

KEY ISSUES SERIES

AUTOMATION, AI AND ANXIETY: POLICY PREFERRED, POPULISM POSSIBLE



PETER LOEWEN & BENJAMIN ALLEN STEVENS UNIVERSITY OF TORONTO JULY 2019



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- Skills, Training and Lifelong Learning By Daniel Munro
- Facilitating the Future of Work Through a Modernized El System By Sunil Johal and Erich Hartmann, The Mowat Centre
- Automation, AI and Anxiety: Policy Preferred, Populism Possible By Peter Loewen and Benjamin Allen Stevens
- Old Gigs, New Gigs: Are Courts and Legislators Reinterpreting an Age-Old Debate for the New World of Work?

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EXECUTIVE SUMMARY

Together, automation and artificial intelligence (AI) have the potential to fundamentally reshape economics and social life. How will these trends affect politics and public policy? Will they expand or lessen the appeal of populism? Will they make it easier or more difficult for governments to shape public policy?

This report explores the potential for automation and AI to lead to widespread political and policy unrest and change in Canada. To examine this, we consider four related questions about automation and AI:

- How knowledgeable are citizens about automation and AI?
- What do they expect its effects to be for themselves, for employment and the economy, and for society?
- How worried are they about the potential effects of automation and AI?
- What kinds of politics and bundles of policy responses are citizens willing to support to confront the challenges (and opportunities) of automation and AI?

To understand citizens' views on automation and AI and their related policy preferences, we surveyed 1,995 Canadians in May and June 2019. Our survey sample was drawn from multiple panels with quotas for age, gender and region, providing a representative sample of the population. Our goal was to understand how people's exposure to automation and AI and their own beliefs about them—which may not align—relate to their preferences for various policy responses to the challenges of automation and AI.

Findings

We found that Canadians have not aligned their expectations of the job loss effects of automation and AI with their own actual exposure. Individuals regularly underestimate their own exposure. When the time for reskilling comes, it will be a shock to many, and a dislocating one at that. Policymakers will only be able to encourage people to take advantage of reskilling opportunities if those in the labour market understand their need for it. Accordingly, understanding how individuals can improve their knowledge of the particular skills they need for the future of their work is a pressing matter.

The political implications of our findings are as important as the technical policy implications:

- Citizens—especially those who are worried about job loss from automation and AI—are willing to support a large bundle of policies to address the downsides of these technologies. Politicians have substantial room to manoeuvre to address their concerns. They should link policy offerings directly to the reasonable apprehensions individuals have about automation and AI.
- Citizens' concerns about automation and AI are not limited to job loss. People are also concerned about social and economic mobility and inequality. Politicians should pursue policy solutions that

recognize not only automation and AI's short-term disruptions, but also their potentially longerterm effects on social and economic dynamism. Politicians can recognize the transformative economic potential of automation and AI while also arguing that the gains from these technologies should be widely and reasonably shared.

Finally, our research shows a link between fear of job loss and populism and nativism. However, we
do not find a direct and clear relationship between citizens' fear of job loss and their exposure to
automation to how they intend to vote in the upcoming election. Likewise, we do not find that fear
of job loss is linked to citizens' evaluations of which political party is best at managing technological
change.

The playing field is open for enterprising parties who wish to take up this policy challenge. Our political parties should do so with a depth and thoughtfulness equal to the challenge.

INTRODUCTION

The world is undergoing a fourth technological revolution¹. Together, automation and artificial intelligence (AI) may fundamentally reshape economics and social life². How will these trends affect politics and public policy? Will they expand or lessen the appeal of populism? Will they make it easier or more difficult for governments to shape public policy?

The goal of this report is to understand how fear of automation and its potential to cause economic dislocation might reshape policy and political preferences in Canada. We find that automation and AI present both substantial political and policy risks and opportunities.

In its current form, populism is roiling the political world³⁴. This is principally manifested in a style of politics: the anti-politics, anti-system offerings of not only Donald Trump, but also the Five Star Movement in Italy, some Brexiteers in the United Kingdom, the rejuvenated One Nation in Australia, as well as a number of new and radicalized parties across Europe, Latin America and Asia. Populism has, however, been less representative of a coherent set of policy offerings. In many instances, it has involved trade protectionism, the veneration of low-income workers without substantial policy support, and anti-immigration policies. In some places, such as Hungary and Poland, it has featured elements of redistribution, but skillfully packaged in the form of welfare chauvinism.

The policy forms that populism might take in the future are open to contestation, experimentation and political entrepreneurship. For instance, populist parties on both the left and the right could move toward a politics of high-income taxation, support for increased wages at the bottom of the income scale, substantial income support for dislocated workers, and trade agendas that focus on the flow of capital and profits rather than the flow of goods. If such policies are accompanied by socially inclusive positions, they could usher in a new era of progressive politics. If, however, they continue to reinforce existing tendencies toward ethno-racial exclusion and anti-statism, they will continue to challenge the stability of democratic institutions and egalitarian group relations.

How might automation and AI underwrite populism? Automation and AI—even in their weak forms—may spark even greater societal change. They can be highly disruptive to labour markets and the price of both low-value and high-value goods and services. These technologies are difficult to explain and hard to govern

¹ Schwab, K. January 3, 2017. The fourth industrial revolution. Crown Business.

² Agrawal, A., Gans, J. S. and Goldfarb, A. February 7, 2017. "What to expect from artificial intelligence." MIT Sloan Management Review, 58(3): 22-27.

³ Judis, J. B. 2016. The populist explosion: How the great recession transformed American and European politics. New York: Columbia Global Reports.

⁴ Mudde, C. and Kaltwasser, C. R. 2017. Populism: A very short introduction. Oxford University Press.

or regulate. The pace of their spread and innovation is hard to predict⁵. Taken together, these factors mean these technologies can be a substantial source not only for disruption, but also widespread anxiety.

This report explores the potential for automation and AI to lead to widespread political and policy unrest and change in Canada. To examine this, we consider four related questions about automation and AI. First, how knowledgeable are citizens about automation and AI? Second, what do they expect its effects to be for themselves, for employment and the economy, and for society? Third, how worried are they about the potential effects of automation and AI? Fourth, what kinds of politics and bundles of policy responses are citizens willing to support to confront the challenges (and opportunities) of automation and AI?

Our report proceeds as follows. We review how automation and AI and labour dislocation might underwrite support for populism and generate demands for effective policy responses. We justify why understanding citizens' current beliefs about automation and AI and preferences for action can help us understand future political responses. We then explain the empirical approach of our study, in particular how and why we measure exposure to automation and AI. We then present our results. A discussion of the policy implications follows.

AUTOMATION, DISLOCATION, AND POPULISM

Four large-scale trends have driven support for populism. First, there are widespread backlashes to migration—especially migration characterized as irregular and beyond effective state control, such as the refugee flows into southern and western Europe⁶. Second, there is fear over economic dislocation, most often generated by automation but portrayed as the result of offshoring of jobs⁷. Third, there is a breakdown in trust in government, and a concomitant willingness to support candidates from outside the political mainstream⁸. Fourth, there is a reaction against rapid cultural change that is perceived as a threat to the dominant status of white, native-born majority groups⁹.

While there has been a trend towards populism and anti-system politics in contemporary democracies over the past 20 years, it has been uneven and non-universal. Among the most important features of populism have been both its geographic diffusion (across Europe and, arguably, from Europe to the United States) and its geographic limits. Populist politics takes root in some geographies more than others, in particular

⁵ Agrawal, A., Gans, J. and Goldfarb, A. April 17, 2018. Prediction Machines: The simple economics of artificial intelligence. Boston, MA: Harvard Business Press.

⁶ Taggart, P. and Szczerbiak, A. May 21, 2018. Putting Brexit into Perspective: The Effect of the Eurozone and Migration Crises and Brexit on Euroscepticism in European States. Journal of European Public Policy. 25(8): 1194-1214

⁷ Rodrik, D. 2018. "Populism and the Economics of Globalization." Journal of International Business Policy 1(1-2): 12-33.

⁸ Foster, C. and Frieden, J. August 10, 2017. "Crisis of Trust: Socio-Economic Determinants of Europeans' Confidence in Government." European Union Politics 18(4): 511–535.

⁹ Sides, J., Tesler, M. and Vavreck, L. 2018. Identity Crisis: The 2016 Presidential Campaign and the Battle for the Meaning of America. Princeton University Press.

rural and suburban areas¹⁰, those at geographic peripheries rather than at the centre¹¹, and those which previously had greater concentrations of manufacturing¹² and comparatively lower levels of ethnic diversity¹³.

The rise of populist parties and candidates across contemporary democracies, from Latin America and the U.S. to western and eastern Europe, has been among the most significant political developments of the post-Cold War era. An ongoing debate, both scholarly and public, has sought to identify the causes of growing support for this form of politics—one that typically combines anti-elite appeals with ethno-nationalist exclusion on the right and with redistributive politics on the left. An emerging consensus suggests that at the root of support for populist parties, particularly on the right, is a backlash against rapid social change that disproportionately disadvantages voters with lower levels of education living outside of major urban centres. While the sources of such change are diverse, central among them are economic transformations that threaten people's livelihood and the possibility of upward mobility for subsequent generations.

Despite the importance of economic factors in shaping support for radical politics, there is little consensus on which types of labour market shocks matter most and the mechanisms through which a sense of dislocation shapes political preferences. Most research on the topic has sought to demonstrate correlations between particular economic indicators and self-reported or observed populist support in specific country cases. For instance, Autor et al¹⁴ show that, in the U.S., local labour market shocks associated with the lowering of trade barriers with China have contributed to support for more radical candidates in primary elections. Guiso et al¹⁵ document similar effects for shocks associated with capital mobility across European countries, while Colantone and Stanig¹⁶ ¹⁷ identify import competition as a source of support for Brexit in the United Kingdom and for the populist right across western Europe more generally.

Among the various potential sources of economic dislocation covered by these studies, the one that is least understood but holds the most significance for the future of democratic politics is technological change. The automation of routine human tasks by AI and robotics presents a major threat to the stability of labour

¹⁰ Cramer, K. J. 2016. The Politics of Resentment: Rural Consciousness in Wisconsin and the Rise of Scott Walker. Chicago, IL: University of Chicago Press.

¹¹ Jennings, W. and Stoker, G. November 27, 2018. "The Divergent Dynamics of Cities and Towns: Geographical Polarisation and Brexit." The Political Quarterly, 90(52).

¹² Gest, J. October 13, 2016. The New Minority: White Working Class Politics in an Age of Immigration and Inequality. New York: Oxford University Press.

¹³ Enos, R. D. October 2017. The Space between Us: Social Geography and Politics. New York: Cambridge University Press.

¹⁴ Autor, D., et al. September 2016. "Importing Political Polarization? The Electoral Consequences of Rising Trade Exposure." NBER Working Paper No. 22637.

¹⁵ Guiso, L., et al. November 21, 2017. "Populism: Demand and Supply." Center for Economic Policy Research Discussion Paper 11871.

¹⁶ Colantone, I. and Stanig, P. April 18, 2018. The Trade Origins of Economic Nationalism: Import Competition and Voting Behavior in Western Europe. American Journal of Political Science 62(4): 936-953.

¹⁷ Colantone, I. and Stanig, P. May 2018. "Global competition and Brexit." American Political Science Review 112(2): 201-218.

markets in the developed world. In contrast to past technological revolutions, its effects are unlikely to be concentrated at the bottom of the income and occupational hierarchies; white collar and professional jobs are equally at risk. As a result, the political consequences of the resulting labour market shocks may not take the form of traditional class politics. Instead, if the research in economics is correct, they may engender a broader reaction against elites, institutions and establishment parties. That is, they present substantial possibility of a populist backlash.

In the 20th century, automation typically led to the loss of blue- and pink-collar jobs. With the onset of the latest AI revolution, however, it is becoming more likely that middle-class and upper-class white-collar jobs will be at least partially automated. In previous waves, automation was mostly deployed to replicate and replace largely repetitive tasks. The physical accuracy, efficiency and strength of machines allowed for human workers to be replaced in assembly lines, for example. In other cases, the advances in computing power, increasingly sophisticated and user-friendly software, and the ubiquity of personal computers allowed for formerly concentrated tasks—such as typing, messaging and correspondence, and research—to be redistributed from dedicated workers, such as typists, to a much broader group of employees. The latest wave of automation, and the accompanying advent of new forms of AI, may have a much wider impact. Tasks that were once the domain of highly skilled professionals—such as a lawyer evaluating a contract, a business adviser aiding in a budget allocation exercise, or a professor evaluating a scientific matter across thousands of academic articles—can now be largely automated. Indeed, McKinsey & Co. estimate that as much as one-quarter of the tasks performed by a chief executive officer can be automated using current technologies¹⁸.

In sum, there are two important observations for the current automation and AI revolution. First, the impact will be broader than previous waves of automation, reaching a much larger range of professions. Second, at an individual level, the effects will depend much more on the exact mix of tasks that an individual performs; some will be replaceable by currently demonstrated technologies, while others are beyond the reach of existing technology. How individuals respond to the potential disruptions and threats of automation and AI will rely partially on their own skills and partially on their own perceptions of how susceptible they and those around them are to job loss due to automation.

Why citizens' views matter

In trying to anticipate the consequences of citizens' views on automation and AI, we make two important assumptions. First, citizens' beliefs and views of the world matter for politics. Politicians and policymakers do not act in a vacuum where they are able to shape citizens' essential beliefs and perceptions independent of citizens' experiences. Yet our second assumption is that citizens rarely hold sophisticated and coherent

¹⁸ Manyika, J. et al. January 2017. <u>A future that works: Al, automation, employment, and productivity</u>. McKinsey Global Institute Research.

views on nuanced and complex policy matters¹⁹. They are simply too busy and too interested in other things.

Instead, citizens look to politicians and policymakers to lead the way. First, citizens expect them to identify the most important problems in a society. Yet leaders do this with some constraints, as they need to identify issues that citizens find concerning. However, there are almost certainly more issues of concern than there is time to discuss them, and so politicians have substantial room to choose issues. Second, and most importantly, they look to politicians to suggest solutions to these problems. Taken together, this suggests that it will largely be left to politicians to determine how the challenges and opportunities of automation and AI are understood, and it will certainly be left to them to identify policy solutions and approaches²⁰. Understanding citizens' views and their preferences over basic policy responses can provide a view into the playing field on which politicians will address these issues.

Data

To understand citizens' views on automation and AI and their related policy preferences, we surveyed 1,995 Canadians in May and June 2019. Our survey was fielded on the Qualtrics platform, using an online survey sample provided by Qualtrics. Our survey sample was drawn from multiple panels with quotas for age, gender and region, providing a representative sample of the population. We also developed post-sampling weights using iterative proportional fitting algorithms and available census data. A full description of the demographics of our sample is available in the <u>Technical Appendix</u>.

Empirical approach

The empirical approach of our study is fourfold. First, we elicit a large amount of information from our subjects on the nature of their current employment. We explain this in greater detail in the next section. In short, we want to understand how a subject's job requires them to use various skills or to complete various tasks. By classifying their job at the level of skills and tasks, we are better able to estimate their susceptibility to automation. Second, we ask citizens about their knowledge of automation and AI. We follow this by eliciting their beliefs about the possible effects of automation and AI on societal and economic mobility, as well as on their current job. Fourth, we ask subjects their views on a number of policy areas.

Our goal is to understand how subjects' objective exposure to automation and AI and their own beliefs about automation and AI—which may not align—relate to their preferences for various policy responses to the challenges of automation and AI. Our approach is to link these measures econometrically, through a series of models of public opinion.

¹⁹ Converse, P.E. 2006. "The nature of belief systems in mass publics (1964)." Critical review, 18(1-3), pp.1-74.

²⁰ Lenz, G.S. 2013. Follow the leader?: how voters respond to politicians' policies and performance. Chicago, IL: University of Chicago Press.

Estimating automation exposure

There are two broad approaches to estimating the susceptibility of a job to replacement or reduction due to automation or AI. The first is an industry-level approach that identifies the industry in which an individual works—which can be done with substantial granularity—and then matches this to an industry-level estimate of exposure to automation and AI. This approach presents two difficulties. First, not all individuals within an industry will do a task that is unique to that industry, and new technologies will affect different roles differently. For example, a new clothing manufacturing technology that has widespread effects on the garment industry will likely affect a seamstress more than a bookkeeper, whose skills are easily transferred to another industry. Second, estimating industry-wide effects of technology is difficult, as the most relevant technological advances within automation and AI—for example, deep learning, neural networks and high-accuracy forecasting—are likely to have many applications across multiple industries. Estimating the effect in any one is deceptively hard.

The alternative approach, which we employ, is to estimate automation and AI exposure at the individual level, according to the tasks that make up an individual's job. The logic is that each individual's job will require a multitude of tasks and each of these tasks has a different degree of potential exposure to automation and AI.

This approach follows *A Future that Works*, a pioneering public study released by the McKinsey Global Institute²¹. This study identifies a number of discrete task characteristics that individuals will employ in their work. These are bundled into five categories: sensory perception, cognitive capabilities, natural language processing, social and emotional capabilities, and physical capabilities.

Our approach is to survey individuals on 17 different task characteristics across five bundles. For example, a survey respondent is asked: "Does your job require you to engage in navigation? For example, finding a route through an unfamiliar part of town?" or, "Does your work depend on you recognizing common patterns?"

A full list of these survey questions and their corresponding skill and skill category are available in the appendix.

We then rely on publicly available estimates of the current state of technology in performing various tasks. In particular, we identify if the task an individual performs can currently be performed through some technology at a rate below the median human ability, above the median, or in the top quartile of human ability. We generate a score for each individual, such that higher scores indicate a higher average technological ability within the tasks an individual currently performs. For example, if an individual's occupation relies on a task for which current technology is below the median human performance, we score

²¹ Manyika, J. et al. January 2017. <u>A future that works: Al, automation, employment, and productivity</u>. McKinsey Global Institute Research.

the individual as 0 on that task, corresponding to a low risk of replacement. If current technology performs at a median human capacity, we score the individual as 1 on that task. If current technology performs in the top quartile of human capacity, we score the individual as 2 on that task. We then average a score for individuals across all tasks they identify as a part of their current job.

The average score for our Canadian respondents is 0.65, suggesting that for the average Canadian, most tasks that they perform are currently performed by machines at a median level just over half the time. The threat of automation may not seem great, then. On the other hand, 93% of our respondents have at least one task in their current occupation for which current technology performs in the top quartile of human performance. Nearly everyone, then, is at least partially exposed to automation and AI.

RESULTS

Our study provides three sets of insights on automation, the future of work, and populism. We begin by asking how much individuals know about automation and AI. We then explore individuals' assessments of the likely societal and economic impacts of automation and AI. We conclude by exploring the relationship between the effects of automation and AI and policy preferences.

Knowledge of automation and AI

In our survey, we presented respondents with a short introduction to automation and AI, which can be found in the <u>appendix</u>. The purpose was to prepare them to think about the topic, to perhaps jog their memories of knowledge they might have, and to give them the best chance possible to display their knowledge on the subject. Despite this, self-assessed knowledge of automation and AI is low.

Figure 1 presents our first results. One-fifth of Canadians (19%) indicated that they know nothing about automation and AI or have merely heard the words but do not understand the concepts. Three in five respondents (61%) indicated that they are "familiar with the concepts, but don't know much about them," or have a basic understanding. One-fifth (19%) indicate that they have a good understanding, while just one percent indicate that they are experts.

FIGURE 1



Self-assessed understanding of automation and AI

Weighted by province, age group, and gender

We examined who knows more about automation and AI through a regression analysis. (Results are available in <u>Table 1 in the appendix</u>). Self-assessed knowledge is lower among older respondents and among women. It is higher among those who consume more news and who have completed more education. Importantly, self-assessed knowledge of automation and AI is unrelated both to employment and to an individuals' exposure to automation and AI in their work.

In addition to general knowledge about automation and AI, we also asked people if they understand how AI is currently changing work in their current industry or sector, and how it will change it in the future. On the current state of AI, 40% indicated that they understand how automation and AI are currently changing their sector, while the majority were unsure or did not know (17% and 43% respectively). Looking to the future, 43% indicated that they understand how automation and AI will change their sector's work in the future, while 20% were unsure and 37% did not know.

When we examine several factors simultaneously (see <u>Table 2 in the appendix</u>), we find that selfassessments of knowledge on the current trends of automation and AI are related to individuals' degree of exposure to automation and AI, but that self-assessed knowledge of future trends is not. As with general knowledge, trends knowledge is lower among women and higher among those who consume more news and have more education. Older respondents report higher knowledge of future trends, but not of current trends.

EXPECTED CONSEQUENCES OF AUTOMATION AND AI

The second set of questions we explore are the expected effects of automation and AI, on both job losses and social inequality and mobility.

On job losses

What do Canadians expect in terms of job losses from automation and AI? First, we asked respondents "Do you think that your job will be replaced by a computer or machine within the next …" with three time frames: five, 10, and 25 years.²² We then asked them "How many of your friends and family's jobs do you think will be replaced by a computer or machine …", giving them the same time frames.

It is important to note that what we are probing here is perceptions and attitudes, rather than a precise estimate of how many jobs will actually be lost. In this sense, such a measurement is analogous to consumer confidence or economic expectations.

FIGURE 2

Perceived risk of losing my job to automation and AI within the next....



²² For unemployed or otherwise non-employed respondents, we also included a line reading "*If you do not work currently, think about your most recent job.*"

FIGURE 3

Perceived risk of friends or family losing jobs to automation and AI within the next...



Weighted by province, age group and gender

Figures 2 and 3 present our results. In sum, Canadians do not foresee substantial job replacement by computers and machines in the next decade, but expect replacement in a quarter century. When asked about their own jobs, just 11% believe they will probably or definitely be replaced in the next five years. Twenty-five percent believe that replacement will probably or definitely happen in the next 10 years. Forty-five percent believe that their job probably or definitely will be replaced by a computer or machine 25 years from now. Respondents think their friends and family will be affected more than themselves, with 9% estimating job replacement in five years, 32% in 10 years, and 52% in 25 years.

We dig deeper to examine the correlates of perceptions of job losses. To do so, we average individuals' responses over all three timescales for the estimated likelihood personal job loss. Our regression results can be found in <u>Table 3 in the appendix</u>. Our results are only partially concerning for skills and labour policy. On the one hand, individuals' self-assessed job skills are linked to their estimates of replacement. Those people who feel that they have the skills required to maintain their standard of living in the future are less likely to feel that their job will be replaced in the future. Likewise, their knowledge of the current and future effects of automation and AI on their own industry are positively correlated with estimates of their own job loss. The plus side, then, is that future-based skill assessments and knowledge of automation and AI are shaping future-based job estimates. The negative side, however, is that an individual's actual exposure score is unrelated to their perceptions of their own job loss susceptibility. There is no discernible relationship

between industry-leading estimates of the likelihood that an individual is exposed to automation and AI and their own estimates of job loss.²³

On inequality and social mobility

We were also interested in knowing whether Canadians think that greater automation and AI will increase inequality and decrease social mobility.

We first asked respondents to register their agreement or disagreement with the following statement: "Automation and artificial intelligence will make economic inequality worse in the future, with the rich getting richer and the poor getting poorer." Nearly two-thirds (64%) of Canadians agreed or strongly agreed with this statement. Just 10% disagreed, while 5% did not know, and 22% neither agreed nor disagreed.

Second, we probed respondents' views on whether in the future automation and AI would make it easier or harder for poor people to become rich. More than three in five respondents (62%) believed that automation and AI will increase social inequality by making it harder for poor people to become richer. Just 9% thought it would increase the ease with which poor people became richer. A third (29%) were unsure.

Taken together, these results suggest that Canadians are not positively disposed to believe that the economic dynamism and disruption associated with automation and AI will have net positive effects on economic and social equality and mobility. Rather, an overwhelming majority think that these technologies will instead have a negative effect.

Importantly, views on the social effects of automation and AI are also related to fear of job losses. Those who personally anticipate job loss because of automation and AI are also more likely to believe that these technologies will increase social inequality. Self-assessed knowledge of automation and AI only slightly tempers these views (Table 4 in our technical appendix).

Automation, AI, and support for populism and nativism

Automation and AI promise substantial economic transformation. They also portend substantial societal disruption. As work is fundamentally changed and many jobs are lost, there is substantial potential for citizens to demand social change and political and policy responses. As with other times of economic disruption, there is potential for populist responses to fill a gap in public policy discussion.

To explore this possibility, we asked respondents about two sets of attitudes: first, their attitudes towards politicians and the political system; and second, their attitudes towards issues of diversity and immigration.

²³ This is equally true if we limit the analysis to the relationship between exposure and estimates of job loss over the next five years, i.e. more immediate job losses.

Negative attitudes on these two components are characteristic of the "right-wing populism" that has taken political hold in many other countries in recent years, but which has been largely absent from Canada.

Our populism measures consist mainly of items related to individuals' views of politics. Specifically, we asked respondents to indicate their agreement or disagreement with seven statements:

- The Canadian economy is rigged to advantage the rich and powerful;
- Traditional parties and politicians don't care about people like me;
- Experts in this country don't understand the lives of people like me;
- To fix Canada, we need a strong leader willing to break the rules;
- Canada needs a strong leader to take the country back from the rich and powerful;
- Politicians should be able to say what's on their minds regardless of what anyone else thinks about their views; and
- I trust the government to do the right thing.²⁴

Empirically, these statements represent a single, coherent measure of populism.²⁵

Second, we asked respondents about nativism. Our measure of nativism consists of items related to individuals' views towards immigration and diversity. Specifically, we asked for respondents' agreement or disagreement with six items:

- Immigrants take jobs away from real Canadians;
- Immigrants take important social services away from real Canadians;
- When jobs are scarce, employers should prioritize hiring people of this country over immigrants;
- Canadians would be better off if we let in all immigrants who wanted to come here;
- Canada would be stronger if we stopped immigration; and
- Immigrants take jobs from people I know.

As with populism, these items can be aggregated into a single, coherent measure.²⁶

²⁴ This item has its value inverted when used as part of the measure.

²⁵ The eigenvalue for the first dimension of populism in a principal-components factor analysis is 2.1. Cronbach's alpha for all seven items is 0.70.

²⁶ The eigenvalue for the first dimension of nativism in a principal-components factor analysis is 3.7. Cronbach's alpha for all seven items is 0.90.

Beginning with populism, we find that those who fear greater job losses from automation are significantly more likely to hold populist views (see <u>Table 5 in the appendix</u>). To illustrate this, we find that on a populism score where 0 represents disagreement with all populist statements and 1 represents agreement with all populist statements, the average score for those with the lowest fear of job loss is 0.72. The score for those with the greatest fear of job loss is 0.78. The effects attributable to fear of job loss are greater than those attributable to any demographic variables, current income or employment variables.

We find similar results for nativism (see Table 5 in the appendix). Those who anticipate greater job losses from automation are more likely to hold restrictive views on immigration and more negative views towards immigrants. As with populism, if we generate a nativism score ranging from least (0) to most (1) nativist, we find that those with the lowest fear of job loss score 0.59, while those with the highest fear of job loss score 0.66. Once again, the effects attributable to fear of job loss exceed those attributable to any demographic variables or current income or employment variables.

Importantly, in neither case do we find that objective respondent-level exposure to job loss via automation and AI is predictive of support for populist or nativist positions. What matters here is not an individual's objective current position, but what they expect the effects of automation and AI on job loss to be more broadly. This suggests a greater potential for mobilization toward populism and nativism on this issue, as the potential pool of individuals who may fear job losses is not limited to those who are objectively exposed to these losses.

Despite our findings linking fear of job loss to populism and nativism, we do not find a direct and clear relationship between citizens' fear of job loss and their exposure to automation to their vote choice in the upcoming election. Nor do we find that it is linked to their evaluation of which party is best to manage technological change.

What policy responses do individuals support?

If people anticipate job loss, disruption and limited social mobility from automation and AI, what reactions from governments are they willing to support? Our final set of results concern the range of policy solutions that individuals would support to address the challenges of automation and AI. To be sure, any effective mix of policies will likely be complex, multifaceted and difficult to explain. Policy is complicated. Our goal, then, is not to test individuals' policy knowledge or to put before them nuanced policies. It is instead to understand in broader strokes the kinds of policies—similar to how they would be portrayed in political debate or in a campaign—that Canadians support.

There are two main takeaways here. First, citizens want governments to take action on automation and AI, and they are willing to support a broad array of policies. Second, appetite for policy action is greatest among those who estimate greater job losses through automation and AI.

To determine this, we asked individuals two types of questions. First, we asked them to register their agreement or disagreement with three policy statements. They were:

- The government should penalize companies that fire workers and replace them with computers or machines;
- Consumers should boycott companies that fire their employees and replace them with computers or machines; and
- Companies should continue to employ workers even when there are computers or machines available that could do their job more efficiently.

These are policies in broad strokes. As Figures 4-7 show, we find more agreement than disagreement. For government penalization and consumer boycott, those who estimate more job losses through automation and AI are more likely to agree with these policy statements. By contrast, as with populism and nativism, we find little variation in opinions according to individuals' objective employment exposure to automation and AI.

FIGURE 4



Support for action against automation and AI

[1] Download data

Weighted by province, age group, and gender Don't know responses excluded

Support For Policy Actions Based on Fear and Exposure to Job Loss

FIGURE 5

Should the government penalize companies that fire workers and replace them with computers or machines?



FIGURE 6

Should consumers boycott companies that fire their employees and replace them with computers or machines?



FIGURE 7



Should companies continue to employ workers even when there are computers or machines available that could do their job more efficiently?

We also explored opinions by presenting respondents with two broad statements about government approaches to automation and AI and asked them which was closer to their own opinion. In each case, respondents were given a status quo statement:

 I don't think there is much the federal government can do to stop automation and artificial intelligence taking away a large number of jobs. Workers should prepare themselves for the changes that are coming.

Against this, they were presented with one of eight statements. This process was repeated three times for each respondent. The possible other policy statements were:

- Automation and artificial intelligence are going to take away a large number of jobs, so the federal government should begin decreasing immigration of <u>skilled</u> workers from other countries;
- Automation and artificial intelligence are going to take away a large number of jobs, so the federal government should begin decreasing immigration of <u>unskilled</u> workers from other countries;

- Automation and artificial intelligence are going to take away a large number of jobs, so the federal government should begin spending a lot more money on university education in science and technology;
- Automation and artificial intelligence are going to take away a large number of jobs, so the federal government should begin spending a lot more money on retraining programs for older adults;
- Automation and artificial intelligence are going to take away a large number of jobs, so the federal government should create tax incentives for companies to retrain workers who are displaced by automation;
- Automation and artificial intelligence are going to take away a large number of jobs, so the federal government should allow workers who are displaced by automation to claim more generous El benefits;
- Automation and artificial intelligence are going to take away a large number of jobs, so the federal government should use the corporate tax system to punish companies who displace workers through automation; and
- Automation and artificial intelligence are going to take away a large number of jobs, so when selecting companies to provide the government with goods and services, the government should favour companies that haven't laid off workers through automation.

Our results are summarized in Figure 8. As with the previous items, we find broad support for government action, irrespective of the particular action:

- 37% of respondents think the government should decrease immigration by skilled workers;
- 42% think immigration by unskilled workers should be decreased;
- 57% think the federal government should increase spending on science, technology, engineering and math (STEM) in universities;
- 56% think that the government should spend more on adult retraining;
- 63% think the government should use the tax system to favour companies that retrain workers displaced by automation;
- 43% think that EI benefits should be made more generous for those who are displaced by automation;
- 37% think that the government should punish via the tax system corporations who displace via automation; and
- 44% believe the government should favour procurement from corporations that do not automate.

FIGURE 8

Support for policy action vs. doing nothing



[1] Download data

Weighted by province, age group, and gender

In sum, then, there is not majority support for government action in every instance, but there is broad support for policies of various kinds. Additionally, we find that support is higher among those who anticipate greater job losses via automation and AI for seven of eight policies. Finally, when we add together all measures of government action across these two question sets (Figure 9), we find that the majority of citizens favour government action, with those who expect more job losses via automation and AI supporting a stronger degree of action (Table 6 in our technical appendix). Citizens—especially those who fear job loss through automation and AI—are ready to support a broad set of policy responses from government.

FIGURE 9

Canadians prefer government take action to protect from job loss from automation and AI - and would consider a range of options



Support for fewer policy options

 [1]
 Download data

Support for more policy options

POLICY IMPLICATIONS AND RECOMMENDATIONS

Our findings have a variety of implications for policymakers. Of our four recommendations, one concerns policy design and three more directly implicate the politics of automation and AI.

On the policy design front, we highlight one important implication. Generally, individuals have not aligned their expectations of the job loss effects of automation and AI with their own actual exposure to job dislocation via automation and AI. Policymakers will only be able to encourage people to take advantage of reskilling opportunities if those in the labour market understand their need for such reskilling. Accordingly, understanding how individuals can improve their knowledge of the particular skills they need for the future of their work is a pressing matter. Likewise, it is vitally important to understand how improved knowledge can be turned into a desire for reskilling.

Knowledge of the effects of automation and AI are limited, generally and within industries. Individuals regularly underestimate their own exposure. When the time for reskilling comes, it will be a shock to many, and a dislocating one at that. Governments need to make reskilling widely available, easily understood, easily accessible, and effectively matched to actual skill needs.

The political implications of our findings are as important as the technical policy implications. First, citizens especially those who are worried about job loss from automation and AI—are willing to support a large bundle of policies to address the downsides of these technologies. Politicians have substantial room to manoeuvre to address their concerns. Certainly, no politician or policymaker is constrained to choose from populist or nativist responses. They should link policy offerings directly to the reasonable apprehensions individuals have about automation and AI.

Second, citizens' concerns about automation and AI are not limited to job loss. People are also concerned about social and economic mobility and inequality. Politicians should pursue policy solutions that recognize not only automation and AI's short-term disruptions, but also their potentially longer-term effects on social and economic dynamism. Politicians can recognize the transformative economic potential of automation and AI while also arguing that the gains from these technologies should be widely and reasonably shared.

Finally, despite our findings linking fear of job loss to populism and nativism, we do not find a direct and clear relationship between citizens' fear of job loss and their exposure to automation to how they intend to vote in the upcoming election. As we show in the appendix (Tables 7 and 8), controlling for relevant demographic variables, voters who are more concerned about job losses do not differ substantially in their vote preferences from those who are not concerned. Similarly, those who are more exposed to automation do not differ substantially in the distribution of their vote choice from those who are not exposed. This effect remains when controlling for populism and nativism.

Likewise, we do not find that fear of job loss is linked to citizens' evaluations of which political party is best at managing technological change. The playing field is open for enterprising parties who wish to take up this policy challenge. Our political parties should do so with a depth and thoughtfulness equal to the challenge.

CONCLUSION

Populism is upturning the political world. Entrepreneurial politicians are converting unease over societal change, concerns about migration, and long- and short-term economic decline and disruption into political power. They do this with little heed to policy consistency or adherence to ideological traditions. Instead, they offer simple solutions to pressing problems. It is not easy to know where populism is going, but it is easier to know how it will get there—by way of an acute awareness of citizens' concerns, combined with seemingly simple policy solutions.

There is a parallel disruption occurring in our economies. The current forms of automation and artificial intelligence feature effects that are unconventional and follow unpredictable paths. Their effects will be much more widely spread, affecting individuals across industries and income brackets. How citizens will react to the changes brought on by automation and artificial intelligence is difficult to predict, not least because there appears at present to be little link between individuals' actual exposure to job loss via these technologies and their own concern for job loss. When disruption occurs, it will come as a surprise for many.

Citizens will likely be unconvinced of social welfare gains from technologies that cause significant changes in work for themselves and others, while at the same time believing that they will worsen inequality and decrease social mobility. This disruption will prove fertile ground for populists. It combines a concern over social change with widespread economic change and dislocation.

The challenge for policymakers is three-fold. First, to do the hard work of increasing awareness among exposed citizens to the availability of opportunities for retraining and retooling. Second, to generate a suite of policies that address dislocation and disruption across industries and across the life cycle of any individual. Third, to do the difficult political work of acknowledging the concerns and fears of individuals and making clear why proactive, pragmatic and broad policy responses are needed. If this is not done, then the playing field is effectively left to those who will be right about the problems, but wrong about the solutions.

