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WORKING PAPER

Protectionism and Retaliation

Canada, along with Mexico, is particularly heavily exposed to trade with the United States, and there is considerable speculation about how Canada should react if the United States moves unilaterally to implement protectionist policies. The authors estimate the damage that would be done by a 10 percent tariff surcharge unilaterally imposed by the United States on its trade partners – and the effects if Canada retaliated with a 10 percent tariff of its own.

Dan Ciuriak and Jingliang Xiao

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About The Authors

Dan Ciuriak
is Fellow-in-Residence with the C.D. Howe Institute (Toronto), Senior Fellow with the Centre for International Governance Innovation (Waterloo), Associate with BKP Development Research & Consulting GmbH (Munich), and Director and Principal, Ciuriak Consulting Inc. (Ottawa).

Jingliang Xiao
is a Research Associate with Ciuriak Consulting and responsible for policy modelling.

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Daniel Schwanen
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The Study In Brief

The election of Donald J. Trump as President of the United States raises a litany of questions about the future of US trade policy. Canada, along with Mexico, is particularly heavily exposed to trade with the United States and there is considerable speculation about how Canada should react if the United States moves unilaterally to implement protectionist policies or demands renegotiation of existing trade deals to repatriate off-shored jobs and industry and to redress what the new President has described as "raw deals" for the United States. Amid such high uncertainty, we consider the implications of a historical example of an attempt to address so-called trade imbalances, namely the 'Nixon measures' of 1971. In particular, we model a Nixon-measures-type 10 percent tariff surcharge unilaterally imposed by the United States on its trade partners in order to put some numbers around what a protectionist policy might imply for all parties. Secondly, we implement a Canadian tariff of 10 percent against the United States to see whether Canada is better or worse off by retaliating.

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The ascension of Donald J. Trump to the presidency of the United States raises a litany of questions about the future of virtually all current US international trade arrangements.

Canada, along with Mexico, is particularly heavily exposed to trade with the United States, and there is considerable speculation about how Canada should react if the United States moves unilaterally to implement protectionist policies. Such moves may yet happen in the event that much-vaunted renegotiation of existing trade relationships by the United States, to repatriate off-shored jobs and industry and to redress what the new President has described as "raw deals" for the United States, do not come to satisfactory conclusions.

Of particular relevance to Canada are the North American Free Trade Agreement (NAFTA) and possibly the Canada-US Free Trade Agreement (CUSFTA).

Renegotiating NAFTA is very high on the new administration's stated priority list. Canada has already announced that it is prepared to join a renegotiation. Mexico, between a wall and a hard case, has appointed as Foreign Minister Luis Videgaray, who arranged Mr. Trump's visit to Mexico during the campaign, which similarly signals an attempt at political accommodation.

What such a negotiation would look like is unclear. Canada is not the primary target in a NAFTA renegotiation, but can hardly dodge the opportunism that would present itself to US trade negotiators, who would undoubtedly press for concessions on the list of trade irritants Washington regularly publishes.

Beyond that, the Trump administration's implications for the global trade landscape are entirely unclear. Actions could range from bilateral trade wars with particular countries to withdrawal from the World Trade Organization (WTO). The appointment of an experienced trade lawyer, Robert Lighthizer, as US Trade Representative signals an "inside the box" trade policy, albeit one that is hawkish on China and skeptical about trade agreements.

However, traditional trade negotiations are not the only tools in the presidential or even congressional arsenals (see Johnson, 2017). Others have been bandied about, ranging from border levies to changes to the corporate income tax in a way that would penalize companies that import into the United States and provide relief to those that export from it.

In this context of high uncertainty, it may be useful to consider the implications of a modern equivalent to the sweeping protectionist policy that was implemented by the United States at a decisive breakpoint in the previous model of globalization: the 'Nixon measures' of 1971. These measures, which included ending the gold-convertibility of the dollar, marked the beginning of the end of the Bretton Woods system of international economic governance and the transition to the current model.

In this paper, we model a Nixon-measures-type 10 percent tariff surcharge unilaterally imposed by the United States on all its trade partners to put some numbers around what a protectionist policy might imply. Secondly, we implement a tariff of 10 percent imposed by Canada against the United

The authors thank Daniel Schwanen for comments on an earlier draft. They retain responsibility for any errors and the views expressed here.

States to see whether Canada is better or worse off by retaliating.

To preview the results, a 10 percent US tariff on all sources of imports would improve the US terms of trade (the price of what the United States exports relative to what it imports) but reduce trade, real GDP and productivity in the United States. Nominal GDP would rise substantially because of the terms of trade effect and the US trade balance would improve. The implications for US economic welfare are modest in aggregate, as positive terms-of-trade gains largely offset real losses in terms of jobs and production. The distribution of the welfare impacts, however, would tend not to favour red-state populations since they are not likely to benefit from those terms of trade gains, which would come mainly via reduced import prices.

Canada would take a serious hit under this scenario. However, retaliation by Canada would double the damage domestically with little deterrent effect on US real GDP or production. The main American interests Canada would hurt are consumers, who would face a significant erosion of economic welfare from retaliation but have little influence on US policy.

A Short History of Canada's Experience with Trade Shocks

Canada's history is replete with examples of external trade shocks of varying degrees of severity. In each case, the shock prompted an urgent search for new markets or efforts to re-establish secure market access.

Great Britain's shift to free trade with the repeal of its Corn Laws in 1846:

Britain's move to free trade left its Canadian colonies in the economic lurch. As Lord Elgin wrote at the time: "Peel's Bill of 1846 drives the whole of the produce down the New York channels of communication, destroying the revenue which Canada expected to derive from canal dues, and ruining at once mill-owners, forwarders and merchants. The consequence is that private property is unsaleable in Canada, and not a shilling can be raised on the credit of the province. We are actually reduced to the disagreeable necessity of paying all public officers, from the Governor-General downwards, in debentures, which are not exchangeable at par." Canada responded by seeking a trade agreement with the United States, leading to the 1854 Elgin-Marcy reciprocity treaty.

The US abrogation of reciprocity in 1866:

In part because Britain had favoured the South in the Civil War, the United States abrogated the Elgin-Marcy treaty. The British colonies were thrown upon their own resources, providing an economic reason – internal trade – for Canada to pursue Confederation in 1867.

The US Smoot-Hawley Tariff of 1930:

The infamous Smoot-Hawley Tariff opened the door wide to the binge of protectionism that many blame for the breakdown of international relations that ultimately led to the Second World War. It hit Canada as well as others. The result was that US-Canada trade plunged. Canada raised its tariffs in retaliation and turned to the British Commonwealth for markets.

The Nixon measures of 1971:

The decline of US gold reserves due to persistent US balance-of-payments deficits in the 1960s, a time when the US dollar was still convertible for gold, led President Richard Nixon to implement a number of measures in August, 1971. They included a 10 percent extra tariff on US imports already subject to duties and ending convertibility of the US dollar for gold. Canada was not exempt from the tariff (although raw materials, including crude oil, natural gas, copper and nickel, were exempted, as was the Auto Pact) and was completely

blindsided. Canada went into diplomatic overdrive, using multiple channels of influence in the United States, but did not retaliate. The tariff surcharge was dropped in December that year, when the Smithsonian Agreement provided for a revaluation of Japanese and European currencies against the US dollar.

Britain's accession to the European Communities in 1972:

On the heels of the Nixon measures, Britain acceded to the European Communities, ending Canada's preferential market access and providing tariff-free entry to Britain for continental European competitors. Facing trade shocks from Canada's two major trading partners, prime minister Pierre Trudeau's government pursued the famous "third option" policy, which resulted in the unsuccessful Framework Agreement with the European Communities.

The rise of US trade remedy actions:

Amendment of US trade laws and their administration in the 1970s generated new uncertainty about market access. These changes included, importantly, the introduction of Super 301 (Section 301 of the *Trade Act* of 1974) and the transfer in 1979 by the US Congress of responsibility for finding injury in anti-dumping and countervailing duty cases from Treasury (which tended not to find injury) to Commerce (which almost always did). The result was a steep rise in trade remedy actions by the United States. The resulting threat to Canada's market access in the United States made obtaining an exemption from US trade remedy laws an overriding policy goal for Canada. This turned out to be one of the major drivers for the initiation of free-trade discussions with the United States that led to the CUSFTA, which took effect in 1989. The agreement itself was signed earlier.

Post-9/11 border measures:

The border thickened for Canada (see, e.g. Brown 2015), as for all countries, after the terrorist attacks in New York and Washington in September, 2001. The result was the launch of repeated efforts to reduce border costs.

The Obama administration's 'Buy America' program:

Buy America was a response to the economic crisis in the United States triggered by the subprime mortgage meltdown in 2008 and 2009. The problem originated in the United States and it externalized the cost. Canada was not exempted. The result was that the Canadian government, taken aback when the protectionist measure was announced, launched an all-out diplomatic campaign in the United States for a Canadian exemption (unsuccessfully), and ended up signing a new government procurement agreement with the United States that opened up provincial procurement to US business in exchange for a partial exemption from Buy America provisions and partial access to US state procurement programs (37 of 50 states). Canada also intensified its bilateral trade negotiation program.

Canada has thus experienced eight major trade shocks – two from Britain and six from the United States. As is immediately evident from this fact, Canada's trade shocks come from its closest friends and allies – and it gets no special bye in this regard, which recalls the observation by Canada's former ambassador to the United States, Allan Gotlieb (1991: 43): "In Washington … a foreign power is just another special interest, and not a very special one at that."

Historically, Canada responded to trade shocks by seeking new trade opportunities elsewhere – with one exception: retaliation against the Smoot-Hawley tariff. The role of that retaliation in the Great Depression would be hard to tease out of the historical data, but this would seem to be easily the least successful of the responses.

Table 1: US Merchandise Trade Balance, USD billions

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
All Goods	-77.5	-69.1	-78.2	-22.9	-31.2	-36.7	-34.9	-36.4	-41.8	-21.0
Energy	-65.9	-69.7	-96.6	-55.3	-72.1	-84.6	-86.5	-88.2	-89.0	-53.5
Total Ex Energy	-11.6	0.6	18.4	32.4	40.9	47.9	51.5	51.8	47.2	32.5

Source: International Trade Centre (ITC, 2015); authors' calculations.

The Canada-US Trade Context Updated

Bilateral trade balances were a flashpoint during the recent US election campaign. From a trade economics perspective, bilateral trade balances are meaningless for three fundamental reasons:

- In a multilateral trade system, countries source imports from hundreds of sources and sell to hundreds of destinations. In general, they do not have balanced trade with any partner. Only in barter trade is there balanced trade.
- Countries do not trade; firms do. Bilateral balances do emerge from the accounting, but they have no inherent economic meaning.
- Trade balances are measured in terms of the gross value of trade and can be completely misleading as to the balance of exchange of value added on a bilateral basis – even if such balances were a meaningful concept in the first place.

Nonetheless, large bilateral imbalances have political profile and it is useful to update our perceptions of Canada-US bilateral balances.

The United States traditionally runs a goods-trade deficit with Canada and a services-trade surplus. However, the goods-trade balance has diminished greatly over the years. Indeed, excluding energy, the United States actually runs a sizeable goods-trade surplus with Canada and has for most of the past decade (Table 1).

Moreover, on a broader basis – that is, the current account, which includes trade in services, investment income and other current transactions – the United States has an almost perfectly balanced relationship with Canada as regards current transactions (Table 2).

Accordingly, even if economically meaningless bilateral balances have political significance, the Canada-US balance is not likely to be on the radar screen. At the same time, as history shows, Canada can be sideswiped by policy actions taken by its major trading partners for reasons that have nothing to do with Canada.

The Nixon Measures Precedent

At present, the shape of future US trade policy is unclear – whether it will be WTO-consistent is just one of the unknowns. For the purpose of this study, which is to shed light on the potential implications of US protectionism, we focus on a previous instance that seems most apposite: the Nixon measures of 1971.

The Nixon measures, which included a 10 percent tariff surcharge on imports already subject to duties, were enacted in response to a perceived balance of payments crisis. Their legality under the rules of the General Agreement on Tariffs and Trade (GATT), to which the United States was a party, was unclear, even though the United States was not the first to make resort to such a measure. (For example, Britain had imposed a similar 15 percent surcharge on imports in 1964.) In any event, the GATT did provide for quantitative measures to be imposed,

Table 2: US-Canada Current Account Balance, USD billions

Current Account	2011	2012	2013	2014	2015
Canadian Receipts	416.2	416.8	434.2	453.6	393.7
Canadian Payments	404.5	422.6	429.5	437.2	391.3
Canadian Surplus/ Deficit	11.7	-5.8	4.7	16.4	2.4

Source: Global Affairs Canada (2016).

if not for an across-the-board tariff increase. A working party was established under the GATT to consider the issue.

Accordingly, we have an instance where the United States imposed unilateral protectionist measures of questionable legality, but it did so within the framework of the GATT rules, reported the measures appropriately, and accepted the formation of a working group to address the legalities. This provides a useful example to illustrate the impact of protectionism in the current environment. We emphasize that this does not prejudge likely moves by the Trump administration and serves only as a means to illustrate effects.

Policy Shock and Results

The policy shock is simple: First, we impose an across-the-board tariff of 10 percent on US imports from all sources; then, we impose a retaliatory 10-percent increase by Canada on its imports from the United States. Regional and sectoral aggregations are as described in the results tables.

To evaluate the impact of this policy shock on the United States, Canada and other countries, we use a computable general equilibrium (CGE) model that is a variant on the widely used Global Trade Analysis Project (GTAP) model. The database for the simulations is the GTAP V9 dataset with a base year of 2011. For the simulations, the database is extrapolated to 2022 using GTAP dynamic tools and drawing on the International Monetary Fund's World Economic Outlook database (October, 2016) for guidance as to growth rates for the projection period. Readers can find additional details on the model, specification and assumptions used in the appendix.

The shock is implemented in 2017; the results are based on the full effect of the impacts once equilibrium has been restored in 2022.

Table 3 shows the main economic indicators for the United States and Canada. The "Retaliation" column shows the combined effect of the US protectionism and Canada's retaliation.

US and Canadian Macroeconomic Impacts

The main observations on these results are as follows. First, for the United States:

- The United States experiences mixed effects from its protectionist policy. Real GDP declines by -0.83 percent but the value of GDP rises by about $575-billion (US) due to strong positive terms-of-trade effects (an improvement of almost 4.8 percent), which drive a strong increase in US domestic prices (the GDP deflator rises by about 4.4 percent).
- Total imports of goods and services fall steeply in real terms – consistent with the decline in real GDP and the higher price of imports. Real exports also decline as the higher US prices undermine US international competitiveness, illustrating the truism that a tax on imports is equivalent to a tax on exports. The trade balance improves because of the terms of trade gains.

Table 3: US and Canada Macroeconomic Impacts

	United States		Canada	
	US Surcharge	Retaliation	US Surcharge	Retaliation
Major Indicators				
Economic Welfare (USD millions)	-6,899	-43,088	-32,539	-44,838
Economic Welfare (% change)	-0.05	-0.30	-1.86	-2.57
GDP Value Change (USD millions)	575,931	458,900	-64,662	-62,412
GDP Value Change (%)	3.53	2.81	-3.26	-3.15
GDP Volume (% change)	-0.83	-0.95	-0.87	-1.96
GDP Deflator (% change)	4.40	3.80	-2.41	-1.21
CPI (% change)	3.67	3.19	-1.59	-0.71
Components of Real GDP				
Consumption (% change)	-0.15	-0.41	-1.88	-2.67
Government Expenditure (% change)	0.44	0.26	-1.34	-1.60
Investment (% change)	-2.20	-2.44	-2.33	-4.67
Real Exports of Goods and Services (% change)	-19.13	-20.03	-2.57	-7.56
Real Imports of Goods and Services (% change)	-11.89	-13.34	-6.32	-11.46
Trade Account				
Bilateral Exports of Goods and Services (USD millions)	-35,339	-101,984	-35,650	-50,210
Bilateral Imports of Goods and Services (USD millions)	-37,485	-52,939	-37,639	-107,638
Total Exports of Goods and Services (USD millions)	-341,479	-368,849	-22,711	-45,596
Total Imports of Goods and Services (USD millions)	-367,479	-403,443	-25,900	-55,439
Trade Balance (USD millions)	24,845	33,345	2,941	9,575
Terms of Trade (% change)	4.77	4.10	-2.96	-1.58
Factor Markets				
Capital Stock (% change)	-0.51	-0.57	-0.66	-1.34
Real Wage of Unskilled Labour (% change)	-1.05	-1.17	-0.92	-1.87
Real Wage of Skilled Labour (% change)	-0.75	-0.88	-0.88	-1.70

Note: The Canada retaliation impact includes the US surcharge impact.
Source: Authors' calculations.

- As investment declines and the current account improves, net capital flows to the United States decline and redirect to other destinations. This is likely to primarily benefit East Asia.
- The rise in prices and the decline in real output reduce real wages. We assume no change in jobs in terms of head count; however, depending on the path the US economy takes to reach the new equilibrium, there might be positive or negative jobs impact en route. At the new equilibrium, any job impacts would likely be negative.
- Productivity declines in line with real wages. This is broadly consistent with expectations given that increased protection and reduced exports weaken the position of the most efficient trade-oriented US firms and enable less efficient firms to survive and preserve their market share.
- While there would be strong redistributive impacts within the United States (mainly toward corporate entities that benefit from terms-of-trade gains and away from the household sector), the US economy as a whole would not suffer particularly in welfare terms – in effect, the United States would work less, but obtain almost the same amount of welfare by extracting lower real prices for imports as foreign suppliers absorb some of the tariff increases (an "optimal tariffs" effect).

For Canada, the results are strongly negative, both from the US protectionist measures and even more so from its own retaliation.

- Real GDP falls by about 0.9 percent from the US measures. Given large terms of trade losses (almost -3 percent), the value of GDP falls by about 3.3 percent, or $65-billion (US). Retaliation, however, increases the pain as the real GDP decline increases to almost -2 percent. Retaliation does offset the terms of trade decline, but not sufficiently to materially improve the outcome on nominal GDP, which remains about the same.
- In response to the US protectionist measures, Canada's total exports fall, but by only about 2.6 percent. This reflects a combination of the general decline in Canadian prices, which improves Canada's competitiveness in third markets and the effect of the US tariff in deflecting Canadian exports to third markets. Total Canadian imports fall by more in real terms than do exports, a consequence of the overall negative impact on Canada's real GDP and the higher prices of US exports. Retaliation deepens the trade decline, with a roughly balanced decline in both real imports and real exports. For third parties, Canada's retaliation against the United States would open up preferential export gains. For example, Mexico would pick up some of the US market share in Canada.
- Real wages fall by about -0.9 percent; productivity falls in line with real wages. Retaliation doubles the real wage impacts to about -1.8 percent on average for skilled and unskilled labour. We assume no change in jobs (as labour markets are assumed to clear). However, the likely path to the new equilibrium would entail job losses en route, as the first impacts on Canadian export-oriented sectors would likely be deeply negative – only as new markets are found would the final impact soften to the -2.6 percent shown in our simulations.
- The bottom line for Canada is a significant loss of economic welfare of about $33-billion (US) from US protectionism, rising to about $45-billion (US) if Canada compounds the problem by retaliating.

Global Impacts

Globally, the imposition of across-the-board tariff protection by the United States falls mainly on itself and the two countries that depend most on the US market for exports: Mexico and Canada. The world as a whole suffers a relatively large loss in economic welfare, but third countries that rely less on the United States as an export market are much less affected in percentage terms (although, cumulatively, they bear the largest share of the welfare losses). Canada's retaliation impacts negatively on the United States, increasing its real GDP decline from -0.83 percent from its own protectionist measure to -0.95 percent. However, it

Table 4: Global Impacts

	Real GDP % Change		Welfare (USD millions)	
	US Surcharge	Canada Retaliation	US Surcharge	Canada Retaliation
United States	-0.83	-0.95	-6,899	-43,088
Canada	-0.87	-1.96	-32,539	-44,838
Mexico	-1.59	-1.43	-34,988	-31,903
Rest of the World	0.00	0.04	-108,622	-78,355
World Total	-0.20	-0.22	-183,048	-198,184

Note: The Canada retaliation figures include the US surcharge impact.
Source: Authors' calculations.

positively affects third parties (including Mexico), since they gain market share in Canada at US expense.

Perhaps the most striking feature of Canada's retaliation is that it shifts welfare loss from the rest of the world to the United States – there is some pain there for the United States, but its impact is largely on consumers from price effects. Since consumers wield little concentrated political power, there would be little pushback on protectionism in the United States from this source.

Sectoral impacts on the United States from US protectionism:

The sectoral impacts of protection in the United States show a familiar pattern: The domestically oriented textiles, apparel, leather products, and other manufacturing sectors mostly benefit from reduced imports and expanded production and jobs. In agriculture, fruits and vegetables also benefit from reduced imports and expanded output. For these sectors, the story of repatriating jobs works.

However, most sectors in the US economy experience reduced value added, despite facing reduced import competition. Notably, these are mostly the US export-oriented sectors. Services sectors, which do not benefit directly from tariff protection, get sideswiped and experience a more or less balanced reduction of exports and imports from the overall negative real impacts on the economy.

Sectoral impacts on the United States from Canadian retaliation:

The impacts of Canadian retaliation on US industry at the sectoral level are relatively modest. The major impacts in terms of lost bilateral exports are in machinery and equipment, automotive, and chemicals, rubber and plastics, each of which sees bilateral exports fall by more than $10-billion (US). However, of these, only automotive would experience a negative impact on overall value added; the other two major sectors are sufficiently internationalized that they make up the lost access to the Canadian market either by expanding their shares of the US domestic market or through exports to third parties. Agricultural sectors that would experience reduced output because of reduced access to the Canadian market include fruit and vegetables, beverages and tobacco, beef, and pork. Services sectors generally again get sideswiped.

Table 5: US Sectoral Impacts: US Tariff Surcharge

US Sectoral Impacts	Bilateral Exports (USD millions)	Bilateral Imports (USD millions)	Bilateral Exports (percent)	Bilateral Imports (percent)	Total Exports (USD millions)	Total Imports (USD millions)	Total Exports (percent)	Total Imports (percent)	Share in Value Added (percent)	Value Added (percent)
Apparel	-104	-56	-26.53	-10.21	-812	-8,044	-24.74	-10.32	0.21	4.35
Leather Products	-41	-10	-27.53	-8.04	-720	-2,500	-26.84	-6.47	0.04	3.75
Textiles	-468	-207	-21.29	-11.82	-3,510	-7,167	-21.24	-11.69	0.39	2.27
Sugar	-7	-21	-16.34	-9.94	-56	-301	-16.40	-8.19	0.03	1.53
Fruit & Vegetables	-83	-183	-2.42	-9.63	-637	-2,037	-4.83	-8.95	0.25	1.08
Oil	-191	-3,189	-49.99	-6.03	-410	-42,439	-49.47	-12.27	1.14	0.73
Gas	-1,706	-2,154	-66.15	-17.53	-3,606	-5,055	-65.18	-28.53	0.11	0.60
Other Services	-655	-133	-9.48	-4.69	-8,428	-4,546	-8.56	-9.18	31.91	0.23
Other Manufacturing	-446	-435	-20.69	-8.34	-5,370	-13,558	-19.72	-13.94	1.48	0.17
Fishing	-20	-64	-3.75	-5.02	-56	-167	-4.63	-5.88	0.04	-0.07
Financial Services	-771	-465	-10.53	-7.12	-7,363	-9,830	-8.49	-11.30	9.63	-0.32
Communica-tions	-109	-67	-12.14	-6.63	-1,477	-1,498	-9.61	-10.52	2.11	-0.32
Food Products	-654	-875	-7.60	-8.18	-3,128	-4,961	-9.26	-9.72	0.94	-0.36
Beverages & Tobacco	-122	-67	-5.42	-4.93	-581	-1,367	-4.73	-5.98	0.36	-0.37
Beef	-161	-212	-16.71	-16.66	-1,064	-919	-14.08	-19.46	0.21	-0.38
Trade	-274	-132	-11.80	-7.14	-2,407	-3,242	-9.98	-10.97	12.78	-0.56
Recreational Services	-450	-109	-10.01	-7.44	-4,326	-1,581	-9.67	-10.35	3.30	-0.57
Dairy	-45	-12	-19.64	-9.74	-968	-453	-18.32	-17.52	0.22	-0.59
Wood Products	-1,628	-2,862	-13.98	-11.85	-8,527	-13,625	-15.63	-14.80	2.46	-0.66
Coal	-14	-46	-2.77	-20.55	-694	-262	-4.46	-20.39	0.27	-0.83
Business Services	-466	-534	-12.72	-7.17	-11,436	-12,211	-9.21	-11.15	10.34	-0.88
Other Farming	-74	-193	-9.45	-8.35	-2,177	-1,958	-9.37	-10.57	0.31	-1.31
Forestry	-24	-17	-6.75	-11.04	-293	-77	-8.73	-12.55	0.08	-1.39
Mineral Products	-409	-495	-6.36	-10.41	-2,008	-3,746	-6.84	-11.17	0.69	-1.63

Note: sectors are ranked by US bilateral exports to Canada, from most negatively impacted to least negatively impacted, in terms of marginal effects compared to the US surcharge.

Source: Authors' calculations.

Table 5: Continued

US Sectoral Impacts	Bilateral Exports (USD millions)	Bilateral Imports (USD millions)	Bilateral Exports (percent)	Bilateral Imports (percent)	Total Exports (USD millions)	Total Imports (USD millions)	Total Exports (percent)	Total Imports (percent)	Share in Value Added (percent)	Value Added (percent)
Pork & Poultry	-202	-243	-12.82	-18.30	-2,100	-581	-17.64	-20.57	0.17	-1.71
Construction	-2	-1	-13.48	-9.36	-904	-486	-9.71	-12.61	6.57	-1.71
Electronic Equipment	-1,694	-356	-29.90	-8.84	-31,232	-40,177	-30.80	-12.81	0.47	-2.00
Transportation Services	-615	-231	-13.74	-6.19	-10,518	-8,751	-12.79	-8.50	2.88	-2.09
Automotive	-5,358	-7,546	-10.93	-12.26	-20,035	-26,359	-14.41	-11.03	0.97	-2.17
Metal Products	-2,941	-3,978	-20.93	-15.22	-20,347	-20,201	-23.52	-16.25	1.39	-3.06
Wheat & Cereals	-19	-225	-4.51	-15.56	-2,127	-300	-6.05	-16.11	0.32	-3.06
Ferrous Metals	-876	-896	-12.64	-12.90	-5,305	-6,433	-16.51	-14.48	0.48	-3.23
Rice	-14	-1	-8.18	-19.47	-313	-143	-11.69	-16.76	0.02	-3.27
Machinery & Equipment	-6,835	-3,304	-15.41	-13.15	-72,433	-63,756	-21.44	-15.85	3.61	-3.78
Chemicals, Rubber & Plastics	-4,994	-5,109	-13.39	-11.69	-56,042	-39,504	-18.38	-13.49	2.73	-4.44
Oil Seeds & Vegetable Oil	-88	-524	-6.71	-12.56	-3,048	-1,367	-8.16	-14.48	0.18	-4.74
Fossil Fuels	-1,503	-926	-10.40	-6.43	-23,744	-7,113	-15.43	-7.55	0.10	-5.74
Transport Equipment	-1,276	-1,610	-18.20	-15.54	-23,275	-10,768	-23.07	-18.45	0.81	-7.55

Note: sectors are ranked by US bilateral exports to Canada, from most negatively impacted to least negatively impacted, in terms of marginal effects compared to the US surcharge.

Source: Authors' calculations.

Sectoral impacts on Canada from US protectionism:

Some Canadian sectors benefit from US protectionism. In particular, Machinery and equipment and Electronic equipment stand to make some market-share gains as lost exports to the United States are more than made up by reduced imports from the United States as US industry takes up domestic market slack created by the impact of US tariffs on the major third-party suppliers to the US market in those sectors. However, Canada's automotive sector, which relies on the US market, would face a decline of more than 5 percent in value added from losses in bilateral exports of more than $7-billion (US). Otherwise, Canadian sectoral impacts from the US protectionist move are broadly negative but spread out, including over services, which decline with overall GDP.

Table 6: US Sectoral Impacts – Canadian Retaliation

US Sectoral Impacts	Bilateral Exports (USD millions)	Bilateral Imports (USD millions)	Bilateral Exports (percent)	Bilateral Imports (percent)	Total Exports (USD millions)	Total Imports (USD millions)	Total Exports (percent)	Total Imports (percent)	Share in Value Added (percent)	Value Added (percent)
Machinery & Equipment	-14,296	-1,684	-32.24	-6.7	-4,895	-6208.41	-1.45	-1.54	3.61	0.143
Automotive	-10,632	-4,288	-21.69	-6.97	-8,727	-3706.82	-6.28	-1.55	0.97	-0.948
Chemicals, Rubber & Plastics	-10,293	-2,327	-27.59	-5.33	-4,318	-3749.72	-1.42	-1.28	2.73	0.003
Metal Products	-5,050	-1,641	-35.95	-6.28	-2,685	-2149.77	-3.1	-1.73	1.39	-0.057
Wood Products	-3,231	-766	-27.75	-3.17	-2,149	-1412.07	-3.94	-1.53	2.46	-0.184
Fossil Fuels	-2,586	-206	-17.89	-1.43	-2,081	-391.52	-1.35	-0.42	0.10	-0.377
Transport Equipment	-2,454	-741	-34.99	-7.15	453	-953.83	0.45	-1.63	0.81	0.631
Electronic Equipment	-2,068	-241	-36.51	-5.99	480	-3094.79	0.47	-0.99	0.47	0.975
Ferrous Metals	-1,894	-323	-27.32	-4.65	-1,316	-547.6	-4.1	-1.23	0.48	-0.291
Financial Services	-1,581	-91	-21.6	-1.4	-246	-994.91	-0.28	-1.14	9.63	-0.094
Food Products	-1,419	-298	-16.49	-2.78	-1,036	-543.12	-3.07	-1.06	0.94	-0.272
Other Services	-1,336	-33	-19.34	-1.18	210	-406.21	0.21	-0.82	31.91	-0.165
Mineral Products	-1,209	-60	-18.77	-1.25	-933	-298.01	-3.18	-0.89	0.69	-0.342
Transportation Services	-1,026	-95	-22.94	-2.55	-40	-806.3	-0.05	-0.78	2.88	-0.044
Recreational Services	-914	-28	-20.34	-1.88	-302	-169.46	-0.67	-0.55	3.30	-0.23
Business Services	-901	-108	-24.62	-1.44	1,239	-1169.08	1	-1.07	10.34	0.031
Gas	-827	-432	-32.05	-3.52	-648	-596.08	-11.71	-3.36	0.11	0.068
Textiles	-773	-99	-35.16	-5.68	-425	-777.63	-2.57	-1.27	0.39	0.287
Other Manufacturing	-745	-212	-34.53	-4.07	4	-1346.35	0.02	-1.38	1.48	0.052
Trade	-536	-29	-23.02	-1.56	-134	-349.16	-0.56	-1.18	12.78	-0.149
Fruit & Vegetables	-473	-13	-13.89	-0.68	-356	-97.94	-2.7	-0.43	0.25	-0.239
Beverages & Tobacco	-307	-13	-13.67	-0.97	-231	-138.78	-1.88	-0.61	0.36	-0.265
Beef	-301	-46	-31.3	-3.65	-148	-89.95	-1.96	-1.9	0.21	-0.218

Note: sectors are ranked by US bilateral exports to Canada, from most negatively impacted to least negatively impacted, in terms of marginal effects compared to the US surcharge.

Source: Authors' calculations.

Table 6: Continued

US Sectoral Impacts	Bilateral Exports (USD millions)	Bilateral Imports (USD millions)	Bilateral Exports (percent)	Bilateral Imports (percent)	Total Exports (USD millions)	Total Imports (USD millions)	Total Exports (percent)	Total Imports (percent)	Share in Value Added (percent)	Value Added (percent)
Oil seeds & vegetable oil	-301	-88	-22.84	-2.1	275	-80.84	0.74	-0.86	0.18	0.789
Pork & Poultry	-301	-60	-19.12	-4.5	29	-66.82	0.25	-2.37	0.17	-0.066
Other Farming	-217	-36	-27.86	-1.57	159	-114.92	0.69	-0.62	0.31	0.146
Communica-tions	-210	-15	-23.47	-1.47	43	-153.23	0.28	-1.08	2.11	-0.104
Coal	-146	-2	-28.37	-0.9	51	-8.53	0.33	-0.66	0.27	0.127
Apparel	-140	-21	-35.64	-3.77	-58	-976.83	-1.76	-1.25	0.21	0.435
Oil	-120	-517	-31.48	-0.98	-116	-2386.65	-13.96	-0.69	1.14	0.137
Wheat & Cereals	-79	-18	-19	-1.24	300	-19.19	0.85	-1.03	0.32	0.382
Forestry	-73	-2	-20.44	-1.28	-1	-5	-0.04	-0.82	0.08	-0.05
Fishing	-58	-12	-10.76	-0.93	-48	-19.73	-3.99	-0.7	0.04	-0.182
Leather Products	-56	-5	-37.6	-4.27	16	-302.05	0.59	-0.78	0.04	1.283
Rice	-43	-1	-25.27	-12.21	-4	-10.18	-0.15	-1.19	0.02	0.165
Dairy	-31	-5	-13.24	-3.81	107	-44.78	2.02	-1.73	0.22	-0.055
Sugar	-13	-7	-32.31	-3.37	-8	-31.38	-2.45	-0.86	0.03	0.033
Construction	-4	0	-25.37	-2.5	166	-44.27	1.79	-1.15	6.57	-0.189

Note: sectors are ranked by US bilateral exports to Canada, from most negatively impacted to least negatively impacted, in terms of marginal effects compared to the US surcharge.

Source: Authors' calculations.

Sectoral impacts on Canada from Canadian retaliation:

Canadian retaliation benefits only a few sectors (fruit and vegetables, pork), but otherwise has negative impacts, in particular on transportation equipment, metal products, automotive, and electronic equipment.

Our Findings

This study considers the implications of potential US protectionism under the new Trump administration. We focus on impacts for the United States and its trading partners, particularly Canada. As future US trade policy is unknown at this stage, we first model an example of a historical precedent – the Nixon measures' 10 percent tariff surcharge

Table 7: Canadian Sectoral Impacts from US Protectionism

	Bilateral Exports (USD millions)	Bilateral Imports (USD millions)	Bilateral Exports (percent)	Bilateral Imports (percent)	Total Exports (USD millions)	Total Imports (USD millions)	Total Exports (percent)	Total Imports (percent)	Share in Value Added (percent)	Value Added (percent)
Automotive	-7,258	-5,712	-12.26	-11.12	-7,080	-3,573	-10.78	-4.95	1.5	-5.55
Chemicals, Rubber & Plastics	-4,740	-5,429	-11.74	-13.63	-3,646	-3,048	-6.06	-4.72	2.4	-0.10
Metal Products	-3,867	-3,098	-15.23	-21.08	-1,668	-1,637	-2.96	-4.44	1.9	-0.08
Machinery and Equipment	-3,181	-7,156	-13.17	-15.54	-1,872	-3,113	-4.70	-3.95	1.8	1.42
Oil	-3,118	-199	-6.12	-50.09	-3,003	-689	-5.75	-5.44	4.2	-0.26
Wood Products	-2,576	-1,838	-11.97	-14.29	-1,481	-1,497	-3.85	-7.39	2.6	-0.02
Gas	-2,038	-1,814	-17.60	-66.25	-1,743	-1,489	-14.57	-44.86	0.9	0.08
Transport Equipment	-1,594	-1,302	-15.54	-18.25	-538	-551	-2.62	-4.24	0.7	0.56
Fossil Fuels	-887	-1,656	-6.52	-10.75	-804	-1,140	-5.18	-5.81	0.4	1.25
Ferrous Metals	-831	-959	-12.95	-12.89	-735	-605	-8.08	-4.72	0.5	-0.45
Food Products	-808	-739	-8.26	-7.88	-709	-612	-5.35	-4.27	0.9	-0.90
Business Services	-534	-466	-7.17	-12.72	669	-1,138	2.16	-4.93	11.8	-0.39
Oil seeds & vegetable oil	-474	-101	-12.65	-6.93	43	-87	0.35	-4.82	0.4	1.87
Financial Services	-465	-771	-7.12	-10.53	-149	-910	-1.23	-5.55	5.8	-0.49
Other Manufacturing	-430	-464	-8.36	-20.78	-227	-512	-2.97	-7.13	2.5	-0.55
Mineral Products	-404	-523	-10.65	-6.89	-158	-523	-0.75	-3.91	1.5	0.60
Electronic Equipment	-350	-1,732	-8.86	-29.97	-1	-864	-0.01	-3.67	0.5	2.56
Transportation Services	-231	-615	-6.19	-13.74	118	-742	0.77	-3.92	2.5	-0.05
Pork & Poultry	-230	-218	-18.35	-12.98	23	-183	0.62	-9.14	0.2	3.17
Wheat & Cereals	-211	-21	-15.61	-4.71	228	-20	2.79	-4.01	0.3	2.75
Beef	-202	-170	-16.71	-16.84	-56	-156	-2.40	-10.89	0.3	-0.26
Textiles	-195	-506	-11.87	-21.51	-169	-353	-8.08	-4.55	0.2	0.12
Other Farming	-178	-82	-8.43	-9.66	-94	-58	-2.66	-2.40	0.3	0.26

Note: sectors are ranked by US bilateral exports to Canada, from most negatively impacted to least negatively impacted.

Source: Authors' calculations.

Table 7: Continued

	Bilateral Exports (USD millions)	Bilateral Imports (USD millions)	Bilateral Exports (percent)	Bilateral Imports (percent)	Total Exports (USD millions)	Total Imports (USD millions)	Total Exports (percent)	Total Imports (percent)	Share in Value Added (percent)	Value Added (percent)
Fruit & Vegetables	-134	-138	-9.88	-3.04	-82	-36	-2.00	-0.53	0.2	0.42
Other Services	-133	-655	-4.69	-9.48	133	-635	2.01	-6.42	27.7	-1.21
Trade	-132	-274	-7.14	-11.80	48	-386	0.83	-5.57	13.6	-1.12
Recreational Services	-109	-450	-7.44	-10.01	226	-416	2.93	-4.62	1.9	-0.11
Communica-tions	-67	-109	-6.63	-12.14	71	-180	1.91	-4.98	2.8	-0.57
Beverages & Tobacco	-62	-140	-5.06	-5.73	-55	-173	-3.16	-3.12	0.5	-0.88
Fishing	-55	-27	-5.40	-4.30	-50	-26	-3.38	-3.45	0.1	-0.24
Apparel	-54	-109	-10.25	-26.65	-34	-314	-4.16	-4.74	0.2	0.03
Coal	-42	-17	-20.53	-2.98	36	-7	0.55	-0.81	0.4	0.53
Sugar	-20	-8	-9.95	-16.78	-18	-19	-5.49	-2.26	0.0	-1.26
Forestry	-15	-29	-11.17	-7.03	39	-27	2.55	-6.12	0.5	0.39
Dairy	-11	-49	0.00	-19.80	11	-55	2.82	-8.47	0.4	-0.47
Leather Products	-9	-44	-8.11	-27.73	-4	-99	-2.05	-3.73	0.0	1.21
Rice	-1	-17	-19.41	-8.65	-1	-1	-13.91	-0.25	0.0	-0.14
Construction	-1	-2	-9.36	-13.48	21	-26	3.66	-4.11	7.2	-2.12

Note: sectors are ranked by US bilateral exports to Canada, from most negatively impacted to least negatively impacted.
Source: Authors' calculations.

imposed by the United States multilaterally – to put some numbers around what a protectionist policy might imply. Second, we implement a retaliatory tariff of 10 percent on the United States imposed by Canada to see whether Canada is better or worse off by retaliating.

Our results suggest that higher tariffs could play to US advantage in certain ways: The US terms of trade might improve and lead to a higher value of GDP and an improved trade balance with the rest of the world. At the same time, higher tariffs would likely reduce US trade, real GDP and productivity. The implications for US economic welfare in aggregate would be modest under these outcomes, although there would likely be significant distributional impacts. In particular, the general decline in real wages would tend not to favour the working class, which would run against the campaign rhetoric that brought "rust belt" states into the Trump camp.

Canada would take a significant hit under this scenario, with the heaviest blow being to the

Table 8: Canadian Sectoral Impacts from US Protectionism

	Bilateral Exports (USD millions)	Bilateral Imports (USD millions)	Bilateral Exports (percent)	Bilateral Imports (percent)	Total Exports (USD millions)	Total Imports (USD millions)	Total Exports (percent)	Total Imports (percent)	Share in Value Added (percent)	Value Added (percent)
Fruit & Vegetables	-13	-473	-0.95	-10.41	-37	-98	-0.9	-1.45	0.20	1.51
Fossil Fuels	-206	-2,586	-1.51	-16.79	-234	-1,735	-1.5	-8.85	0.40	1.03
Pork & Poultry	-60	-301	-4.76	-17.97	-202	-206	-5.58	-10.29	0.20	0.35
Fishing	-12	-58	-1.16	-9.06	-14	-46	-0.96	-6.08	0.10	0.05
Beef	-46	-301	-3.84	-29.78	-91	-195	-3.92	-13.67	0.30	0.04
Coal	-2	-146	-0.98	-24.88	-43	-78	-0.66	-8.72	0.40	-0.01
Gas	-432	-827	-3.73	-30.19	-415	-406	-3.47	-12.22	0.90	-0.02
Oil	-517	-120	-1.01	-30.3	-519	88	-0.99	0.69	4.20	-0.04
Forestry	-2	-73	-1.47	-18.07	-16	-64	-1.07	-14.3	0.50	-0.1
Financial Services	-91	-1,581	-1.4	-21.6	-112	-942	-0.92	-5.75	5.80	-0.13
Recreational Services	-28	-914	-1.88	-20.34	-91	-482	-1.18	-5.35	1.90	-0.13
Beverages & Tobacco	-13	-307	-1.07	-12.54	-15	-167	-0.85	-3.03	0.50	-0.2
Other Services	-33	-1,336	-1.18	-19.34	-60	-942	-0.91	-9.53	27.70	-0.21
Other Farming	-36	-217	-1.71	-25.41	-60	-45	-1.69	-1.86	0.30	-0.22
Food Products	-298	-1,419	-3.05	-15.14	-392	-764	-2.96	-5.33	0.90	-0.35
Communica-tions	-15	-210	-1.47	-23.47	-27	-115	-0.72	-3.19	2.80	-0.43
Wood Products	-766	-3,231	-3.56	-25.12	-1,255	-1,819	-3.26	-8.99	2.60	-0.45
Dairy	-5	-31	0	-12.46	-12	-13	-3.13	-1.99	0.40	-0.48
Trade	-29	-536	-1.56	-23.02	-39	-334	-0.68	-4.82	13.60	-0.66
Mineral Products	-60	-1,209	-1.57	-15.92	-147	-910	-0.7	-6.8	1.50	-0.71
Business Services	-108	-901	-1.44	-24.62	-191	-612	-0.62	-2.65	11.80	-0.79
Wheat & Cereals	-18	-79	-1.32	-17.34	-135	-67	-1.65	-13.82	0.30	-0.91
Transportation Services	-95	-1,026	-2.55	-22.94	-319	-401	-2.1	-2.12	2.50	-0.96
Rice	-1	-43	-13.97	-21.9	-1	2	-15.13	0.47	0.00	-1.03

Note: impacts are ranked by value added, from most positive to most negative, based on marginal impacts over the case of the United States imposing the import surcharge.
Source: Authors' calculations.

Table 8: Continued

	Bilateral Exports (USD millions)	Bilateral Imports (USD millions)	Bilateral Exports (percent)	Bilateral Imports (percent)	Total Exports (USD millions)	Total Imports (USD millions)	Total Exports (percent)	Total Imports (percent)	Share in Value Added (percent)	Value Added (percent)
Machinery and Equipment	-1,684	-14,296	-6.97	-31.04	-2,851	-4,033	-7.16	-5.11	1.80	-1.09
Other Manufacturing	-212	-745	-4.12	-33.35	-292	-302	-3.82	-4.2	2.50	-1.19
Chemicals, Rubber & Plastics	-2,327	-10,293	-5.76	-25.84	-3,586	-3,847	-5.96	-5.95	2.40	-1.27
Sugar	-7	-13	-3.43	-28.28	-11	-2	-3.27	-0.23	0.00	-1.27
Apparel	-21	-140	-3.93	-34.27	-30	-15	-3.61	-0.22	0.20	-1.29
Oil seeds & vegetable oil	-88	-301	-2.34	-20.66	-349	-209	-2.8	-11.62	0.40	-1.45
Ferrous Metals	-323	-1,894	-5.03	-25.45	-462	-933	-5.08	-7.27	0.50	-1.46
Textiles	-99	-773	-6.04	-32.84	-126	-224	-6.05	-2.88	0.20	-1.49
Construction	0	-4	-2.5	-25.37	-8	-3	-1.34	-0.53	7.20	-2.11
Leather Products	-5	-56	-4.56	-35.23	-9	-6	-4.48	-0.21	0.00	-2.31
Electronic Equipment	-241	-2,068	-6.09	-35.8	-492	-525	-6.2	-2.23	0.50	-2.88
Automotive	-4,288	-10,632	-7.24	-20.69	-4,846	-4,819	-7.38	-6.68	1.50	-4.33
Metal Products	-1,641	-5,050	-6.46	-34.36	-3,736	-1,782	-6.64	-4.83	1.90	-4.33
Transport Equipment	-741	-2,454	-7.22	-34.42	-1,661	-819	-8.09	-6.31	0.70	-5.61

Note: impacts are ranked by value added, from most positive to most negative, based on marginal impacts over the case of the United States imposing the import surcharge.
Source: Authors' calculations.

automotive sector, which is heavily focused on exports to the United States and would have a difficult time diversifying to other markets. There would be some Canadian winners, however, as the international trade deck is reshuffled to take account of the changed relative cost structures that emerge from the protectionist move.

Retaliation by Canada would double the damage domestically, while having little deterrent effect on US real GDP or production. The main US interests Canada would hurt are consumers, who would face a significant erosion of economic welfare from retaliation but have little influence on US policy.

Interpreted in terms of industrial policy, Canada is better off if the United States takes to protectionism than if Canada resorts to this same policy. Generally, the sectors hurt by Canadian protectionism are the more technologically intensive sectors.

These results endorse the traditional Canadian response to trade shocks emanating from its major trading partners. Historically, when access to the

British or US markets has been compromised, Canada has not retaliated (the exception is its retaliation to the infamous US Smoot-Hawley Tariff of 1930 that contributed to the Great Depression), but pursued new markets.

Tariffs, if they vary across products, determine the composition of imports and exports. Accordingly, they are best thought of as industrial policy tools to influence the mix of things that a country produces for its own consumption and exports – and what it buys from other countries on the open market. At the aggregate level, a tax on imports is the same as a tax on exports. The effect can be thought of as working through the exchange rate: An initial decline in imports puts upward pressure on a country's currency, which leads to a decline in its exports.

Canada is better off adopting an industrial policy tailored to succeeding in the context that is being shaped by new disruptive technologies built on artificial intelligence, blockchain technologies that enable peer-to-peer exchange, and others, rather than distorting the playing field for Canadian enterprise with crude border measures motivated by political games and posturing. From that perspective, a reactive retaliatory measure in the face of US protectionism is ill-advised. Canada is better off economically by not retaliating. It can also use that as high ground to win allies in the United States for a withdrawal from protectionism.

That being said, the simulation results reported here sound a warning. The impacts on the United States are not entirely negative: US terms of trade improve and this translates into some nominal benefits, including an improved balance of trade. This is not an entirely surprising outcome. The theory of optimal tariffs states that countries with international market power can improve their terms of trade by imposing tariffs. In this sense, the United States, by opting for low tariffs, helped underwrite the expansion of the global trading system to the advantage of the global community in general.

However, this public good that the United States delivered (and from which it also benefited significantly, notwithstanding forgone terms-of-trade gains) is not responsible for US trade deficits and this issue will not be solved by withdrawing that public good through the raising of tariffs.

To understand this point, it must be recognized that the United States is in a unique situation in today's global system, because it provides the currency for international exchange. As shown in the Bank for International Settlements 2016 Central Bank survey, the US dollar is on one side of 88 percent of all international currency transactions. Accordingly, there is a large demand abroad for US dollars and liquid US-dollar denominated assets. This is the basis for the "exorbitant privilege" of the United States being able to transact abroad in its own currency without facing currency risk. This is of great value to the United States, but it does mean that foreign entities (firms and governments) have to have a large and growing stock of US dollars, which they earn by selling goods and services to the United States, without reciprocating by buying goods and services from the United States. In short, the exorbitant privilege comes at the cost of maintaining a permanent trade deficit. A US current-account deficit on the order of 2 percent of its GDP seems to be roughly consistent with providing the global economy a sufficient supply of US dollars and liquid US-dollar-denominated assets to grease the wheel of international finance. However, as the US economy gradually shrinks as a percentage of the global economy, this percentage must rise. Otherwise, the world will move away from using the US dollar as the vehicle currency – and the United States would not take kindly to that.

Getting to the nub of things, the United States is currently in a good balance with the rest of world in terms of current-account position – there is nothing for the Trump administration to fix. Interestingly, the more risk the United States injects into the global economy through rhetoric or destabilizing trade policies, the greater the demand will be for

its currency abroad, and the larger will be its trade deficit. Creating trade-related risks is self-defeating in this regard. Starting a trade war would be one particularly effective way to inject risk into the international economy and widen the US external deficit.

Conclusions

The bottom line is quite simple: A protectionist policy by the United States will have as much impact on its exports as its imports and will generate an industrial revival in the United States only to the extent that it undermines other sectors of the US economy, reduces investment in the United States and possibly reduces the role of the US dollar in international transactions if the global supply of US dollars and US-dollar-denominated liquid assets becomes inadequate.

At the same time, disrupting global trade patterns that have evolved to exploit low-cost patterns of production will likely push up costs and reduce productivity both in the United States and in its partner economies. Accordingly and predictably, protectionism will end up being a lose-lose proposition for all, although the distribution of the negative impacts remains to be determined.

Canada will have little influence over US decisions. However, retaliation simply compounds the problem for the retaliating country since it invites trade diversion to higher-cost sources of imports. Canada should avoid any temptation to retaliate and instead follow its historically validated policy of pursuing markets elsewhere, while continuing to shift its trade policy from border measures that no longer make sense in today's highly integrated global production system to inside-the-border industrial policies targeted squarely at the future.

Appendix: Modelling a US Protectionist Policy

We apply a recursive-dynamic (i.e., one that can be solved sequentially over time, year by year) variant of the standard Global Trade Analysis Project (GTAP) computable general equilibrium (CGE) model to assess the impacts of the policy shocks.

A1 General Background on CGE Models

CGE models integrate a number of accounts to provide a complete description of an economy:

- The standard national income and expenditure accounts;
- A breakdown of industry by sector that reflects inter-sectoral input-output links, which take into account internationally sourced intermediate goods and services (in all, the GTAP dataset allows for the representation of up to 57 sectors, 43 of which are goods);
- A production function for each sector that combines sector-specific inputs of capital, skilled and unskilled labour, and intermediate inputs; and
- A trade account that models the international linkages for each sector of the economy.

The CGE framework generates impact results for the following aggregates:

- National accounts (consumption, investment, government expenditure, real exports and real imports);
- Economic welfare (equivalent variation, see below);
- Sectoral production, imports, exports and domestic shipments;
- Impacts on capital formation and labour (skilled and unskilled);
- Price impacts (consumer prices and terms of trade); and
- Government revenue.

On the production side, the model evaluates efficiency gains (or losses) from reallocation of factors of production across sectors. In the first stage, land, labour (skilled and unskilled) and capital substitute for one another to generate domestic value added by sector. Intermediate inputs, which include imported intermediates, substitute for domestic value added in a second stage.

On the demand side of the model, an aggregate Cobb-Douglas utility function allocates expenditures to private consumption, government spending and savings so as to maximize per capita aggregate utility. Following a shock, the changes in consumption are allocated across these three aggregates based on their income shares in each region. Private household demand responds to changes in prices and income based on the standard Constant Difference of Elasticities demand system in the GTAP model.

The trade module assumes imperfect substitution based on product differentiation across regions. The key parameter determining the scale of impacts on trade from a tariff shock is the elasticity of substitution: A high elasticity of substitution generates relatively large trade impacts for a given size of tariff shock. Note that the GTAP sectors reflect relatively large aggregates of individual products; accordingly, substitution elasticities are lower than they would be for product categories that are defined more narrowly and, thus, are more substitutable for each other.

Economic welfare is based on "equivalent variation," the lump-sum payment at pre-shock prices that would have to be made to households to leave them as well off as in the post-shock economy.

We use a perfect competition specification of the GTAP model. Some models incorporate imperfect competition for industrial-goods sectors, introducing price mark-ups that represent monopolistic pure profits in equilibrium. These price mark-ups are reduced by intensified competition under trade liberalization, generating additional welfare gains. A number of recent models incorporate heterogeneous firm features, which

generate productivity gains from reallocation of market shares to more productive firms under trade liberalization.

For a technical description of the basic GTAP model, see Hertel (1997); for a discussion of the degree of confidence in CGE estimates, see Hertel et al. (2003).

A2 The Recursive-dynamic Framework

The recursive-dynamic variant of the GTAP model features an investment module in which capital supply responds to changes in the rates of return (ROR) to capital. The recursive-dynamic investment framework is based on the Monash-type investment function (Dixon and Rimmer, 2002). In this function, the growth rate of capital (and, hence, the level of investment) is determined by investors' willingness to supply increased capital to each sector in each country, which in turn depends on changes in the expected ROR for capital in that sector and region. Assuming that investors are cautious, any shock to the ROR in a given sector and region is, however, eliminated only gradually. This results in similar treatment of investment as in models that incorporate costs of adjustment that are positively related to the level of investment in a given year (based on, e.g., construction/installation costs of capital suppliers). The Monash model, however, instead of relying on increasing adjustment costs as the mechanism to limit investment, incorporates investor perceptions of risk for this purpose.

The parameter that mediates the supply response of capital – i.e., the elasticity of the supply of capital to RORs – is set at unity. This result is based on empirical evidence from a gravity model applied to firm-level data on rates of return, investment and other firm-level characteristics.

A3 Closures

Closure refers to the choice made by the user of the model as to which variables shift as the model is run – which are endogenous to the model – and those that are set externally to inform the modelling exercise and do not change – i.e., are exogenous variables. This choice is necessary because each model can only determine the value of a given number of endogenous variables.

Given that we use a dynamic version of the GTAP model, capital responds to changes in the ROR on capital. Both labour and capital are assumed to be mobile across all sectors within a country.

Labour can also respond to changes in the wage rate. However, for the present study, the total labour supply is assumed to be fixed, implying a long-run elasticity of labour supply with respect to wages of zero – i.e., there are no changes in total employment as a result of the policy measures being modelled. In reality, there will be a positive response of labour to wage changes; accordingly, this closure understates the actual impacts.

We assume that productivity rises in line with wages, thus supporting the real wage gains generated in the simulation. This is done by splitting the increase in the factor payments to labour into productivity and real wages. With this assumption, the model behaviour is in line with historical experience concerning the co-movement of wage rates and productivity, which in turn is consistent with the microeconomic theory that labour is paid its marginal product and heterogeneous firms theory and empirics that establish that stronger firms, which gain market share under trade liberalization, are more productive and pay higher wages.

For the external closure, given the US interest in affecting its external balance through the policy measures, the closure that allows the external trade balance to adjust is necessarily adopted. The alternative option would be to fix the external trade balance, which would result in an implicit exchange-rate adjustment in response to the policy shock to restore the trade balances observed in the baseline data.

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