

## Supply Chains and Tariff Rates: The Impact of Reversing NAFTA

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Global trade models are widely used to examine the impact of trade agreements on the global economy. The data upon which these models are based, however, are very aggregated, not only with regards to the level of commodity detail, 57 sectors, but also the distinction between trade in intermediate and final goods. This distinction between trade in intermediates and final goods has become increasingly relevant in policy analysis as trade in intermediates has grown rapidly world-wide, and supply chains have become longer and increasingly global. This paper introduces a new model and database, the ImpactECON global supply chain (IESC) model and database, based on the GTAP Model, that takes account of differences in the sourcing of imports firms, final consumers and for investment; as well as the differential tariff rates on these goods. The differences in sourcing of imports by end-use allows the IESC model to capture the existence of supply chains, for instance the high vertical integration of trade and production within the NAFTA region. The differences in tariffs by end-use stem from the fact that a motor vehicle (category MVH in the GTAP database) sold to a final consumer differs from the motor vehicle (part) sold to firms and to the motor vehicle (a crane) sold for investment purposes; and as such these different commodities are likely to be subject to different tariff rates. This is believed to be the first multi region input-output database that takes account of differences in tariff rates across uses and is publicly available.

Using this model and database, this paper seeks to demonstrate how the integration of supply chains and differential tariffs can improve analysis of trade policy. To illustrate this, we examine the North-American Free Trade area, where trade in intermediates has grown exponentially since the signing of the North-American Free Trade Agreement (NAFTA) over 20 years ago. With public perception of trade agreements at an all-time low, we examine the impact of a potential rise in US tariffs on imports of goods from Canada and Mexico to most favored nation (MFN) rates. We also consider the potential impact of Canada and Mexico retaliating to the new US trade policy stance, by also raising their own tariffs on US goods to MFN rates. Overall, the results show that the US's reversal of NAFTA leads to a decline in real GDP, trade and investment in the US, Mexico and Canada, with the potential for much greater larger losses should Mexico and Canada chose to retaliate. 250,000 workers in the US become unemployed, if Mexico and Canada retaliate. Sectoral production rises or falls depending on the inter-related nature of trade in intermediate and final goods and the extent to which tariffs rise on each of these goods. The largest declines for the US from its reversal of NAFTA occur in manufactured goods – those sectors which prompted the call for more protectionist policies. There is some potential for growth in production of cranes, semi-trailers and tractors (motor vehicles purchased for investment), as domestic production replaces Mexican imports of these goods when the US raises tariffs; however, these gains are reversed if Canada and Mexico retaliate. The impact of Canada and Mexico's retaliation is positive in general for US manufacturing (other than motor vehicles).

When comparing our results with the standard GTAP model, we find that while the macroeconomic results of the two models are similar, the sectoral results differ markedly when NAFTA trade and production are interrelated, as is the case in the motor vehicles sector. The benefit of including supply chains is most clearly evident when investigating the impact of tariffs by end-use, for instance the introduction of a policy aimed at raising tariffs on imports of consumer goods (as opposed to intermediate inputs), since only the supply chain model can capture the inter-related nature of trade and production and differential tariff rates applied on imports of intermediate versus final goods.