Impact of Public Health Orders

251. This section provides an opinion in response to Question (iv):

> *Is there a manner in which it is possible to determine on a class-wide basis what portion of losses, if any, suffered by a business in Alberta between March 17, 2020, and the present was caused solely by the Public Health Orders of the Chief Medical Officer of Health referred to in Appendix A?*

VII.A. Class-Wide Approaches for Estimating CMOH Order Impact

252. Section VI describes several econometric methodologies designed to study the impact of events and policies. Such approaches can potentially be applied to Alberta business or sales data to assess the impact of Covid-19 in aggregate and the CMOH orders specifically.

253. I argue that a combination of ITSA, ARIMA models with intervention analysis, VAR, and panel data techniques can be utilized, depending on what data is available through the Province, Statistics Canada, or other sources for such an analysis.

254. Although such analyses can confidently assess the aggregate impacts of Covid-19, I am more skeptical about their ability to produce accurate results regarding the impact of specific policies or sets of policies. As discussed previously, this is for several reasons, including:

a. The availability of sufficient data. I am skeptical that data available for the province of Alberta is frequent enough to distinguish between policy changes and the other factors that were present and changing around the same time that policy was turned on and off.

b. Even if such data is available, it will not be the ideal profit and financial data that is only reported quarterly. Defining a methodology to map things that may be measurable, like sales or productivity, will still be necessary and may not be feasible with available data.

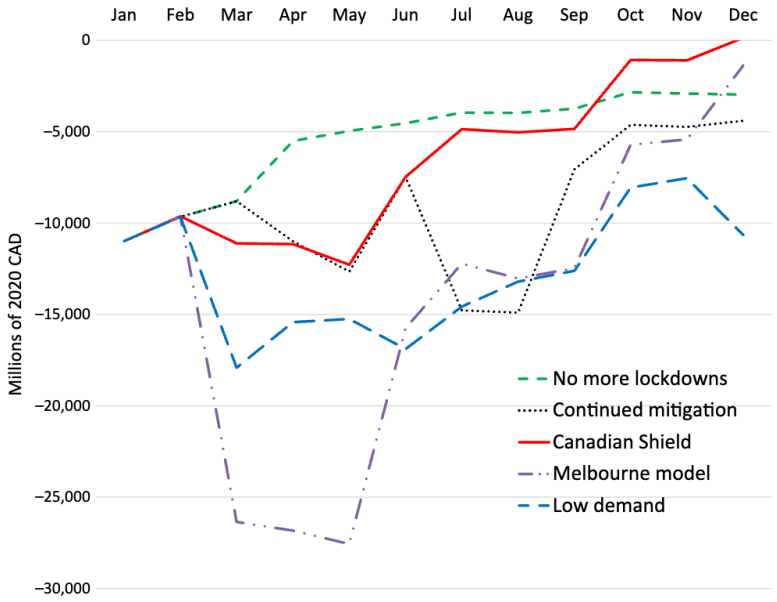
c. Similarly, even with real-time data, I remain unconvinced that there is enough independent variation in the timing of lockdown measures in Alberta to accurately distinguish their impact from other factors at play.

d. Uncertain dynamics and interconnections. While most of the approaches outlined in the previous section will struggle to estimate a policy's spillovers and lasting effects after it is turned off, a method like VAR, by assessing the interconnections between different factors, may provide insights in this regard. However, I am even more skeptical about the existence of sufficient data and independent variation to estimate a VAR model than I was for the other analysis types.

255. Despite these concerns, it is almost certainly feasible to construct some estimate regarding the impact of CMOH orders on firm outcomes. How accurate these estimates are, whether they are of the "right" outcomes to value firm losses, and whether the estimates can be more granular than at the primary industry level will depend on the extent of data available and the independent variation between policies and other factors. I suspect that there will be substantial noise inherent in any such analysis.

256. Some of my research shows how one may develop, calibrate, and estimate a detailed model of firm output under alternative policy scenarios.[62] Figure VII.1, from my article in the *Canadian Journal of Economics*, shows how such methods applied to publicly accessible industry data can be used to estimate declines in output associated with different lockdown measures and use these insights to estimate what would have happened under various alternative scenarios.

Figure VII.1. Scenario analysis with industry-level data (GDP relative to estimated counterfactual)



257. Analyses like this can be conducted at the industry level but require additional assumptions and analyses to translate any such effects into lost profits at the firm level. The required extensions to the framework for estimating profits would involve modeling and estimating similar impacts on sales, revenues, and other factors and then combining them into a model, translating these impacts into profits.

258. Doing this or an alternative approach would be a very challenging task, more in line with a complex, novel academic research project than a professional analysis. It would be difficult to get right and require a highly qualified expert or team of experts with demonstrated

[62] Cotton et al. (2022) supra; Cotton et al. (2021) supra; Agnew et al. (2020) supra.

experience developing and completing credible complex analyses that have not been done before.

259. Developing a model that provides loss estimates for any industry or business type is necessary for systematically estimating business losses on a class-wide scale. However, I have substantial concerns with such an approach.

260. First, the loss estimates produced by such an analysis are likely to be relatively noisy. They may produce a "best guess" regarding the harm caused by CMOH orders on a business of a given type. But, due to the number of assumptions required to produce these estimates and the inherent noise in the estimation strategies, the "best guess" will not necessarily be a good guess.

261. Second, even if the estimates being produced by such models were highly accurate, they would be highly accurate *on average*. This does not mean that they are accurate for individual firms. To the extent that there is substantial variation in individual firm experience (and there is ample evidence that there is wide variation), the estimated losses produced for individual firms may differ widely from what the firms actually experienced.

VII.B. Estimating Impact on Individual Firms

262. Throughout this document, I present evidence and argue that there were substantial differences between individual firm experiences during Covid-19. This was true not just across industries, but within industries and subsectors. It is also true for firms that looked similar going into Covid, but due to different choices by their owners, employees, customers, or due to luck, they saw differences outcomes.

263. Relying on a class-wide assessment to estimate the losses faced by individual firms is problematic for several reasons, which I discuss above and elsewhere in this document. More accurate assessments requires individualized assessments, accounting for a firm's own data and experiences. These assessment may be complemented with industry wide patterns to help isolate the impact of policy (e.g., estimate the share of decline in in-person customers attributed to lockdown restrictions).

264. Such individual firm assessments

a. Avoid substantial discrepencies between the estimated losses and actual losses faced by firms.
b. Avoid underestimating the losses faced by firms that suffered particularly harsh damages during the pandemic.
c. Avoid overestimating the losses faced by firms that experienced only minor losses.
d. Avoid attributing losses to firms that benefited from policies.

e. Avoid not attributing losses to firms that experienced losses but were part of a sector or group that gained on average.

265. The following method is an example of an approach that may be adapted to assess individual firm losses due to lockdown policies:

Incorporating Detailed Firm Data

266. For a granular analysis, individual firm data should include detailed financial statements covering revenues, expenses, and profits both before and during the lockdown periods. Key metrics to consider are:

a. Revenue Breakdown: Firms should provide data on the proportion of sales generated through in-person interactions versus online or other channels, as well as in-province and out-of-province sales. This helps in understanding how much of the revenue loss can be directly attributed to the restrictions on in-person activities.

b. Customer Data: Information on customer demographics and behavior changes during the lockdown period can shed light on shifts in demand and consumption patterns.

c. Operational Adjustments: Documentation of any operational changes made in response to the lockdowns, such as shifts to online sales, cost-cutting measures, or new product lines, is crucial. This helps in distinguishing losses due to lockdowns from those mitigated or amplified by strategic adjustments.

d. Fixed and Variable Costs: Detailed cost data allows for the separation of fixed costs, which may remain constant, and variable costs, which might fluctuate with changes in sales volume. This distinction aids in accurately estimating cost reductions that accompany reduced sales or production and translating these factors into profit losses.

Methodological Approach

267. The analytical approach to combining these datasets involves several steps:

a. Establishing a Covid-free counterfactual: Use pre-pandemic financial data to establish a baseline of normal business operations. This serves as a counterfactual scenario—what the firm's performance would have likely been without Covid-19, inclusive of the CMOH orders and other factors.

b. Identify changes that accompanied the lockdown policies: Use detailed firm level data and interrupted timeseries techniques to identify the trends in sales,

revenue, production, and other factors over time, including how they shifted with the implementation and relaxation of lockdown restrictions. Triangulate with industry data and firm operational details to establish a counterfactual for a case without lockdowns.

c. Estimate the short-run impact of lockdowns on firm profits: Estimate the deviation from the counterfactual that took place when lockdown policies were implemented in terms of sales, production, and costs.

d. Consider dynamic affects: Using firm data, determine activities during lockdowns periods (e.g., continued production, accumulation of inventories, other investments) as well as how changes to the business environment that an be directly linked to the policies (e.g., the closure of competitors) likely affected future sales, costs, and profits. Adjust the loss estimates accordingly.

268. Such an approach can be adjusted to account for different levels of data granularity. They may also adopt more sophisticated econometric techniques in the identification of the no-Covid counterfactual, to the extent that detailed data is available across many firms that can be used to predict how profits and financial measures typically evolve over time.

269. Such an approach is not perfect. It still relies on the construction of a counterfactual to provide a best guess as to what would have occurred in a state of the world that does not exist. It also requires assumptions to estimate how policy implemented at one point in time may contribute to changes in future points in time, a consideration that I discuss in the next section.

270. However, despite these limitations, an analysis at the individual firm level is likely to be much more accurate than a class-wide assessment for most firms.

VII.C. Conclusions regarding opinion

271. For the same reasons I discuss in Section VI, I do *not* believe that it is possible to estimate the impact of CMOH orders at the firm level on a class-wide basis with an acceptable degree of accuracy.

272. Not only are there significant technical challenges to estimating the typical impact of the orders on the losses by subsector or firm type, but there will also be substantial variation between the "typical" impact that is estimated and the impact experienced by the individual firms. As such, the estimates for individual firm losses that would be generated by such models will be much less accurate than estimates that take into account their experiences.

273. This does not mean that it would be impossible to estimate losses for firms on a class-wide basis. It only means that the level of analysis necessary to do so with a reasonable degree of accuracy would require substantial analysis to develop different predictions as to

how different factors and characteristics contributed to profits that may differ by subsector, operational model, and firm strategy. It would also require a substantial amount of data from the individual firms.

274. There may be some categories of business (e.g., specific business types within a subsector) that it would make sense to treat as a single class from an analytical perspective. For example, there may be gains in simultaneously estimating the losses faced by all independent full-service restaurants, while constructing algorithms to account for the data and experiences of the individual establishments based on various factors. Such a class action could ensure a consistent understanding of how Covid-19 and the CMOH orders transformed the business environment across cases, and construct a rich dynamic model of the costs, revenues, and other factors that contribute to profits for that type of business.

275. Although such a smaller-scall class action may make sense from an analytical perspective, I see *no* analytical advantage in attempting to a class-wide action as currently defined, inclusive of all sectors, subsectors, products, and operational models.

276. A credible approach would essentially have to conduct independent analyses for each subsector and business model regardless. If anything, combining them into a massive class action inclusive of all groups creates a project on a scale that will be practically impossible to execute without introducing shortcuts that will substantially reduce the accuracy of the individual firm loss estimates.

VIII. Dynamic Considerations

277. This section provides an opinion in response to Question (v):

> *Is it possible to determine, on a class-wide basis, whether any losses a business may have occurred during a portion of time within the class period were sustained, shifted, negated or otherwise affected during the remainder of the class period?*

VIII.A. Overview of Dynamics

278. Economies are complex systems with dynamic interconnections across time and between businesses and industries, policies, financial markets, and consumers. Several factors suggest that the effects of lockdowns or other restrictions are felt not only by firms during the periods in which they are implemeted but also may have significant impacts on firm operations, sales, and profits in future periods.

279. Several factors contribute to this complexity.

280. Interplay with the Spread of Covid-19: Lockdown, capacity restrictions, and other CMOH orders likely contributed to reducing the spread of Covid-19, preventing healthcare systems from being overwhelmed, and showing that the disease could be controlled. These factors may have contributed to consumer confidence and willingness to engage in commerce when restrictions were relaxed. They may have also helped prevent catastrophic outcomes that would have been significantly worse for businesses.

281. Deferred Spending and Demand Surges: Lockdowns often resulted in deferred consumer spending rather than permanent losses. As restrictions eased, many sectors experienced surges in demand. This phenomenon was evident in industries such as retail, where pent-up demand led to significant revenue increases post-lockdown. Businesses that could adapt quickly to changing conditions often recouped some of their initial losses, complicating the straightforward measurement of lockdown impacts.

282. Financial Assets and Liabilities: Many firms relied on cash or other existing assets to weather the lockdowns, while others relied on loans and credit. These changes to a firm's financial assets and liabilities carried over beyond any lockdown period.

283. Market Dynamics and Competition: The pandemic potentially reshaped markets leading to the closure of some businesses, reducing competition or increasing market power for surviving firms. These changes had long-term implications for market structure, influencing pricing, market share, and overall competitive behavior.

284. Inventory Dynamics: Firms that could continue production during periods of restriction may have accumulated excess inventories that allowed them to meet increased future demand

at lower future costs. Similarly, firms that could continue production during the pandemic may have been shielded at least in part from shortages in supply due to inventories on hand and could increase production later to make up for their reduction in inventories.

285. Behavior Shifts: The pandemic accelerated shifts in consumer and firm behavior. Many changes in consumer and firm behavior that occurred during periods of lockdown or restriction did not return to normal after the restrictions were lifted. For example, the restrictions may have contributed to the movement to virtual meetings as a substitute for travel and in-person meetings. Even after the economy reopened and travel restrictions were lifted, many meetings that would have otherwise been held in person are now held virtually. Similarly, shifts to food delivery have also stuck.

286. Supply Chain Challenges: Lockdowns worldwide disrupted supply chains, affecting production and inventory management. These affects were often felt by businesses and consumers after restrictions were lifted.

VIII.B. Possibility of Determining Class-Wide Loss Dynamics

287. Determining whether the losses experienced by businesses during a portion of the class period were sustained, shifted, negated, or otherwise affected during the remainder of the class period on a class-wide basis is a complex task. Given the dynamic and interconnected nature of economic factors during the pandemic, any analysis aiming to make such determinations must account for various challenges and nuances.

288. The heterogeneity in business responses and outcomes during the pandemic complicates class-wide assessments. Businesses within the same industry or subsector often experience divergent impacts based on their unique characteristics, such as size, market position, customer base, and strategic responses. For instance, some businesses might have suffered initial losses due to lockdowns but later recuperated by adapting their business models to new market conditions. Others might have faced prolonged negative impacts without any significant recovery. This variability means that a single, class-wide analysis may not capture the nuanced experiences of all businesses within the class.

289. Ultimately, while it is possible to estimate average trends and impacts on a class-wide basis using sophisticated econometric techniques, these methods have limitations when it comes to capturing the full dynamics of losses for individual businesses over the class period. The heterogeneity in business experiences, the complexity of interacting factors, and the limitations of available data all contribute to the challenges of making precise class-wide determinations. Therefore, any class-wide analysis should be complemented with detailed case studies and firm-specific evaluations to ensure a more accurate and comprehensive understanding of the pandemic's impact on business profitability.

VIII.C. Methodological Considerations

290. To address the above complexities, a combination of time series and panel data techniques can be employed to track and analyze the evolution of business performance over the class period. Interrupted Time Series Analysis (ITSA) and panel data methods like Fixed Effects and Random Effects models can help identify overall trends and average effects of Covid-19 and related policies. These methods allow for the examination of changes in business performance over time, providing insights into whether initial losses were sustained, shifted, or negated in subsequent periods.

291. Additionally, incorporating more granular data can enhance the analysis. Detailed financial data on revenues, expenses, and profits over multiple time periods, combined with qualitative information on strategic business decisions, can offer a more comprehensive view. By segmenting the analysis based on key firm characteristics—such as industry, size, and pre-pandemic financial health—researchers can better understand how different types of businesses navigated the pandemic over the entire class period.

Challenges and Limitations

292. Despite the robustness of these methods, there are inherent limitations in determining the specific dynamics of losses on a class-wide basis. One significant challenge is the interplay of multiple concurrent factors affecting business performance, such as government policies, changes in consumer behavior, and supply chain disruptions. These factors often interacted in complex ways, making it difficult to isolate the effect of any single factor over the entire class period.

293. Moreover, the availability and quality of data play a crucial role in the accuracy of such analyses. While macroeconomic data and industry averages can provide useful context, they may not capture the specific experiences of individual businesses. Similarly, firm-level panel data, while detailed, might still miss certain qualitative aspects of business responses that are crucial for understanding the full impact of the pandemic.

VIII.D. Conclusions regarding opinion

294. The intertemporal dynamics of firm sales, production, investments, and profits greatly increase the challenge of estimating the impact of CMOH orders on firms' profits and valuations. These are essential factors to account for in the accurate estimation of firm losses, but they are almost impossible to assess accurately using the empirical methods outlined in the previous sections.

295. While there are empirical methods for assessing the dynamic interconnections between different factors and characteristics (e.g., VAR), it is highly unlikely that the available data and

observed variation in factors will facilitate a detailed enough analysis to confidently estimate the dynamic connection between the CMOH orders and longer-run profits.

296. These concerns add to the conclusion from Sections VII that a credible estimation of firm losses requires a detailed assessment of the firm's operational model and subsector dynamics and the incorporation of detailed data on the firm's production, costs, sales, and investments before and during the pandemic.

297. Accounting for these factors will require a detailed understanding of the dynamics inherent in the subsector and business type. This is another reason to recommend not attempting such an analysis on a class-wide basis, inclusive of all industries and firms in Alberta. Rather, it would be better to focus on a subclass of firms that faced similar challenges prior to and during the pandemic, and to work to deeply understand the interactions and dynamics within that sector in order to model firm finances, profits, and valuation in response to the changing environment.

IX. Other Considerations

298. This section provides an opinion in response to Question (vi):

> *Any further relevant economic issues within my expertise which, in my opinion, are raised by the Action or the certification application?*

299. Throughout the report, in addition to addressing the specific questions requested, I discuss several other issues.

Defining losses

300. Section III explains why the broad categorization of losses in the Statement of Claim is too broad for the estimation of losses. In that section, I argue that losses should be defined as declines in profit compared to a counterfactual scenario either without Covid-19 (to estimate total losses suffered as a result of the pandemic) or with Covid but without the CMOH orders (to estimate losses suffered as a result of the policies).

301. Througout the discussion, I highlight how many businesses suffered losses in Spring 2020, but then experienced higher profits in later periods. Often, these later gains more than offset earlier losses, calling into question the degree to which the average business in Canada suffered losses "as a result of Covid-19."

302. Such insights show how the timeline over which losses are assessed is a crucial component of any loss estimation. Defining losses based on performance in 2020 alone will likely drastically overestimate the value of these losses.

303. Extending the estimation of losses beyond 2020 is essential. However, it is easier said than done. While one can estimate how Covid-19 as a whole shifted profits both during and after lockdowns, it may not be possible to do with when trying to assess the impact of individual factors, such as the CMOH orders, the estimation of which is based on an analysis of changes "just before" and "just after" introducing or relaxing a policy.

304. Bringing such longer-term assessments into the evaluation of an individual firm's losses due to CMOH orders will likely require a detailed analysis of the individual firm's data combined with assessment of how lockdown policies likely contributed to the shifts in profitability within that industry.

Inherent tradeoffs

305. The report has primarily focused on whether CMOH orders contributed to economic and business losses. It is important to acknowledge that the orders may have come with some benefits that prevented more costly losses in other parts of society.

306. The most obvious example is that the CMOH orders may have helped prevent the healthcare system from being overwhelmed, prevented people from getting sick and reduced mortality. Such impacts are good for public health.

307. To the extent that the CMOH orders prevented more catastrophic health outcomes, they may have helped prevent much worse economic outcomes as well.

308. Some businesses had customer bases that were willing to continue "normal" pre-Covid behavior as the pandemic set in and lockdowns were implemented. However, it is not obvious that these same customers would have still been willing to behave as if Covid did not exist if the disease had gotten a lot worse, which initial experiences from other locations around the world demonstrate it could have. Because worse health outcomes were successfully prevented, those who chose to defy the orders did so in an environment with lower risks.

309. Without a provincial government response, there was a higher probability that Alberta would have seen substantially worse outcomes in terms of massive death rates and overwhelmed healthcare system. Such severe outcomes would likely have led to substantial economic uncertainty, decreased consumer confidence, and decreased willingness to leave the house that may have lasted longer than the lockdowns that were in place.

310. There are other examples in which business restrictions could help reduce restrictions on other factors that contribute to long-run economic growth. CMOH orders may have affected the likelihood of school closures, return to in-person education, and the disruption of other public services and mental health services that were not necessarily under the control of CMOH, particularly during later periods. As the pandemic went on, priority was increasingly placed on ensuring activities like schooling and mental health services, for example.[63] [64]

Restrictions in Alberta vs. other provinces

311. There was significant variation in restrictions placed on businesses and other activities across provinces in Canada. For the most part, the experience of Alberta's businesses was typical for businesses in Canada more widely.

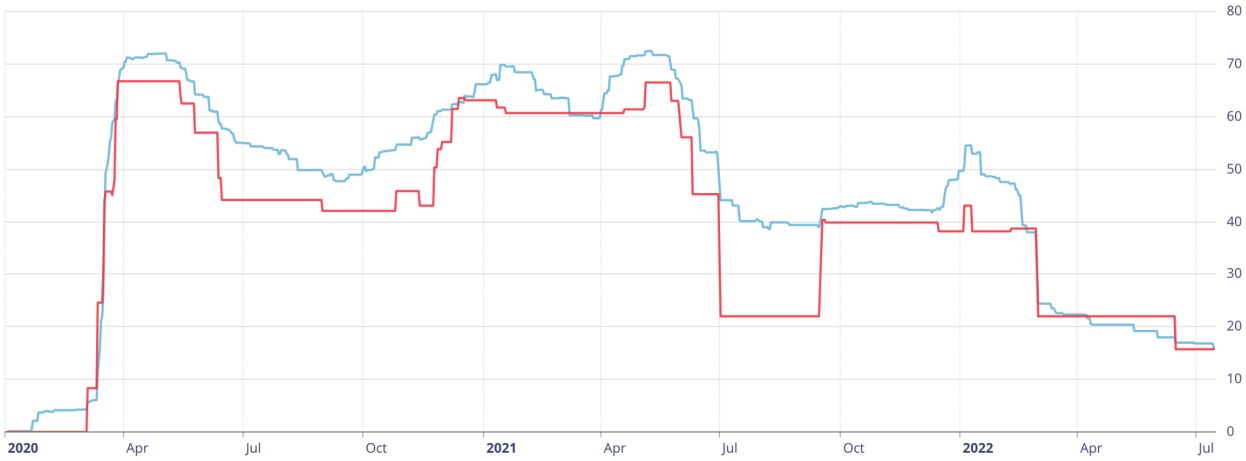
312. Figure IX.1 illustrates the average Bank of Canada's Stringency Index value across all restrictive activity measures, comparing these values for Alberta and Canada as a whole.

[63] There is an increasing body of evidence suggesting that the effects of school closures, for example, are substantial, particularly for marginalized and at risk students. See, for example J Baron, E Goldstein, C Wallace "Suffering in silence: How COVID-19 school closures inhibit the reporting of child maltreatment" (2020) J Pub Econ 190 104258 www.sciencedirect.com/science/article/pii/S0047272720301225
[64] N Afodjo et al. "Student Experiences with COVID-19 in Canada" (2023) One Society Network and Queen's University working paper https://maggiejones.ca/wp-content/uploads/2023/11/qed_wp_1511.pdf

313. Figure IX.2 presents my own comparison of the lockdown restriction indensity using the Statistics Canada's adaption of the Stringency Index by restriction measure for Alberta.[65]

314. Figure IX.3 compares the stringency of the restrictions in Alberta with those in other provinces. It shows the average intensity of restrictions on schools, restaurants, salons, and gyms by month over the first two years of the pandemic. The analysis uses data from Statistics Canada adaptation of the Stringency Index.[66] A value of 100 represents a full shutdown, except in the case of "public information campaigns," where it represents a full-intensity public messaging campaign.

Figure IX.1 Average lockdown Stringency Index by date, all sectors[67]

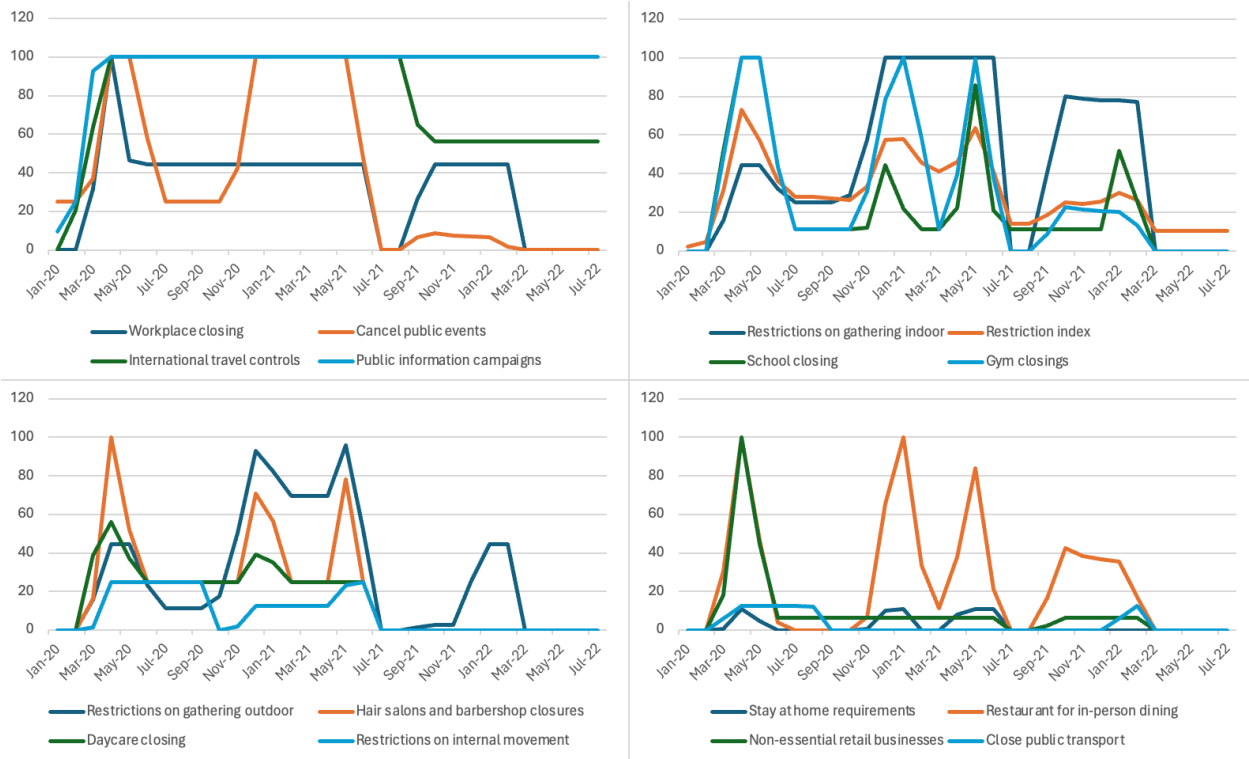


Red: Alberta; Blue: Canada

Source: Bank of Canada

[65] For details on the Stringency Index, see J Dekker and R MacDonald "Economic and social reports: Covid-19 restrictions index update." (2022) Statistics Canada. https://doi.org/10.25318/36280001202200800002-eng
[66] The aggregation and visual display of data was conducted by Afodjo et al (2023) supra.
[67] Covid-19 Stringency Index, Bank of Canada www.bankofcanada.ca/markets/market-operations-liquidity-provision/covid-19-actions-support-economy-financial-system/covid-19-stringency-index/

Figure IX.2 Average lockdown Stringency Index by restriction type and month, Alberta[68]



Source: Author analysis of Statistics Canada data

[68] Statistics Canada. Table 33-10-0497-01 Monthly COVID-19 Restrictions Index
https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3310049701

Figure IV.1. Average Stringency Index by month, category, and location[69]

		2020								2021										2022			Avg.
		Mar	Apr	May	Jun	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Sep	Oct	Nov	Dec	Jan	Feb	Mar	
AB	School closing	94	100	100	44	11	11	12	44	22	11	11	22	86	21	11	11	11	11	52	25	0	34
	In person dining	56	100	46	4	0	0	7	66	100	33	11	38	84	21	17	42	38	37	36	17	0	37
	Hair salons	29	100	52	25	25	25	25	71	56	25	25	25	78	25	0	0	0	0	0	0	0	29
	Gyms	88	100	100	44	11	11	31	78	100	58	11	39	99	38	9	23	21	21	20	13	0	44
BC	School closing	88	100	100	100	21	11	11	11	11	11	11	11	11	11	11	11	11	11	31	11	7	28
	In person dining	10	11	11	19	44	44	42	44	44	44	48	100	87	44	54	59	57	57	56	38	20	46
	Hair salons	65	100	58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
	Gyms	0	0	0	0	0	0	0	0	0	0	6	100	100	100	13	20	19	45	66	13	9	24
MB	School closing	29	44	44	44	19	16	39	39	44	44	44	44	77	94	6	0	0	32	41	0	0	35
	In person dining	31	100	100	33	11	34	96	100	100	66	44	44	86	91	30	29	27	42	58	40	0	58
	Hair salons	0	100	32	25	25	25	73	100	96	50	25	25	81	88	25	25	25	25	25	25	25	45
	Gyms	71	100	100	44	44	44	80	100	100	66	44	44	86	91	30	29	27	42	58	40	0	61
NB	School closing	94	100	87	44	19	11	11	11	35	35	11	11	11	11	11	11	11	25	81	11	10	30
	In person dining	78	100	31	11	11	9	23	19	60	59	19	11	11	11	10	28	24	25	71	41	18	31
	Hair salons	76	100	76	25	25	20	25	25	50	43	25	25	25	25	0	0	0	9	68	39	36	33
	Gyms	88	100	100	23	11	9	23	19	56	59	19	11	11	11	10	28	24	23	62	25	18	34
NL	School closing	42	44	44	44	12	11	11	11	11	69	70	23	11	11	17	11	11	46	80	11	10	29
	In person dining	56	100	100	57	44	44	44	44	44	80	89	44	44	44	11	20	18	27	52	47	41	50
	Hair salons	53	100	100	43	25	25	25	25	25	71	49	25	25	25	25	38	38	36	35	33	31	41
	Gyms	82	100	100	57	11	11	11	11	11	68	83	11	11	11	11	17	17	16	42	44	41	35
NS	School closing	74	100	100	100	32	11	22	41	27	18	16	29	100	35	11	11	11	51	57	11	11	42
	In person dining	76	100	100	23	11	11	25	94	19	11	11	34	100	30	11	24	22	31	55	39	11	40
	Hair salons	76	100	100	35	25	25	25	25	25	25	25	45	100	28	25	25	25	25	25	25	25	39
	Gyms	76	100	100	23	11	11	25	65	11	11	11	34	100	30	11	31	31	37	55	39	11	39
NT	School closing	42	44	44	44	11	11	11	11	11	11	11	11	22	11	94	94	94	30	99	94	11	39
	In person dining	0	67	100	65	44	44	44	44	44	44	44	44	44	43	0	0	0	0	0	0	0	34
	Hair salons	0	67	59	25	25	25	25	25	25	25	25	25	25	23	0	0	0	0	0	0	0	20
	Gyms	0	67	70	23	11	11	11	11	11	11	11	11	11	10	0	0	0	0	0	0	0	14
NU	School closing	82	100	100	44	11	11	50	14	11	11	11	56	94	17	11	11	11	17	99	94	88	43
	In person dining	71	100	100	83	44	15	50	48	44	44	11	56	94	94	11	11	11	11	31	100	96	52
	Hair salons	0	13	100	78	25	25	58	27	25	25	25	58	88	46	25	25	25	25	25	25	25	38
	Gyms	82	100	100	70	44	15	50	46	44	44	11	56	94	48	11	11	11	11	11	11	11	42
ON	School closing	90	100	100	100	43	33	39	65	96	69	39	89	100	100	29	11	11	11	63	30	11	59
	In person dining	88	100	100	96	44	80	78	96	100	96	73	96	100	63	19	35	33	43	93	41	0	72
	Hair salons	41	100	100	92	25	25	42	90	100	92	88	99	100	100	25	21	6	6	23	25	25	60
	Gyms	53	100	100	100	11	70	89	96	100	96	89	96	100	63	17	27	25	27	89	26	0	68
PE	School closing	91	100	100	100	19	11	11	34	16	11	20	11	11	11	11	11	11	40	97	11	11	35
	In person dining	88	100	100	11	11	11	11	43	11	14	20	11	11	11	11	22	21	35	74	41	11	31
	Hair salons	82	100	76	25	25	25	25	25	25	28	32	25	25	25	25	25	25	25	25	25	25	33
	Gyms	82	100	100	44	44	44	44	64	35	14	29	11	11	11	11	18	18	31	67	25	11	39
QC	School closing	96	100	96	94	11	44	44	44	44	19	11	94	48	11	11	11	11	39	60	11	11	43
	In person dining	71	100	100	72	19	94	94	96	100	96	94	94	88	24	36	33	23	37	99	34	22	69
	Hair salons	53	100	100	19	25	25	25	40	100	44	25	88	79	25	25	25	25	25	25	25	20	44
	Gyms	94	100	100	73	19	94	94	96	100	96	85	94	94	36	20	19	19	34	100	61	22	70
SK	School closing	73	100	100	100	32	11	11	59	48	34	11	11	11	11	0	0	0	0	0	0	0	29
	In person dining	66	100	100	56	44	44	44	44	44	44	44	39	25	8	0	16	14	13	12	5	0	37
	Hair salons	53	100	69	22	25	25	25	25	25	25	25	25	25	18	0	0	0	0	0	0	0	23
	Gyms	82	100	100	31	11	11	11	11	11	11	11	11	11	11	0	16	14	13	12	5	0	22
YT	School closing	82	100	100	100	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	26
	In person dining	38	100	91	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	46	47	24	16
	Hair salons	35	100	88	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	15	0	31
	Gyms	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	19	12	2

Source: Afodjo et al (2023)

[69] Afodjo et al (2023) supra

315. There was significant variation in restrictions placed on businesses and other activities across provinces in Canada. For the most part, the experience of Alberta's businesses was typical for businesses in Canada more widely.

316. The first graph shows that on average activities in Alberta were marginally less restricted during the pandemic than they were elsewhere. The second shows that there was wide variation in restrictions across activities and over time in Alberta.

Are the firms in the statement of claim representative of the class?

317. Much of my concern with class-wide damage estimation comes from the variation that exists across industries, subsectors, operational models, and individual businesses. There is no uniform experience that applies to most firms in Alberta. Estimating damages for an individual firm will require a detailed assessment of its subsector and operations model and its own individualized experience. This is nearly impossible to do at a class-wide level.

318. The two businesses named in the Statement of Claim should not be seen as representative of the class. Building a loss estimation strategy based on their experiences will be drastically inaccurate for other businesses in Alberta.

319. Even if the two firms represent the typical experience of a certain subset of restaurants and fitness facilities, the class is defined much more generally, inclusive of all businesses that potentially experienced losses due to government restrictions during the pandemic. The subsectors in which the named firms operated were two of the sectors to experience the greatest losses during the pandemic. Even within these sectors, the individual experience of the two firms did not necessarilly capture the experience of the typical firm in their groups.

320. The class is inclusive of manufacturing, construction, real estate, natural resources, and all other sectors of the economy, all of which have firms with substantially different operational models and experiences.

Author Signature

Christopher S. Cotton, Ph.D.

June 6, 2024

Date