Andersons Policy Bulletin

**The Economic Impact of Tariffs on Chinese Imports:
A Potentially Costly Mistake?**

Jobs, Trade and Wages

Throughout the 2016 US Presidential campaign, a familiar theme of candidate Donald Trump was that import competition from China has been bad for the US economy in general, and more specifically for workers in the manufacturing sector. In this context, there has been considerable focus among analysts on his proposal to levy a 45 percent tariff across-the-board on imported goods from China, and the likely economic impact of implementing such a policy on the US economy in aggregate, as well specific effects on the US labor market and consumers (Noland *et al*., 2016).

At the root of many voter concerns about globalization is the "mercantilist" notion that imports are bad for the economy, especially those from emerging countries abundant in unskilled labor, while exports are good, all measured in terms of employment in US manufacturing. Counter to this, international economists have consistently argued trade raises a country's economic welfare (Autor *et al*., 2016) – specifically, allocating its relatively abundant resources (skilled labor, capital, and land) to those sectors that intensively use such resources, maximizes the value of its Gross Domestic Product (GDP), thereby raising the purchasing power of its consumers, an outcome drawing on what is formally known as the Heckscher-Ohlin (1991) theorem.

The corollary of this is that resources used intensively in export-competing sectors benefit from trade, the converse being true of resources used intensively in import-competing sectors, e.g., skilled versus unskilled US workers. This result, originally due to Stolper and Samuelson (1941) (see *The Economist*, 2016b), implies that international trade can have a significant impact on the distribution of income. However, even if redistribution of income occurs with trade, and assuming unskilled labor from the import-competing sector is re-employed elsewhere, the orthodox view is that benefits to winners (skilled workers and consumers) will outweigh costs to losers (unskilled workers), openness to trade passing the benefit-cost test: the winners can in principle compensate the losers and still be better off.

Prior to the 1990s, however, the flow of trade in goods was mostly between the developed countries (the "North"), Hanson (2012) reporting that high-income countries accounted for 80 percent of world trade in 1985. Specifically, countries with similar GDP/capita produced part of the potential range of goods in a specific sector such as automobiles, constrained by economies of scale and the size of their own market, and then traded those goods with other high income countries in a larger integrated market for similar but differentiated goods, i.e., intra-industry trade. The view of economists is that trade within industries not only resulted in consumers benefiting from a greater variety of goods, but that it also helped minimize the costs of structural adjustment as it is easier to reallocate resources within industries than to

reallocate from one industry to another, thereby reducing the impact of trade on the distribution of income (Krugman, 1981).

Notwithstanding these predictions, concerns were expressed in the 1980s about growing income inequality in the US, reflected in the increasing gap between skilled and unskilled wages, blame being apportioned to growing imports of unskilled labor-intensive goods from low-wage countries in the South (Krugman, 2008). However, empirical analysis published in the early to mid-1990s, concluded that the effects of North-South trade on US income inequality were very modest (Krugman, 2008). In fact, by the start of the 2000s, the consensus among trade economists was: trade was not a key contributing factor in either declining employment in the US manufacturing sector or rising income inequality; second, workers losing employment in the import competing sectors could relocate to jobs elsewhere; and, third, the impact of trade affected all unskilled workers not just those in the import-competing sectors (Autor *et al*., 2016). Importantly, the general view that emerged in the economics literature was that observed changes in the US labor market were due to technological change in the manufacturing sector which complemented skilled workers, thereby driving up skilled relative to unskilled wages (Berman *et al*., 1998).

Economic Impact of "Factory China"

However, at the same time as this consensus was reached, export growth by "factory China" really lifted off (as Autor *et al*., 2013; 2016). Between 2000 and 2007, US import penetration by low-wage countries grew from 15 to 28 percent, China's share of this growth being 89 percent (Autor *et al*., 2013). Over the same period, the share of the US working population employed in manufacturing fell from 11.0 to 8.4 percent, while the US (China's) current account deficit (surplus) averaged 5 percent of their respective GDPs (Autor *et al*., 2016). Specifically, the value of US imports from China rose by 171 percent between 2000 and 2007, compared to growth in US exports to China of 150 percent, i.e., US manufacturing has faced a significant increase in Chinese import competition without an offsetting increase in exports – a pattern shared by virtually all industrial sectors (Autor

et al., 2013; 2016). China has exploited its clear comparative advantage in producing unskilled labor-intensive goods such as apparel, shoes and electrical appliances (Amiti and Freund, 2010), drawing on the significant increase its industrial workforce due to rural-to-urban migration of 250 million workers (Li *et al*., 2012), in combination with the benefits of WTO accession in 2001 (Branstetter and Lardy, 2006), and annual productivity growth of 8 percent over the period 1998 to 2007 (Brandt *et al*., 2012).

Given the significant increase in Chinese import competition prior to the Great Recession, recent economics research has focused on evaluating its impact on employment and wages of unskilled labor in the US manufacturing sector. Before 2000, employment in US manufacturing remained relatively constant through the 1990s, but over the period 2000 to 2007 it declined by almost 19 percent, with 5.8 million jobs being lost by 2011 (Acemoglu *et al*., 2016). The latter authors have conducted a very detailed evaluation of what proportion of these manufacturing job losses were due to Chinese import competition over the same period. In their study, they calculate that between 1999 and 2001, 985,000 jobs were lost in manufacturing industries directly and indirectly exposed to Chinese imports, i.e., 17 percent of the total loss in manufacturing jobs. In addition, over the same period, another 994,000 were lost in the non-manufacturing sector due to linkages with manufacturing, generating a total of 1.98 million jobs lost. This compares to Hicks and Deveraj (2015), who calculate that over the period 2000 to 2010, 750,000 jobs were lost in the manufacturing sector, i.e., 13 percent of all US manufacturing jobs lost, with an additional 950,000 jobs lost due to linkages to the manufacturing sector. In summary, available estimates suggest that 13 to 17 percent of US manufacturing jobs lost in the decade prior to the Great Recession were due to the direct effect of import competition, the implication being that a large proportion of the remaining manufacturing job losses were likely due to technological change and associated productivity effects (Hicks and Deveraj, 2015).

Clearly, there has been a significant shock to overall US manufacturing employment at the national level from Chinese import

penetration. However, perhaps more important are the regional employment effects, which may result in trade-adjustment costs being borne disproportionately by unskilled workers in certain parts of the US such as the Midwest and Southeast regions (Autor *et al*., 2016). Using data for commuting zones (CZs) over the period 1990 to 2007, Autor *et al*. (2013) find CZs that were more exposed to Chinese import competition had larger reductions in manufacturing employment, job losses not being offset by re-employment either locally or elsewhere. The latter finding suggests unskilled labor in the US has less mobility than previously thought. At the same time, these authors find that workers in more trade-exposed CZs suffer larger reductions in average weekly wages, and also receive higher increases in social transfers in the form of unemployment and other benefits, including payments from the Trade Adjustment Assistance Scheme (TAA). Surprisingly, while the TAA was explicitly designed to help workers who lose their jobs because of import competition, it actually accounts for the smallest portion of social transfers per capita to those affected.

Potential Costs of Tariffs against China

In light of these research results, it is unsurprising that Donald Trump was able to secure election, partly on the strength of his appeal to voters in states where manufacturing employment has been affected by Chinese import competition. However, his proposal to use a 45 percent tariff against Chinese imports is expected to be a very blunt policy instrument: across-the-board protectionism will result overall in net costs to the US economy, even without retaliation by China. Levying tariffs on imports from China can be expected to have the following effects at the economy-wide level: first, resources will be inefficiently employed in sectors where the US has a comparative disadvantage, which then acts as a tax on efficient resource-use in sectors where the US has a comparative advantage, the overall effect being to reduce US GDP; second, the relative increase in the price of imported goods will reduce the purchasing power of US consumers, thereby lowering their economic welfare. These costs will necessarily be greater if China retaliates with an across-the-board tariff of its own to match the US.

Empirical research by Noland *et al*. (2016), published by the Peterson Institute for International Economics during the Presidential campaign, provides clear support for the first effect. Based on a scenario where the US imposes 45 and 35 percent tariffs against imports from China and Mexico, the latter countries responding symmetrically, they forecast that this would amount to a tax on trade, reducing both exports and imports, and causing a long-term decline in economic efficiency. Restriction of trade also results in an increase in the rate of inflation, to which the Federal Reserve would respond by raising interest rates, with knock-on effects on investment. As a result, Noland *et al*. (2016) forecast that the US economy would be pushed into recession within three years, generating a loss of 4.8 million jobs – a 4 percent decline in private sector employment, with a significant number of US states suffering a similar percentage decline in employment. Interestingly, this study also forecasts that while the US manufacturing sector will clearly be hurt by such protectionism, especially in the capital-goods sector, the majority of jobs will be lost by low-wage/unskilled workers in sectors such as wholesaling and retailing, part of the very segment of the voting population that President Trump has promised to help.

Tariffs and Global Supply Chains

A key issue ignored by Noland *et al*. (2016) in their analysis is the fact that 80 percent of international trade now occurs within global supply chains (UNCTAD, 2013). Global supply (value) chains first appeared in the early-1990s, rapidly developing across many industrial sectors (Feenstra, 1998). The global supply chain for a specific good can be defined as the value added of all activities required to produce that good for final consumption (Timmer *et al*., 2014). A key feature of such chains is, unlike the pattern of vertically integrated production characterizing much of the manufacturing sector in the post-WWII era, manufacturing has become increasingly fragmented across space as production process has been "unbundled", i.e., stages of production once performed in close proximity have been dispersed geographically (Baldwin, 2006), trade in intermediate goods accounting

for 56 percent of trade by 2005 (*The Economist*, 2016c).

The canonical example is production of Apple's iPod, assembled in China using multiple components sourced globally, e.g., the display and hard drive being produced in Japan by Toshiba (Dedrick *et al*., 2009), Apple capturing 36 percent of the retail price of an iPod compared to 2 percent for assembly in China. This fragmentation has largely been the result of a rapid decline in the costs of coordinating vertical production – specifically, the information and communications technology (ICT) revolution has reduced the complexity of coordinating supply chains at a distance, while the availability of low-wage unskilled labor in emerging economies such as China has made fragmentation profitable (Baldwin, 2012).

Timmer *et al*. (2014) report several key features of global supply chains: first, fragmentation, measured as the share of foreign value-added content of production rose on average from 28 to 34 percent over the period 1995 to 2008; second, an increasing share of value-added is accruing to capital and skilled labor as opposed to unskilled labor; and, third, countries in the North are increasingly specialized in using the services of skilled labor. Related to the latter is the increased importance of production of intangibles such as intellectual capital (software and databases, research and development, and designs) which typically requires employment of skilled labor in its production, and is adding to the wage gap of skilled over unskilled labor in the US – a richer version of the Heckscher-Ohlin theorem (Haskel *et al*., 2012).

Once global supply chains are explicitly recognized, the effect of US tariffs on goods imported from Chinese becomes rather more subtle. First, if a high proportion of value-added in goods imported from China is generated and then exported from the US, an import tariff not only raises the price of these goods to US consumers, but it also becomes an explicit tax on production of intangibles and employment of skilled labor in the US. Second, it is highly unlikely that assembly of consumer goods currently undertaken in China will actually return to the US if tariffs are implemented – assembly jobs were not simply offshored but were "destroyed" by productivity

changes in the US economy (*The Economist*, 2017). Third, fragmentation of global supply chains allows for multinational corporations shifting production of inputs and assembly of final consumer goods from China to another emerging economy such as Vietnam (Noland *et al*., 2016). Fourth, China might retaliate by explicitly disrupting say Apple's supply chain (*The Economist*, 2016d).

Effect of Tariffs on US Consumers

With respect to the impact of increased import prices, Fajgelbaum and Khandelwal (2016) have recently published research analyzing who gains from trade across consumers within countries, and from this the authors calculate the expected reduction in consumer purchasing power if trade were actually closed off (autarky). Their results indicate that if the US were to move in the direction of autarky, consumers at the lower end of the income distribution (the 10th percentile) would suffer a 69 percent reduction in their real income, compared to those at the upper end of the income distribution (the 90th percentile) who would see their real incomes fall by 4 percent. In other words there is a clear bias to the poor from trade, due to the fact that they spend a relatively high proportion of their income on traded goods compared to high income consumers who spend high proportion of their incomes on least-traded goods such as services. Even if President Trump's trade policy does not fully close- off the US economy, it is not unreasonable to draw the conclusion that low-income consumers who have benefited from cheap Chinese exports of goods such as clothing, shoes, furniture, and toys and electronics, will be disproportionately hurt the most by such a policy (*The Economist*, 2016a).

Could a Trade War Break Out?

Noland *et al*. (2016) also evaluate a second scenario where China does not retaliate with its own across-the-board tariff, but instead selectively raises tariffs on imports of specific US goods such as aircraft and soybeans. While it is intuitively reasonable to assume that China will retaliate in some form against any tariffs that the President Trump unilaterally imposes against its exports, it is important to consider the basic economic logic for their doing so, and why economists have

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always pointed towards the destructive costs of a trade war. In the textbook representation of the economic effects of trade policies, it is usual to start from the assumption that a country is too small to affect the world price of a good that it imports, in other words it has no buying power on the world market, and therefore cannot influence its international terms of trade, i.e., the price of its imports relative to the price of its exports. In this instance, when a tariff is imposed, only the local terms of trade improve in favor of domestic firms operating in that sector, i.e., the domestic price of the import-competing good increases, generating an increase in "producer surplus" (the difference between the price domestic firms actually receive for supplying a good and the minimum price at which they are willing to supply). On the demand side, consumers in the importing country also face the tariff-driven increase in the price of the import-competing good, generating a decrease in "consumer surplus" (the difference between the maximum price consumers are willing to pay for a good and the price they actually pay). The net effect of the price increase is the difference between the gain in producer surplus plus tariff revenue, and the total loss of consumer surplus, which will be negative and consists of the cost of inefficient domestic production replacing imports and the "deadweight" loss of the tariff. In this case, the tariff is a self-inflicted wound on the importing country, and the only reason it would implement such a policy would be if the policymaker received political contributions from a well-organized lobby of firms in the import-competing sector, the policymaker being willing to transfer economic benefits from consumers to firms (Grossman and Helpman, 1994) .

This model is considerably richer if it is assumed an importing country the size of the US has buying power in the world market in the sense that if it imposes a tariff, it drives down the world price of the imported good relative to the price of its exports, positively affecting its international terms of trade. In this case, it is possible for the additional tariff revenue due the positive terms of trade effect to outweigh the negative effect of the tariff, providing an additional incentive for a policymaker to implement such a tariff. Of course, the positive terms of trade effect for a large importing country such as the US will impose a negative externality on an exporting country such as China whose international terms of trade will worsen. However, in a non-cooperative game between the US and China, each has the unilateral incentive to use its market power to improve its international terms of trade by implementing a tariff on the good(s) that it imports. The net result of this "prisoners' dilemma" is that each country ends up reducing access to its own market through import tariffs, thereby lowering total global trade, and assuming a symmetric reduction in market access, world relative prices actually do not change.

The latter result, originally due to Johnson (1954), has subsequently been analyzed in the context of a trade war by Grossman and Helpman (1995), whereby each country's policymakers react only to contributions from their domestic lobby, ignoring the effects on the foreign policymaker and lobby. It is also part of the economic logic for the General Agreement on Tariffs and Trade (GATT) propounded by Bagwell and Staiger (1999; 2007). If the GATT (and the successor World Trade Organization (WTO)), is treated as a cooperative bargaining game between countries, its function is quite clear: it removes the incentive for each country to manipulate their international terms of trade. By committing to a reciprocal reduction in their import tariffs, each country is better off due to increased access to the other's market, all the time ensuring that their international terms of trade do not change, i.e., as each country lowers the tariff on the good imported from the other country, the world price of that good increases, mapping into an increase in the world price of the other country's exported good.

Consequently, if President Trump does reduce US market access to Chinese imports through unilateral implementation of tariffs, even without existing legal disciplines of the GATT/WTO, China will have every incentive to respond in kind. This has the potential for serious negative economic consequences to the both the US and global economy.

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