

Background paper accompanying DNBulletin “Why protectionism does not work”  
(24 August 2017)

We have modelled two scenarios using the NiGEM model. Under the first, *unilateral* scenario, the United States unilaterally implements protectionist measures, resulting in higher import prices in the United States. The main purpose of this scenario is to show potential near-term effects of protectionism. The second, rather more dramatic scenario involves a trade war, simulating a permanent adverse productivity shock. This scenario concerns the longer term.

- **Scenario 1: unilateral US protectionism**

Under the first scenario, the United States introduces 20% import tariffs for products from China, Japan, Mexico and Germany. This scenario assumes that other countries will not take any retaliation measures and that policies will not be reversed due to a WTO trade dispute.

On balance, the United States will be worse off if it introduces trade barriers. After two years, US GDP will be 1.4% lower than in the baseline projection (see Table 1). Inflation will rise sharply on the back of higher import prices in the first year following the introduction of the import tariffs, putting a drag on consumption. The Fed will respond to higher inflation by tightening its monetary policy more than assumed in the baseline projection. Initially, higher interest rates and lower demand will heavily depress investment, which will be 4.7% below the baseline projection after two years. As markets anticipate the tighter monetary policy, the US dollar effective exchange rate will appreciate by 3.8%. The model assumes rational expectations.

Due to higher import prices, imports will be 4.9% lower on balance after two years. Exports will be 1.9% lower than in the baseline projection after two years, owing to lower foreign demand as higher import prices push up export prices.

**1. Scenario results: unilateral US protectionism**

Deviation from baseline projection as a percentage (in percentage points for inflation and policy interest rate)

	Year 1	Year 2
<b>Effects on United States</b>		
GDP	-0.6	-1.4
Consumption	-0.7	-1.6
Private investment	-2.6	-4.7
Imports	-2.4	-4.9
Exports	-0.7	-1.9
Inflation	1.4	0.9
Policy interest rate	1.0	0.7
Effective exchange rate	3.8	3.4
<b>International effects</b>		
China GDP	-0.1	-0.3
euro area GDP	-0.2	-0.5
Germany GDP	-0.3	-0.6
Japan GDP	-0.3	-0.7
Mexico GDP	-0.7	-1.5
World trade	-1.1	-2.3

World trade will be 2.3% lower two years after the introduction of trade barriers. Of the countries directly affected by the trade barriers, Mexico will be hit the hardest due to its substantial trade relations with the US. Mexican GDP will be 1.5 percentage points lower year-on-year in the second year compared with the baseline projection. The slowdown in the other directly affected countries will be significantly less pronounced. In the euro area as a whole, output will be 0.5% lower due to spillovers from lower economic activity in Germany to other Member States and as the ECB will raise its policy interest rate slightly in response to higher German inflation.

- **Scenario 2: countermeasures and productivity shock**

This alternative scenario, which concerns the longer term, assumes a trade war sparked by the introduction of US trade barriers. The affected countries, i.e. China, Japan, Germany and Mexico, will announce countermeasures that raise the prices of their imports from the US by 20%. The scenario also assumes that the trade sanctions will make allocation of production factors less efficient in the US, China, Japan, Germany and Mexico, given that modern trade theory posits that open economies are more productive due to their exposure to international competition (IMF, 2017).<sup>1</sup> As a result, productivity will drop immediately and permanently by 2% compared with the baseline projection.

Under these assumptions, US GDP growth will sharply slow down compared with the baseline projection after five years (see Table 2). This is caused mainly by a substantial reduction in investment (-5.4% after five years) due to the productivity shock. The combination of mutual import tariffs and the productivity shock, which drives up production costs, will cause both US import prices and export prices to increase sharply.

## 2. Scenario results: retaliation and productivity shock

Deviation from baseline projection as a percentage (in percentage points for inflation and policy interest rate)

<b>Effects on United States</b>	<b>Year 5</b>	<b>Year 10</b>
GDP	-4.7	-4.9
Consumption	-5.8	-6.2
Private investment	-5.4	-4.6
Imports	-9.1	-9.2
Exports	-6.4	-6.7
Inflation	0.0	0.0
Policy interest rate	0.4	0.2
Effective exchange rate	0.8	1.2
<b>International effects</b>	<b>Year 5</b>	<b>Year 10</b>
China GDP	-1.3	-1.6
euro area GDP	-2.4	-3.4
Germany GDP	-2.0	-2.6
Japan GDP	-2.1	-2.6
Mexico GDP	-5.1	-5.7
World trade	-4.9	-5.0

<sup>1</sup> IMF et al (2017), "Making Trade an Engine of Growth for All".

This will have a major adverse impact on both US imports and US exports, which will be 9.1% and 6.4% lower, respectively, than in the baseline projection. Elsewhere, the impact is relatively large, although this scenario also shows differences between the countries involved. Again, Mexico will suffer the most, its output being around 5% below the baseline projection after five years. The other affected countries and the euro area will encounter a reduction in GDP by 2% on average.