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GAINS FROM TRADE FOR CANADA'S NORTH: THE CASE FOR A NORTHERN INFRASTRUCTURE CORRIDOR

G. KENT FELLOWS AND TREVOR TOMBE

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GAINS FROM TRADE FOR CANADA'S NORTH: THE CASE FOR A NORTHERN INFRASTRUCTURE CORRIDOR*

G. Kent Fellows and Trevor Tombe

SUMMARY

In the 19th century, building the Canadian Pacific Railroad was a crucial element for successful and profitable trade between populated and developing portions of southern Canada. In the 21st century, that crucial element could be a northern corridor that eases east-west trade through Canada's North. Two recent Senate reports, supported by federal Transportation Minister Marc Garneau, concluded such a project could "unlock significant economic opportunities for our Country." We explore this possibility.

Canada's North relies heavily on imports for many important goods and services, especially manufactured products, agricultural goods, and professional and scientific services. While imports account for 28 per cent of spending for Canadian provinces, that figure stands at 35 per cent for the Yukon, 39 per cent for the Northwest Territories and 40 per cent for Nunavut. Exports are also critical, especially for the Northern resource sector, which exports 80 per cent of production compared to 66 per cent for the provinces. But due to its vast geography, sparse population, challenging weather and poor trade infrastructure, the costs of trading are large; the gains liberalization equally so.

In this paper, we summarize recent analysis that quantified the magnitude and consequences of trade costs with and between Canada's territories. We find that while distance matters, it matters much more for the territories. Specifically, we find the per-mile trade costs are 45 per cent larger for the territories than the provinces, suggesting lower quality infrastructure is an important cause. The gains from lowering such costs are large. We find the combined annual GDP of Nunavut, Yukon and the Northwest Territories could increase by nearly \$4.7 billion – a massive increase of roughly 50%.

A northern corridor providing better trade infrastructure would benefit provinces and territories alike. And while the initial outlay for northern infrastructure including multiple transportation modes would be significant, the long-term gains in GDP may justify such costs.

* This research was financially supported by the Government of Canada via a partnership with Western Economic Diversification.

INTRODUCTION

Trade matters for Canada's economy. And while international trade receives disproportionate attention, Canada's internal trade – that is, trade among its various provinces and territories – is no less critical. This is especially true for Canada's North. Recently, the Canadian government and the Senate have shown a distinct interest in internal trade and the development of trade corridors in Canada. Two recent Senate reports make the case:¹

1. Senate of Canada. 2016. "Tear Down These Walls: Dismantling Canada's Internal Trade Barriers," *The Senate Standing Committee on Banking, Trade and Commerce*;
2. Senate of Canada. 2017. "National Corridor: Enhancing and Facilitating Commerce and Internal Trade," *The Senate Standing Committee on Banking, Trade and Commerce*.

The federal government responded. A letter of support from Minister of Transportation Marc Garneau (2017) supported the conclusions of the second report. The Senate's 2017 report observed "the development of an east-west corridor through Canada's North and near-North would unlock significant economic opportunities for our country." But the significance of the benefits of such a transportation corridor and the associated infrastructure remains an open question.

In this communiqué, we review the results of recent analysis to provide a conservative estimate of the value of the economic opportunities that the Canadian Northern Corridor concept presents. This is a summary of and companion to a longer-form research paper which is also being released through *The School of Public Policy Publications*.²

IMPORT SHARES

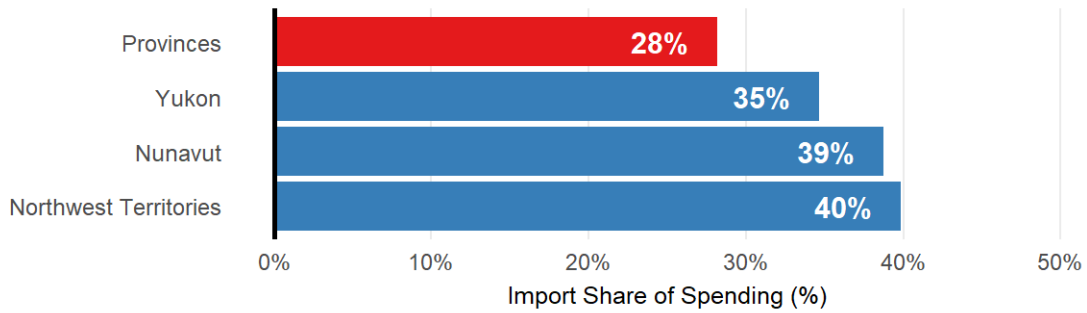
Challenged by remote locations, small populations, rugged terrain and (at times) difficult climate conditions, Canada's territories rely heavily on imported goods to maintain their standards of living, support economic activity, satisfy consumer demand and provide inputs to investment and government services. As Figure 1 illustrates, imports (both intra-national and international) account for an average of 28 per cent of spending for Canadian provinces. However, this proportion is significantly higher for the territories at 35 per cent for the Yukon, 39 per cent for the Northwest Territories and 40 per cent for Nunavut.

The composition of these imports is important as well. As shown in Figure 2, imports satisfy almost all of the territories' final demand for manufactured goods, agricultural products, wholesale trade, and professional and scientific services. The starkest difference between provincial and territorial imports is for agricultural products, which are almost entirely imported into the territories, while imports are only one-quarter of spending on agricultural goods in the provinces. Wholesale trade – an important sector with linkages to almost all others – also relies more heavily on imported services in the territories compared to the provinces.

¹ Tombe presented testimony to the Senate hearings in preparation of the first of these reports (Senate of Canada, 2016) while Fellows presented testimony to the Senate hearings in preparation of the second of these reports (Senate of Canada, 2017).

² Fellows and Tombe (2018)

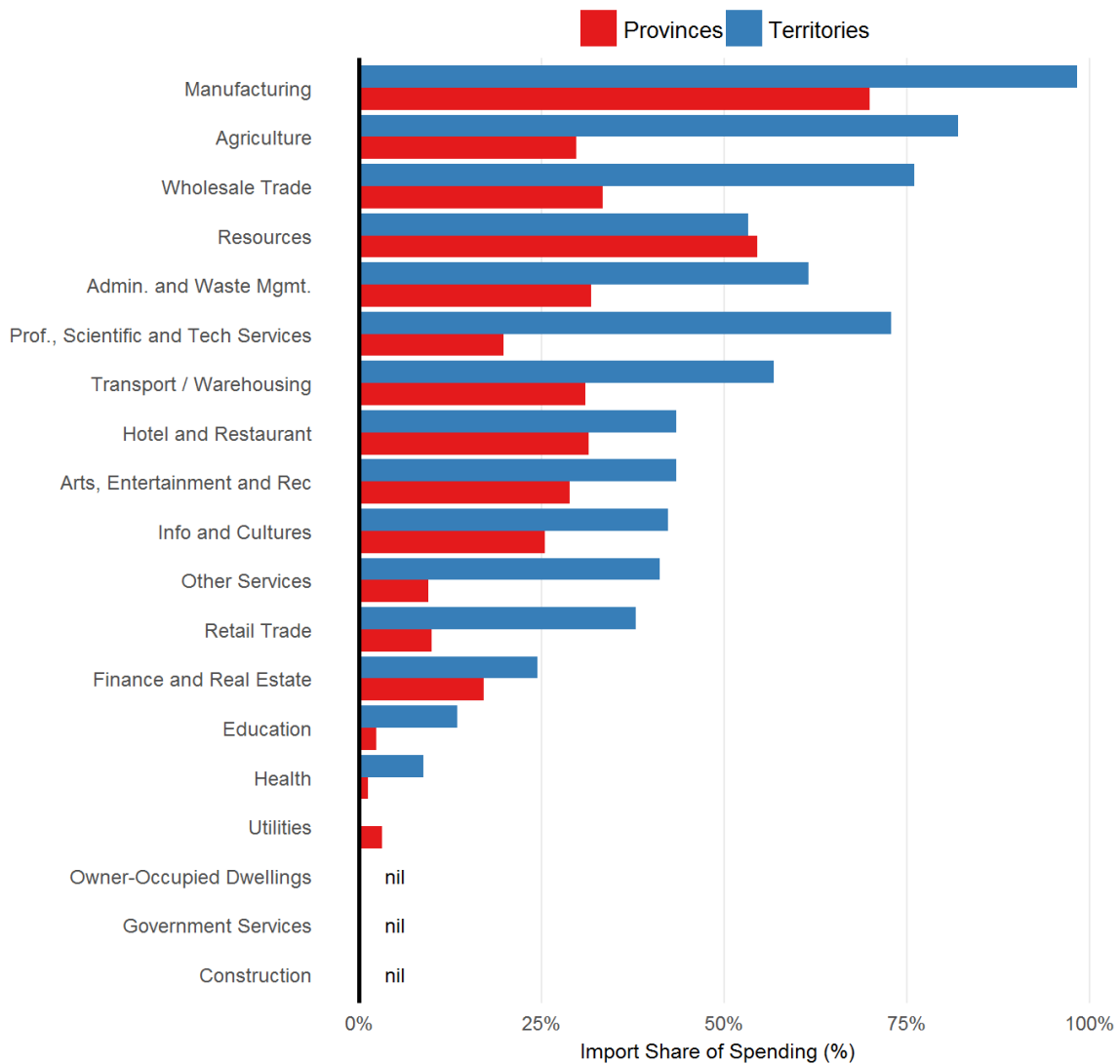
Figure 1: Import Shares in Canada, by Territories and Provincial Average (2013)



Source: Own calculations from CANSIM 386-0003.

Figure 2: Import Shares in Canada, by Sector (2013)

Weighted-average import share of spending across the three territories and ten provinces.



Source: Own calculations from CANSIM 386-0003.

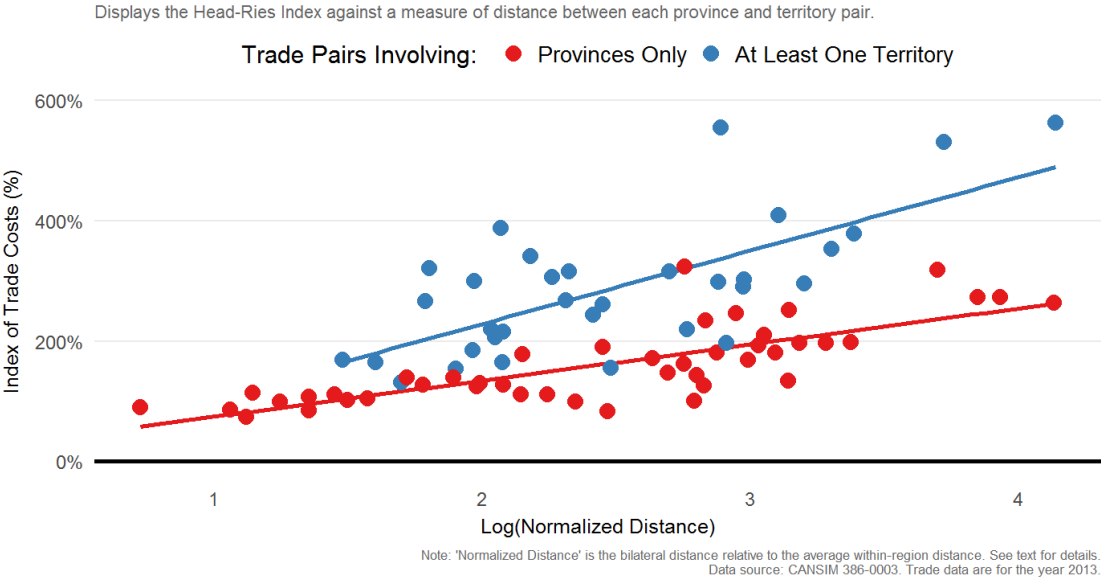
While there is less disparity between shares on the export side, exports are also critical for the territories' economic health. In particular, the resource sectors in the territories export over 80 per cent of their production compared to a two-thirds share for the provinces in this sector. The resource sectors also account for the majority of territorial exports.

These figures demonstrate the importance of trade (both international and intra-national) to the territorial economies. However, while the territories rely heavily on trade, this trade may face higher costs to import and export than the provinces. We proceed next to present estimates of internal trade costs in Canada.

TRADE COSTS

Trade costs, broadly understood, are anything that inhibits trade that would otherwise have occurred between two regions. Taxes and fees on imports or exports, quota restrictions on the amount of imports, the distance and time required to ship goods, lack of knowledge of which products are available, poor quality physical transport infrastructure and policies such as regulations or product certifications that differ, are just a few examples of what contributes to trade costs. Not all of these factors are directly observable – indeed, with the exception of explicit taxes and fees, most are not. And even if they were, aggregating the disparate factors together in a single measure of trade costs is a challenge. In our full research paper, we present a number of different estimates. Here, we focus on one that is particularly relevant and intuitive for Canada's North.

Figure 3: Trade Costs and Distance between Trading Pairs in Canada



Regions that are far from others will naturally face higher costs. However, it turns out that the territories face higher costs than one would expect based only on their distance from trading partners. Figure 3 shows the relationship between measured trade costs

and geographic distance for provincial/territorial trading partners within Canada.³ The red points represent trading pairs where both trade partners are provinces while the blue points represent trading pairs including at least one territory.

We find per-mile trade costs are more than 45 per cent larger for pairs with at least one territory when compared to province/province pairs.⁴ It's not just that territories are further away from provinces than provinces are from each other (i.e., blue points are skewed to the left relative to red points in Figure 3) but also that trade costs are higher per mile (i.e., blue points are skewed up relative to red points in Figure 3). Given this, we speculate that the higher measured trade costs for the territories are the result of the low quality of transportation infrastructure serving the territories relative to the quality of transportation infrastructure serving the provinces. This assertion is backed up by research examining transportation costs relative to infrastructure quality in the northern context where winter ice roads are used as an imperfect substitute for all-weather highways (Michaelis et al., 1996). Following from this, these results suggest that improving the quality of northern transportation infrastructure (a key goal of the Canadian Northern Corridor concept) could significantly reduce (but by no means eliminate) territories' trade costs, bringing them more in line with those measured for province-to-province trade.⁵

BENEFITS OF IMPROVED NORTHERN TRANSPORTATION INFRASTRUCTURE / REDUCED TERRITORIAL TRADE COSTS

To get a more complete picture of how a reduction in northern territories' trade costs would impact the Canadian economy, we use a computational general equilibrium (CGE) model to simulate the economic response that would occur if territorial trade costs were reduced as the result of an improvement in the quality of territories' transportation infrastructure.⁶

Specifically, we calibrate the model to observed economic data (including the measured trade costs as described above) and then "shock" the model by removing the trade costs associated with poor quality northern transportation infrastructure.

Figure 4 illustrates the simulated change in territorial GDP resulting from this shock. Specifically, the combined annual GDP of Yukon and Northwest Territories increases by \$3.75 billion (from \$7.23 billion to \$10.98 billion) while Nunavut's GDP increases by \$900

³ These results are an extension of the work of Albrecht and Tombe (2016). Trade costs are measured using a Head-Reis (2001) index while distance is calculated through the use of population centroids. Distance measures are normalized relative to average within-region population distances. The complete methodology behind Figure 3 is described in our companion paper: Fellows and Tombe (2018).

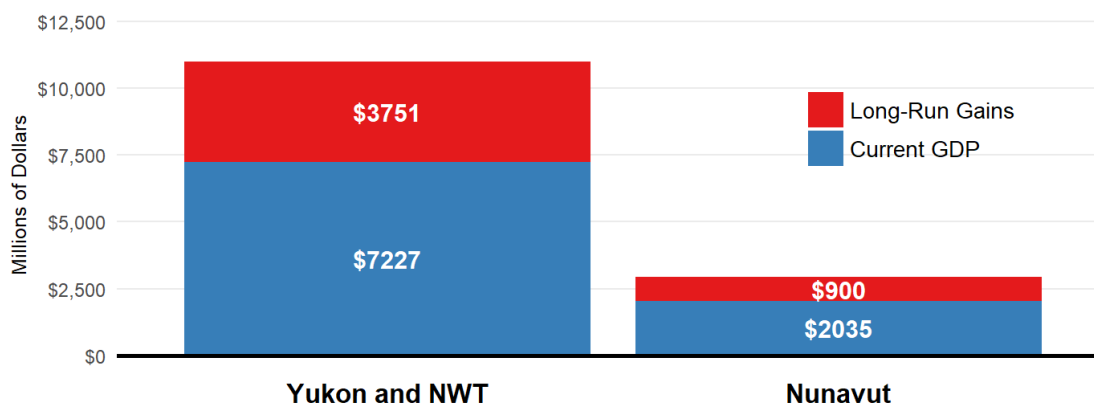
⁴ Consider a pair of trading partners A and B with a normalized distance of 20. (That is, the average distance between a seller in region A and a buyer in region B is 20x the average distance between a seller in region A and a buyer in region A). Noting that $\text{Log}(20) \approx 3$, Figure 3 shows that if both of these trading partners are provinces, the resulting trade cost will lead to a three-fold increase in cost (the original cost plus a 200 per cent increase in cost due to trade costs). However, if one or both of these trading partners is a territory (with lower quality transportation infrastructure) the same distance is associated with a more than four-fold increase in price (the original cost plus a greater than 300 per cent increase in cost due to trade costs).

⁵ Essentially, bringing the blue points on Figure 3 down to a level more consistent with the red dots.

⁶ A complete description of the computational general equilibrium model is presented in our companion paper: Fellows and Tombe (2018).

million (from \$2.04 billion to \$2.94 billion).⁷ Considering that annual GDP growth rates in Canada average between one per cent and two per cent per year,⁸ these increases in GDP (52 per cent and 44 per cent respectively) are hugely significant for the territories.

Figure 4: Territorial GDP Gains from Improved Northern Infrastructure Quality



Source: CGE Model Simulations.

Shifting focus from GDP to GNI (gross national income) as an economic indicator, Table 1 shows that resource income as a component of national income undergoes the largest gains in the territories. This is followed by a much smaller, but still dramatic, proportional increase in wage (labour) income.

Table 1: Territories' Income Responses to Improved Infrastructure Quality

Nunavut	Wage Income (Real)	48%
	Capital Income (Real)	12%
	Resource Income (Real)	211%
Yukon and Northwest Territories	Wage Income (Real)	53%
	Capital Income (Real)	12%
	Resource Income (Real)	139%

Source: CGE Model Simulations

The relatively smaller increase in capital income requires some additional explanation. Our modelling assumptions generally reflect a conscious decision on our part to maintain conservative assumptions while modelling these simulations.⁹

While the territories would obviously feel the effects of an infrastructure quality improvement most keenly, there are also spillovers to other provinces. Because trade

⁷ All reported results represent a long-run scenario defined as a timeframe which allows for capital investment to enter the territories from the rest of Canada and abroad such that the overall capital stock of the territories in particular and Canada in general is able to vary. In our companion paper (Fellows and Tombe (2018)), we also investigate a medium-run scenario wherein capital stock is fixed at the national level but is mobile across sectors and regions, as well as a short-run scenario wherein the capital stock is fixed and immobile for each sector and region.

⁸ Source: CANSIM table 384-0038 and authors' calculations.

⁹ In particular, the capital income measure presented in Table 1 does not include the income generated by new capital (that is, capital resulting from investment dollars that enter the territories from other provinces or from abroad).

goes both ways, a cost reduction that benefits importers in the territories will also benefit exporters in the provinces (and vice versa). While the impacts to the provinces are smaller than those of the territories (especially when considered as a proportion of provincial GDP), the results indicate that spillover effects are non-trivial and generally benefit every province.¹⁰ In fact, the overall productive benefit of the reduction in trade costs grows by almost 40 per cent when we include spillovers to other provinces. Overall, Canada's national simulated GDP grows by nearly \$6.5 billion, with \$1.8 billion in GDP gains outside the territories.

CONCLUSIONS

Lower territorial trade costs may require substantial infrastructure investment. Fellows and Sulzenko (2016) presented a rough back-of-the-envelope calculation positing that the cost of constructing Northern Corridor Infrastructure, including multiple transportation modes, would be in the range of \$100 billion. While this costing was presented as a rough estimate, and would require significant study to validate, the resulting GDP gains could justify such construction costs. With an overall increase to annual Canadian GDP of \$6.5 billion (a modest projection, by design), the build-out would show a positive net benefit within a few decades even accounting for reasonable social discounting.¹¹ What the Canadian Pacific Mainline was for Canada in the 19th century, the Northern Corridor project can be for the 21st.

¹⁰ The sole exception to this is Saskatchewan, where there is a very small negative impact due to some crowding out in Saskatchewan's trade with the territories as a result of improvements in other provinces' trade relationships.

¹¹ The Canadian Cost-Benefit Analysis Guide (Treasury Board of Canada Secretariat 2007) recognizes the responsible use of a three per cent discount rate in situations of social discounting where consumer spending and welfare is concerned. Using this discount rate, the annual GDP value stream of \$6.47 billion reaches a net present value of \$100 billion at the 22-year mark.

Specifically: $\sum_{t=1}^{22} \left[\frac{\$6.47b}{1.03^t} \right] = \$103.11b$

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About the Authors

G. Kent Fellows (PhD, Calgary) is a Research Associate at The School of Public Policy, University of Calgary. Kent has previously worked as a researcher for the University of Alberta's School of Public Health and as an intern at the National Energy Board. He has published articles on the effects of price regulation and bargaining power on the Canadian pipeline and pharmaceutical industries as well as the integration of renewable generation capacity in the Alberta electricity market. His current research agenda focuses on the area of computational economics as applied to the construction and use of large-scale quantitative models of inter-sector and interprovincial trade within Canada. Kent is also involved in forwarding The School of Public Policy's Canadian Northern Corridor research program, which is aimed at studying the concept of a multi-modal linear infrastructure right of way through Canada's North and near North.

Trevor Tombe (PhD) is an Associate Professor of Economics at the University of Calgary and a Research Fellow at The School of Public Policy. Prior to joining the University of Calgary in 2012, he was an Assistant Professor of Economics at Wilfrid Laurier University in Waterloo, Ontario. He received his PhD and MA from the University of Toronto. His research focuses on the intersection of international trade and macroeconomics, with a particular focus on the factors influencing productivity within and between countries. He has published in a variety of leading economics journals, has written various policy papers through the University of Calgary's School of Public Policy, and is an occasional contributor to *Maclean's* and the *Financial Post*.

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University of Calgary, Downtown Campus
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GAINS COMMERCIAUX POUR LE NORD CANADIEN : ARGUMENTS EN FAVEUR D'UN CORRIDOR NORDIQUE D'INFRASTRUCTURES*

G. Kent Fellows et Trevor Tombe

RÉSUMÉ

La construction du chemin de fer du Canadien Pacifique, au XIX^e siècle, a été un élément crucial pour la vitalité du commerce entre les régions en développement du sud du Canada. L'élément crucial du XXI^e siècle pourrait être la mise en place d'un corridor nordique qui favoriserait l'axe commercial est-ouest dans le Nord Canadien. Deux récents rapports du Sénat, avalisés par le ministre des transport, Marc Garneau, concluent qu'un tel projet « générerait d'importantes retombées économiques pour le pays ». C'est cette possibilité que nous examinons.

Dans le Nord canadien, plusieurs biens et services d'importance dépendent fortement de l'importation. C'est particulièrement le cas pour les produits manufacturés, les produits agricoles ainsi que les services professionnels et scientifiques. Alors que l'importation représente 28 pour cent des dépenses des provinces canadiennes, ce chiffre s'élève à 35 pour cent pour le Yukon, 39 pour cent pour les Territoires du Nord-Ouest et 40 pour cent pour le Nunavut. L'exportation aussi est cruciale, particulièrement pour le secteur des ressources dans le Nord qui exporte 80 pour cent de sa production, alors que les provinces en exportent 66 pour cent. Mais en raison de sa vaste étendue géographique, des populations clairsemées, des rigueurs climatiques et des infrastructures précaires, les coûts commerciaux sont très élevés dans le Nord canadien; tout comme peut l'être la libéralisation des gains.

Nous présentons, dans ce document, le résumé d'une analyse récente qui permet de quantifier la magnitude et les répercussions des coûts commerciaux dans les territoires canadiens. Nous observons que si la distance est un facteur important, elle l'est d'autant plus pour les territoires. Plus précisément, nous observons que les coûts commerciaux au mille sont plus de 45 pour cent plus élevés dans les territoires que dans les provinces; ce qui porte à penser que la piètre qualité des infrastructures en est une des principales causes. L'abaissement de ces coûts donnerait lieu à d'importants gains. Nous constatons que les PIB combinés du Nunavut, du Yukon et des Territoires du Nord-Ouest pourraient

* Cette recherche a été soutenue financièrement en partie par le gouvernement du Canada via Diversification de l'économie de l'Ouest Canada.

s'accroître de près de 4,7 milliards de dollars : une augmentation substantielle d'environ 50 pour cent.

En apportant des infrastructures commerciales améliorées, le corridor nordique deviendrait avantageux tant pour les provinces que pour les territoires. Et bien que les dépenses initiales pour la mise en place d'une infrastructure nordique comprenant divers modes de transport soit considérables, les gains de PIB à long terme peuvent justifier un tel coût.

INTRODUCTION

Les échanges commerciaux sont essentiels pour l'économie du Canada. Alors que le commerce international reçoit une attention disproportionnée, le commerce intérieur au Canada – c'est-à-dire les échanges entre les provinces et les territoires – n'en n'est pas moins important. Cela est particulièrement vrai dans le cas du Nord canadien. Le gouvernement du Canada et le Sénat se sont récemment intéressés au commerce intérieur et au développement de corridors commerciaux au Canada. Le Sénat a déposé, en ce sens, les deux rapports suivants :¹

1. Sénat du Canada. 2016. « Des murs à démolir : démantèlement des barrières au commerce intérieur au Canada », *Comité sénatorial permanent des banques et du commerce*;
2. Sénat du Canada. 2017. « Corridor national : améliorer et faciliter le commerce et les échanges intérieurs », *Comité sénatorial permanent des banques et du commerce*.

Le gouvernement fédéral y a répondu. Une lettre du ministre des Transports, Marc Garneau (2017), vient appuyer les conclusions du deuxième rapport. Dans son rapport de 2017, le Sénat observait que « la création d'un corridor est-ouest, qui passerait dans le Nord et le Nord proche du Canada, générerait d'importantes retombées économiques pour le pays ». Cependant, l'importance des retombées d'un tel corridor de transport et des infrastructures associées demeure une question ouverte.

Dans le présent communiqué, nous examinons les résultats d'une analyse récente pour effectuer une estimation conservatrice des retombées économiques liées au concept d'un corridor nordique au Canada. Il s'agit du résumé d'un plus long rapport de recherche également publié dans le cadre du School of Public Policy Publications.²

PARTS DES IMPORTATIONS

Aux prises avec l'éloignement, des populations clairsemées, un terrain accidenté et (parfois) des conditions climatiques rigoureuses, les territoires du Nord canadien dépendent fortement de l'importation de denrées pour maintenir la qualité de vie, soutenir l'activité économique, satisfaire la demande des consommateurs ou fournir en intrants les investissements et les services gouvernementaux. Comme l'indique la figure 1, l'importation (tant domestique qu'internationale) représente en moyenne 28 pour cent des dépenses

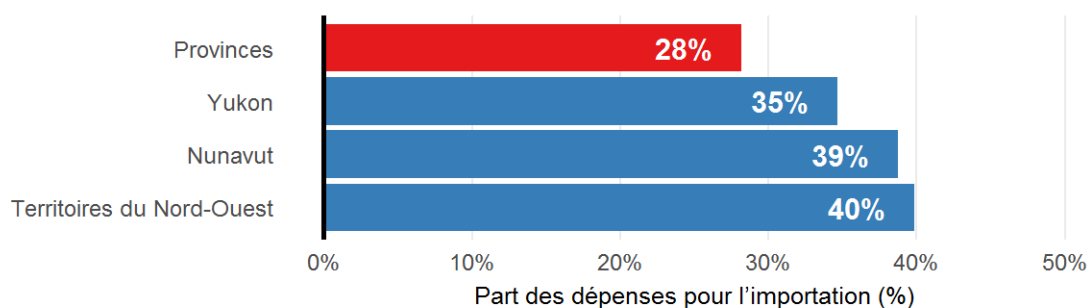
¹ Tombe a témoigné devant le comité du Sénat dans le cadre de la préparation du premier rapport (Sénat du Canada, 2016) tandis que Fellows a témoigné pour la préparation du deuxième rapport (Sénat du Canada, 2017).

² Fellows et Tombe (2018).

des provinces canadiennes. Cependant, cette proportion est beaucoup plus élevée dans les territoires, avec 35 pour cent pour le Yukon, 39 pour cent pour les Territoires du Nord-Ouest et 40 pour cent pour le Nunavut.

La nature de ces importations revêt également son importance. Tel qu'indiqué à la figure 2, l'importation satisfait pratiquement l'ensemble de la demande finale dans les territoires pour ce qui est des produits manufacturés, des produits agricoles, du commerce de gros ainsi que des services professionnels et scientifiques. La différence la plus manifeste entre les provinces et les territoires concerne les produits agricoles, lesquels sont presque entièrement importés dans les territoires alors que l'importation compte pour un quart des dépenses provinciales dans le secteur agricole. Par ailleurs, le commerce du gros – un secteur crucial en lien avec presque tous les autres – dépend plus fortement de services importés dans les territoires que dans les provinces.

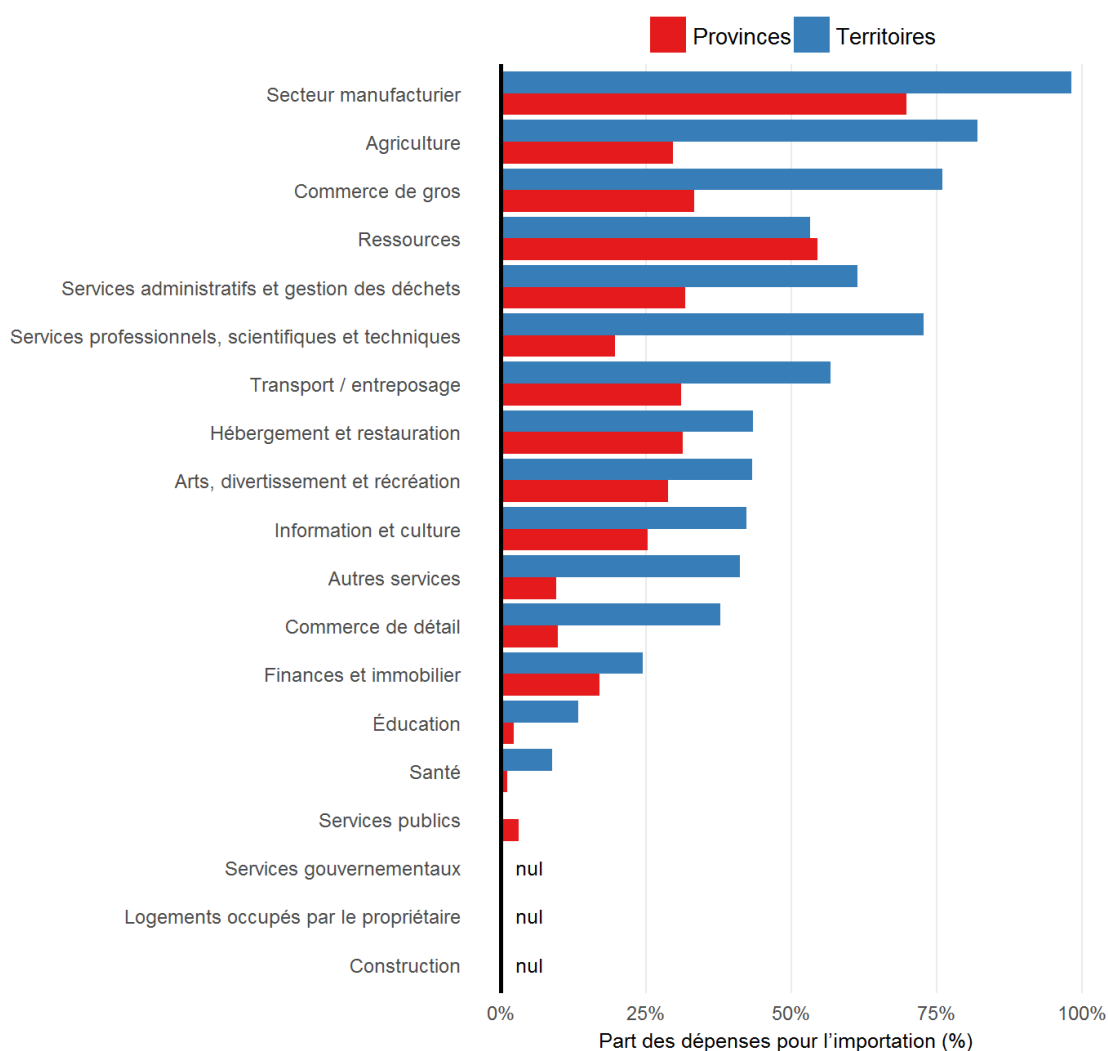
Figure 1 : Parts des importations au Canada, selon la moyenne des territoires et des provinces (2013)



Source : calculs à partir de CANSIM 386-0003.

Figure 2 : Parts des importations au Canada, par secteur (2013)

Moyenne pondérée des dépenses pour la part des importations dans les trois territoires et les dix provinces.



Source : calculs à partir de CANSIM 386-0003.

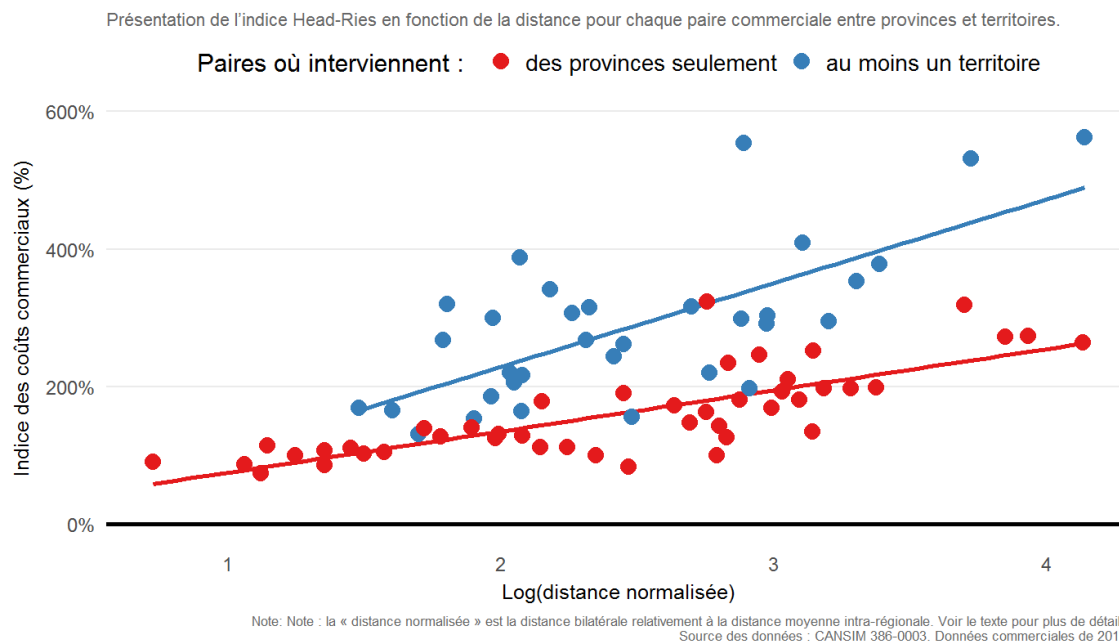
Bien qu'il y ait moins de disparité quant aux parts des exportations, celles-ci demeurent néanmoins essentielles pour la santé économique des territoires. Plus concrètement, pour le secteur des ressources, les territoires exportent plus de 80 pour cent de la production alors que les provinces en exportent les deux tiers. En fait, le secteur des ressources représente la majorité de l'exportation pour les territoires.

Ces chiffres montrent l'importance du commerce (tant international que domestique) pour l'économie des territoires. Cependant, même si les territoires comptent fortement sur le commerce, celui-ci fait face à des coûts d'importation et d'exportation plus élevés que pour les provinces. Nous poursuivons en présentant une estimation des coûts commerciaux internes au Canada.

COÛTS COMMERCIAUX

Les coûts commerciaux, dans l'ensemble, concernent tout ce qui empêche une activité commerciale qui aurait eu lieu, dans d'autres circonstances, entre deux régions. Les taxes et droits d'importation ou d'exportation, les quotas d'importation, la distance et le temps requis pour l'envoi des biens, le manque de connaissances sur la disponibilité des produits, la qualité physique des infrastructures de transport et les politiques divergentes de réglementation ou de certification des produits figurent parmi les exemples de facteurs qui influent sur les coûts commerciaux. Ces facteurs ne sont pas tous directement observables – en fait, à l'exception des taxes et droits explicites, la plupart ne le sont pas. Et même s'ils étaient observables, il est difficile de saisir l'ensemble de ces facteurs disparates en une seule mesure pour quantifier les coûts commerciaux. Notre rapport détaillé de recherche présente plusieurs estimations. Mais dans le présent communiqué, nous mettons de l'avant une estimation qui est particulièrement pertinente et perceptible pour le Nord canadien.

Figure 3 : Coûts commerciaux et distance entre paires commerciales au Canada



Les coûts sont logiquement plus élevés pour des régions éloignées entre elles. Cependant, il apparaît que les territoires font face à des coûts encore plus élevés qu'escompté. La figure 3 montre la relation entre les coûts commerciaux mesurés et la distance géographique pour les partenaires commerciaux provinciaux/territoriaux au Canada.³ Les points rouges représentent les paires commerciales où les deux partenaires sont des provinces tandis que les bleus représentent celles où au moins l'un des partenaires est un territoire.

³ Ces résultats sont le prolongement du travail d'Albrecht et Tombe (2016). Les coûts commerciaux sont calculés à l'aide de l'indice Head-Ries (2001) tandis que la distance est calculée en fonction des centroïdes de population. La mesure des distances est normalisée en fonction des distances moyennes entre les populations à l'intérieur des régions. La méthodologie complète qui sous-tend la figure 3 est décrite dans notre document d'accompagnement : (Fellows et Tombe (2018)).

Nous observons que les coûts commerciaux au mille sont plus de 45 pour cent plus élevés dans le cas des paires où intervient au moins un territoire, comparativement aux paires province/province.⁴ Les territoires ne sont donc pas uniquement plus éloignés des provinces que les provinces le sont entre elles (il y a asymétrie vers la gauche des points bleus par rapport aux points rouges sur la figure 3); les coûts commerciaux au mille y sont aussi plus élevés (il y a asymétrie vers le haut des points bleus par rapport aux points rouges). Cela porte à penser que les coûts commerciaux plus élevés dans les territoires résultent de la piètre qualité des infrastructures de transport qui les desservent, comparativement à la qualité des infrastructures qui desservent les provinces. Cette affirmation s'appuie sur l'examen des coûts de transport par rapport à la qualité des infrastructures dans le contexte nordique, où les routes de glace hivernales sont utilisées à titre de substitut rudimentaire aux routes praticables en toute saison (Michaelis et al., 1996). Ces résultats portent à penser qu'une amélioration de la qualité des infrastructures de transport (un des objectifs clés du concept du corridor nordique canadien) pourrait réduire de façon significative (sans toutefois les éliminer) les coûts commerciaux dans les territoires, ce qui les placerait davantage au niveau des coûts commerciaux mesurés dans le commerce entre provinces.⁵

AVANTAGES D'UNE AMÉLIORATION DES INFRASTRUCTURES DE TRANSPORT DANS LE NORD / RÉDUCTION DES COÛTS COMMERCIAUX DANS LES TERRITOIRES

Pour avoir une meilleure idée de l'impact sur l'économie canadienne d'une réduction des coûts commerciaux dans les territoires, nous avons recours à un modèle informatique d'équilibre général (IEG) afin de simuler la réaction de l'économie face à une réduction des coûts commerciaux obtenue grâce à une amélioration de la qualité des infrastructures de transport dans les territoires.⁶ Plus précisément, nous avons calibré le modèle selon les données économiques observées (notamment les coûts commerciaux mesurés, tel que décrit ci-dessus) et nous avons ensuite « provoqué » le modèle en retirant les coûts commerciaux associés à la mauvaise qualité des infrastructures de transport dans le Nord.

La figure 4 illustre la modification du PIB des territoires qui résulte de cette « provocation » simulée. Plus précisément, les PIB annuels combinés du Yukon et des Territoires du Nord-ouest s'accroissent de 3,75 milliards de dollars (soit de 7,23 à 10,98 milliards de dollars) alors que le PIB du Nunavut s'accroît de 900 millions de dollars (de 2,04 à 2,94 milliards de

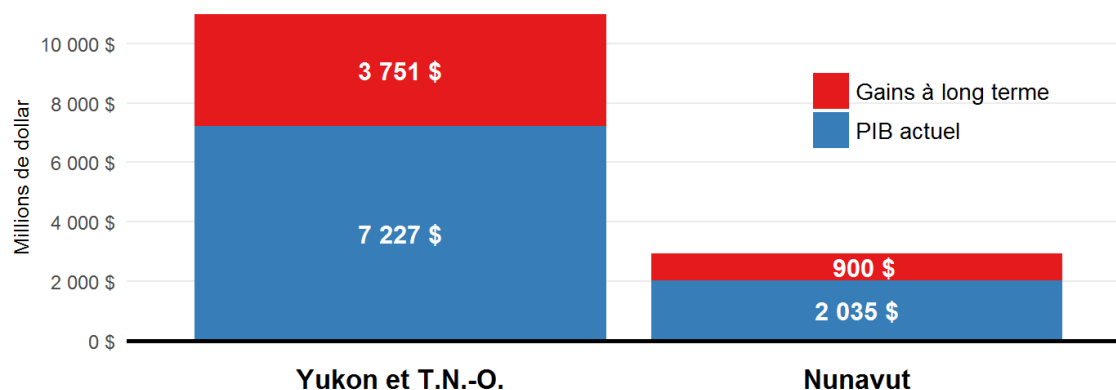
⁴ Prenons comme exemple la paire de partenaires commerciaux A et B avec une distance normalisée de 20 (c'est-à-dire que la distance moyenne entre un vendeur de la région A et un acheteur de la région B équivaut à 20x la distance moyenne entre un vendeur de la région A et un acheteur de la région A). Considérant que $\text{Log}(20) \approx 3$, la figure 3 montre que si les deux partenaires sont des provinces, le coût commercial résultera en un prix trois fois plus élevé (le prix original plus une augmentation de 200 pour cent due aux coûts commerciaux). Toutefois, si un des deux partenaires est un territoire (doté d'une moins bonne infrastructure de transport), alors la même distance résultera en un prix plus de quatre fois plus élevé (au prix original s'ajoute une augmentation de plus de 300 pour cent en raison des coûts commerciaux).

⁵ Ce qui, essentiellement, placerait les points bleus de la figure 3 à un niveau comparable aux points rouges.

⁶ Une description complète du modèle informatique d'équilibre général est présentée dans notre document d'accompagnement : Fellows et Tombe (2018).

dollars).⁷ Étant donné que les taux de croissance annuelle du PIB au Canada s'élèvent en moyenne entre un et deux pour cent par année,⁸ ces augmentations du PIB (52 et 44 pour cent, respectivement) sont plus que considérables pour les territoires.

Figure 4 : Gain de PIB pour les territoires résultant d'une amélioration de la qualité des infrastructures nordiques



Source : simulations du modèle IEG

En plaçant l'attention sur l'indicateur économique qu'est le RNB (revenu national brut) plutôt que le PIB, le tableau 1 montre que le revenu tiré des ressources, en tant qu'élément du revenu national, enregistre les gains les plus importants. Vient ensuite un accroissement proportionnel plus petit, mais tout de même important, du revenu salarial (travail).

Tableau 1 : Réaction du revenu des territoires face à une amélioration de la qualité des infrastructures

Nunavut	Revenu salarial (réel)	48 %
	Revenu du capital (réel)	12 %
	Revenu tiré des ressources (réel)	211 %
Yukon et Territoires du Nord-Ouest	Revenu salarial (réel)	53 %
	Revenu du capital (réel)	12 %
	Revenu tiré des ressources (réel)	139 %

Source : simulations du modèle IEG

⁷ Tous les résultats indiqués représentent un scénario à long terme dont l'échéance permet aux investissements en capital venant du reste du Canada et de l'étranger d'entrer dans les territoires, de sorte que le stock de capital global des territoires en particulier, et du Canada en général, puisse varier. Dans le document d'accompagnement (Fellows et Tombe (2018)), nous examinons aussi un scénario à moyen terme où le stock de capital est fixe au niveau national mais mobile entre les secteurs et les régions, ainsi qu'un scénario à court terme où le stock de capital est fixe et immobile pour tous les secteurs et chacune des régions.

⁸ Source : tableau CANSIM 384-0038 et calculs des auteurs.

L'accroissement relativement moins important observé pour le revenu du capital demanderait des explications supplémentaires. Dans l'ensemble, notre interprétation du modèle résulte d'une décision délibérée d'émettre des hypothèses conservatrices dans le cadre des simulations.⁹

Les territoires bénéficieraient donc manifestement des effets d'une amélioration des infrastructures, mais il y aurait aussi des retombées pour les provinces. Puisque le commerce se fait dans les deux sens, une réduction des coûts bénéficiant les importateurs des territoires est aussi à l'avantage des exportateurs provinciaux (et vice versa). Alors que l'impact pour les provinces est plus petit que celui pour les territoires (particulièrement en ce qui a trait au PIB provincial), les résultats indiquent que les retombées sont non-négligeables et bénéficient en général à toutes les provinces.¹⁰ En fait, les bénéfices de production généraux associés à une réduction des coûts commerciaux s'accroissent de près de 40 pour cent si on y ajoute les retombées pour les autres provinces. Dans l'ensemble, le PIB national canadien simulé croît de près de 6,5 milliards de dollars, dont 1,8 milliards de dollars en gain en dehors des territoires.

CONCLUSION

Il faut sans doute apporter d'importants investissements infrastructurels pour abaisser les coûts commerciaux dans les territoires. Fellows et Sulzenko (2016) ont présenté un calcul approximatif qui indique que le coût de construction de l'infrastructure du corridor nordique, incluant divers modes de transport, se situerait autour de 100 milliards de dollars. Bien qu'il s'agisse d'une estimation, et qu'une étude plus poussée soit nécessaire pour en valider le montant, le gain de PIB qui en résulterait pourrait justifier un tel coût de construction. Avec un accroissement général du PIB annuel canadien de l'ordre de 6,5 milliards de dollars (un projection modeste, à dessein), ce développement représenterait un net avantage en quelques décennies, même en tenant compte d'une actualisation sociale raisonnable.¹¹ Le projet du corridor nordique pourrait devenir, au XXI^e siècle, ce qu'a représenté pour le pays le réseau du Canadien Pacifique au XIX^e siècle.

⁹ Plus précisément, la mesure du revenu du capital présentée dans le tableau 1 ne comprend pas le revenu généré par le nouveau capital (c'est-à-dire, le capital qui résulte des dollars-investissement introduits dans le territoire à partir d'autres provinces ou de l'étranger).

¹⁰ La seule exception concerne la Saskatchewan, où il y a un très léger impact négatif dû à une éviction du commerce de la Saskatchewan avec les territoires en raison d'une amélioration des relations commerciales avec les autres provinces.

¹¹ Le Guide d'analyse coûts-avantage pour le Canada (Secrétariat du Conseil du Trésor du Canada 2007) reconnaît l'usage responsable d'un taux d'actualisation de trois pour cent dans les situations d'actualisation sociale où il est question de dépenses de consommation et de bien-être. En utilisant ce taux d'actualisation, le flux de valeur annuelle du PIB de 6,47 millions de dollars atteint une valeur actualisée nette de 100 milliards de dollars après la marque de 22 ans.

Plus précisément : $\sum_{t=1}^{22} \left[\frac{\$6.47b}{1.03^t} \right] = \$103.11b$

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About the Authors

G. Kent Fellows (PhD, Calgary) is a Research Associate at The School of Public Policy, University of Calgary. Kent has previously worked as a researcher for the University of Alberta's School of Public Health and as an intern at the National Energy Board. He has published articles on the effects of price regulation and bargaining power on the Canadian pipeline and pharmaceutical industries as well as the integration of renewable generation capacity in the Alberta electricity market. His current research agenda focuses on the area of computational economics as applied to the construction and use of large-scale quantitative models of inter-sector and interprovincial trade within Canada. Kent is also involved in forwarding The School of Public Policy's Canadian Northern Corridor research program, which is aimed at studying the concept of a multi-modal linear infrastructure right of way through Canada's North and near North.

Trevor Tombe (PhD) is an Associate Professor of Economics at the University of Calgary and a Research Fellow at The School of Public Policy. Prior to joining the University of Calgary in 2012, he was an Assistant Professor of Economics at Wilfrid Laurier University in Waterloo, Ontario. He received his PhD and MA from the University of Toronto. His research focuses on the intersection of international trade and macroeconomics, with a particular focus on the factors influencing productivity within and between countries. He has published in a variety of leading economics journals, has written various policy papers through the University of Calgary's School of Public Policy, and is an occasional contributor to *Maclean's* and the *Financial Post*.

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University of Calgary, Downtown Campus
906 8th Avenue S.W., 5th Floor
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