POTENTIAL IMPACT OF WTO TARIFFS ON CROSS-BORDER TRADE

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1. Introduction

The nature of the trade arrangements that will be in place following the exit of the UK from the EU is currently unknown and will be the subject of considerable negotiation over the coming years. To inform this process, it is useful to have information on the current trading patterns and how different elements of alternative trade arrangements might impact on overall trade flows and how these might be distributed across different sectors and products. Businesses across the island of Ireland are currently highly integrated with products potentially crossing the border multiple times during different stages of processing. It is therefore particularly exposed to even temporary disruptions to trade or increases in trading costs as a particularly closely knit example of the European single market.

In the absence of a specific trade deal being agreed, the tariffs applied to third countries under World Trade Organisation (WTO) arrangements represent a fall-back scenario for goods trade. Although this may be considered a worst case scenario, it is a useful exercise to examine the impact of these tariffs and other trade barriers in order to understand the parameters in which trade negotiations would operate. Trade in services does not have a similar fall-back set of tariffs or trade restrictions and data on services trade is more limited so this paper focuses entirely on goods trade.

Although some existing research exists on the overall impact of a WTO scenario for post-Brexit UK-EU trade, such as the analysis by Lawless and Morgenroth (2016), the different structure of cross-border trade compared to overall Ireland-UK trade means that the results they provide are unlikely to accurately capture the cross-border impact. That previous analysis took the 5,200 products listed in the EU external tariff schedule and applied them symmetrically to EU-UK trade. This work showed that the effective tariff rates ranged from 2% to 11% by country. Across sectors, the variation was more dramatic, ranging from 0% to 50% reflecting the differences in products traded.

This paper uses a similar approach to Lawless and Morgenroth but tailors it to the specific composition of cross-border trade and, in addition, extends the methodology to take into account exchange rate movement effects and other potential new costs to post-Brexit trade flows arising from non-tariff barriers. The wide variation in tariff rates, and hence heterogeneity in sectoral impacts, is the reason why an in-depth examination of the existing structure of trade flows is crucial to providing a tailored estimate of the impact of the possible introduction of tariffs.

After combining the tariff and non-tariff barrier estimates with the current trade structure, the next step of the research is to examine how the tariff-induced price increases might change the demand for the currently traded products. The total impact on trade will be a combination of the size of the price increase caused by the tariff and the sensitivity of trade to price changes. To do this, we will use international elasticity response estimates of trade to price changes at a sector level to calculate the effect on cross-border trade flows. As the price effect can be re-enforced or mitigated by exchange rate movements, we build in an estimate to reflect the impact of changes in the euro-sterling exchange rate on cross-border trade.

2. Data on Cross-Border Trade and Current Patterns

The Central Statistics Office collects import and export data for the Republic of Ireland in which Northern Ireland is identified separately from the rest of the UK as a trading partner.[1] The data is available at an extremely disaggregated product level, which can be matched to the listed tariff schedule registered by the EU with the WTO.

South to North trade in goods was valued at €1.65 billion in 2016 (down from €1.73 billion in 2015) and North to South trade was €1.05 billion (down slightly from €1.108 billion in 2014).[2] These trade values differ somewhat from the North-South trade figures collected by other agencies such as the Regional Trade Statistics from HMRC. A detailed examination of the methodological differences in the alternative sources of trade statistics was undertaken by InterTradeIreland (2009) and found that although the differences could be quite large, they were spread across sectors and did not show any systematic bias. As a result, there is little reason that the distribution of the exposure to tariffs analysed in this work would be sensitive to these data collection issues.

The detailed product data covers 90 per cent of trade in both directions, with the remaining 10 per cent being estimated in the total statistics and not assigned to a specific product category. The range of products traded is considerable – 1,933 product categories are exported from the Republic of Ireland to Northern Ireland and 2,269 products are exported from Northern Ireland to the Republic. Despite this wide range of products being traded, trade volumes are dominated by a relatively small subset of products: the top 100 products account for 59 per cent of the Republic's exports and 64 per cent of Northern Ireland's exports (although these are not necessarily the same products of course).

Table 1 gives an overview of the structure of trade between Ireland, Northern Ireland and the rest of Great Britain. There are some notable differences in the sectoral structure of trade from Ireland to Northern Ireland compared to what it sells into the rest of Britain. Chemicals and Pharmaceuticals account for 20.5% of exports from Ireland to Britain but just 2.6% of exports to Northern Ireland. Likewise, the Machinery and Electrical sector makes up twice as high a percentage of Irish trade to Britain as it does to Northern Ireland. Significantly, these are sectors that in Ireland are generally dominated by multinational firms, and their lower share in trade to Northern Ireland suggests that these export flows are less multinational dominated than overall Irish exports.

[1] As our data is from the CSO, it should be noted that export data (i.e. goods leaving Ireland) are collected on a free on board (fob) basis whereas the import data (goods coming into Ireland) are collected inclusive of cost, insurance and freight (cif). Tariffs are generally levied on the cif value so this introduces a slight discrepancy between the different flows. The CSO report that the standard adjustment made to convert between the two measures for intra-EU trade is 2 per cent (for details see: http://www.cso.ie/en/methods/balanceofpayments/methodologydocuments/servicesexportsandimportsbackgroundnotes/).

[2] In terms of the reduction in trade in 2016, the trade data we use here is as was available in March 2017 and some further revisions may be made. As a check, we ran the scenarios in this paper on the final 2015 data and the overall results did not change.

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DATA ON CROSS-BORDER TRADE AND CURRENT PATTERNS

Table 1: Sectoral Composition of Trade 2016

	Ireland to GB	GB to Ireland	Ireland to NI	NI to Ireland
Live animals	1.4%	1.2%	4.2%	0.7%
Meat and fish	13.1%	3.5%	10.6%	6.0%
Dairy	4.8%	1.5%	3.2%	14.8%
Vegetable products	1.1%	1.6%	2.5%	4.6%
Products of milling industry, oil, fats	0.3%	1.1%	2.8%	4.7%
Foodstuffs	6.2%	8.4%	4.9%	6.3%
Beverages	1.7%	2.1%	5.4%	3.7%
Residues of food and tobacco	1.2%	1.2%	3.8%	8.8%
Mineral products	4.0%	13.5%	6.5%	3.8%
Chemical and pharmaceutical products	20.5%	5.1%	2.6%	1.9%
Other organic chemicals	5.4%	6.2%	3.7%	1.5%
Other chemicals	2.4%	1.8%	2.1%	0.6%
Plastic and rubber	3.5%	4.8%	5.9%	5.6%
Raw Hides, skins, leather, & furs	0.4%	0.3%	0.3%	0.1%
Wood and wood products	3.4%	4.6%	6.2%	6.0%
Textiles	0.4%	0.2%	0.1%	0.2%
Carpets, footwear, umbrellas	1.1%	4.6%	2.7%	1.8%
Stone, glass	1.8%	1.4%	1.8%	1.6%
Metals	2.9%	5.7%	5.0%	4.1%
Machinery, electrical	12.8%	14.3%	7.3%	6.3%
Transportation	4.6%	5.3%	3.0%	4.0%
Miscellaneous	7.0%	11.7%	15.3%	12.8%
	100.0%	100.0%	100.0%	100.0%

The overall structures of North-to-South and South-to-North trade are more similar, with the main exception being the very large share of exports from Northern Ireland accounted for by the Dairy sector.

This has important consequences for the exposure of Northern Ireland to the potential introduction of tariffs as under the WTO tariff schedule, which will be discussed in the next section, tariffs are systematically higher on food products than on any other sectors.

3. Tariffs and Non-Tariff Barriers

3.1 WTO Tariffs

This research will use the tariffs registered by the EU at the WTO as being the standard applied to external trading partners with whom the EU does not have a specific trade treaty. They can therefore be regarded as the default or fall-back arrangement if the negotiations for a post-Brexit trade treaty are not complete by the date of the UK's exit from the EU.

Tariffs can be applied in two different ways – most of the WTO tariff rates are ad valorem tariffs (i.e. charged as a percentage of the value of the goods being shipped) while others are applied as a charge per unit quantity or by weight. In some instances, the two methods are combined, as for example in the case of the tariff on fresh or chilled boneless bovine meat which is 12.8% of the value of the product plus €303 per 100 kg. In some cases a tariff range is registered with the WTO – in these cases, we apply the lowest applicable percentage or charge per weight. The CSO data on cross-border trade flows that we will use provides the weight as well as the value of trade to allow us to include both elements where applicable.

The external WTO tariffs are levied on specific product lines and the variation is considerable. Of the 5,000 individual products that are listed with the WTO, the tariffs applied by the EU on non-members without a specific trade deal range from 0% to over 80%. As a result, a WTO arrangement would impact trade quite differently depending on the trade structure and this is why it is so important to provide a focused analysis of the cross-border trade flows.

Table 2 gives an indication of the variation in tariffs across sectors and how they can be affected by differences in trade composition within sectors. As the tariffs are imposed at a product level and some are related to the weight of the goods being traded, when the tariff is summed up for a particular sector, different rates can result – for example, the tariff on meat exports from Ireland to Great Britain is much higher than that on meat coming into Ireland from Great Britain. This is because more of the meat being exported from Ireland is beef products which have a higher tariff than other types of meat such as poultry. For this reason, we use the term "effective tariff" to indicate that the rate we are describing is trade-weighted and includes both ad valorem and unit based charges.

Table 2: Sector Level Effective Tariffs by Trade Direction

	Ireland to GB	GB to Ireland	Ireland to NI	NI to Ireland
Live animals	2.9%	0.4%	24.3%	30.3%
Meat and fish	59.2%	29.4%	73.4%	34.8%
Dairy	46.6%	31.4%	51.1%	64.1%
Vegetable products	11.0%	13.0%	18.8%	8.4%
Products of milling industry, oil, fats	10.1%	19.9%	26.4%	23.8%
Foodstuffs	11.7%	13.7%	12.2%	10.5%
Beverages	2.9%	4.7%	1.0%	2.1%
Residues of food and tobacco	9.4%	8.2%	7.9%	7.7%
Mineral products	0.2%	0.0%	1.0%	0.5%
Chemical and pharmaceutical products	0.2%	0.8%	1.4%	1.1%
Other organic chemicals	6.9%	2.4%	5.8%	5.2%
Other chemicals	1.1%	4.7%	1.3%	4.2%
Plastic and rubber	5.1%	5.2%	4.6%	5.7%
Raw Hides, skins, leather, & furs	1.4%	3.4%	0.7%	3.3%
Wood and wood products	2.1%	0.3%	1.5%	0.5%
Textiles	4.0%	5.2%	5.3%	4.7%
Carpets, footwear, umbrellas	10.2%	11.1%	10.5%	11.0%
Stone, glass	2.1%	4.0%	2.8%	3.4%
Metals	1.9%	2.0%	2.3%	1.1%
Machinery, electrical	1.1%	1.3%	1.6%	1.6%
Transportation	3.0%	5.7%	3.9%	5.2%
Miscellaneous	5.2%	3.1%	9.6%	12.3%

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There are a large number of sectors that would face either no tariff at all or a rate set very close to zero: these include paper products, pharmaceuticals, iron and steel. At the other end of the scale, food and textiles sectors face rates ranging from 10.2% on footwear to as high as 73.4% on meat products The sectors with the highest tariffs all fall within the broader headings of food, clothes and tobacco products. Countries in the EU either exporting or importing these products to and from the UK face very different tariff barriers from those producing other types of manufactured products and particularly those exporting higher technology products such as electrical and telecommunications equipment or precision instruments which attract tariffs not far from 1%. Tables 1 and 2 show that cross-border trade has considerable agri-food content, where we would expect higher tariffs to apply, so the overall impact on Northern Irish trade to the EU is likely to be greater than that estimated for the UK as a whole.

Another way of showing the dispersion of tariff rates across products is to look at how many products fall into different tariff ranges. Table 3 divides the tariffs for all products traded between Ireland, Northern Ireland and Great Britain into ten categories and shows how many products fall within each band and the associated percentage of trade. Significantly, a substantial proportion of products (29%-30%) would face no tariff at all under the EU's WTO registered schedule. Around 10% of products incur tariffs of between 0 and 2.5% and a further quarter of products have tariff rates between 2.5% and 5%. At the top end of the scale, around 5% of products incur tariffs of over 15%. These products in the highest tariff groups however account for a sizeable percentage of trade values. The 2% of products that would incur tariffs of over 35% in a WTO scenario contributed 12% of exports from Ireland in 2016 (to both Northern Ireland and Britain). From Northern Ireland, the share of trade falling into the highest tariff category was 19% in 2016. Imports to Ireland from the rest of Britain on the other hand had just 3% of trade that would be affected by the highest end of the tariff schedule. Comparing this to the sector distribution in Table 2, this further shows how the exposure of products in the agri-food sector differs substantially from other products and how the composition of trade drives the aggregate impact of the tariff schedule.

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Table 3: Number of Products and Share of Trade by Tariff Range

	Ireland to GB			GB to Ireland		
Tariff (%)	Number of products	Share of products	Share of trade	Number of products	Share of products	Share of trade
0	864	29%	44%	1,304	29%	46%
(0, 2.5]	314	10%	5%	477	11%	5%
(2.5, 5]	734	24%	12%	1,024	23%	14%
(5, 7.5]	416	14%	5%	657	15%	14%
(7.5, 10]	205	7%	9%	401	9%	9%
(10, 12.5]	260	9%	5%	293	7%	6%
(12.5, 15]	41	1%	2%	54	1%	1%
(15,25]	90	3%	3%	113	3%	2%
(25,35]	27	1%	1%	44	1%	1%
35+	51	2%	12%	57	1%	3%
Total	**3,002**	**100%**	**100%**	**4,424**	**100%**	**100%**

	Ireland to NI			NI to Ireland		
Tariff (%)	Number of products	Share of products	Share of trade	Number of products	Share of products	Share of trade
0	551	29%	30%	679	30%	26%
(0, 2.5]	220	11%	7%	279	12%	4%
(2.5, 5]	447	23%	10%	521	23%	11%
(5, 7.5]	241	12%	8%	302	13%	14%
(7.5, 10]	115	6%	9%	154	7%	7%
(10, 12.5]	167	9%	3%	159	7%	4%
(12.5, 15]	46	2%	14%	26	1%	2%
(15,25]	72	4%	6%	72	3%	13%
(25,35]	26	1%	1%	32	1%	1%
35+	48	2%	12%	45	2%	19%
Total	**1,933**	**100%**	**100%**	**2,269**	**100%**	**100%**

One caveat to our approach of applying WTO tariffs to each of the trade flow directions is that in the case of intermediate products coming into and leaving the EU for processing, some suspension of tariffs can apply. Assuming the same type of rules were kept in place by the UK following an EU exit, this would imply that our method may double-count some goods (and hence tariffs) as they cross and re-cross between jurisdictions. We would note however that administrative and regulatory costs would still apply so the estimates of non-tariff barriers (discussed further below) would be likely to be incurred by firms using the inward and outward processing system as applied to tariffs.[3] Appendix A gives some further information on how tariffs are applied in the case of processing.

[3] At this stage, we do not have full information on the extent of trade in intermediate inputs and cross-border processing. Further work in this area is planned as a follow-up to this report.

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3.2 Non-Tariff Barriers

Non-tariff barriers are a wide-ranging set of mechanisms covering policy measures other than tariffs that act to restrict or inhibit international trade flows. Focusing on goods trade, non-tariff barriers can include quantity limits, subsidies to domestic production and technical requirements such as licensing, labelling, standards and sanitary and phyto-sanitary rules (rules designed to protect health and food safety). They also cover requirements on customs inspections and documentation and measures to restrict competition from imports to protect domestic firms. More onerous customs procedures, whether measured as number of documents, length of time or monetary cost, have been shown to have a negative effect on export participation (Lawless, 2010 a, b). There is little evidence of a negative effect on average trade values per firm, however, suggesting that this type of procedural fixed cost has a larger impact on small firms.

As non-tariff barriers can take many different forms, measuring their overall level and impact on trade is not a straight-forward exercise. Detailed work done for the World Bank by Kee, Nicita and Olarreaga (2009) addresses this issue in detail and they combine a wide range of non-tariff barriers at a detailed product level and convert them to an ad-valorem tariff equivalent. To do this, they use data collected by the United Nations on more than 30 different types of NTBs (the TRAINS database – Trade Analysis Information System) supplemented by additional information from the WTO's trade policy reviews and the EU Standard's Database.[4] They undertake separate estimates for 4,575 HS six-digit product categories - we match their estimates with the trade flow data from the CSO at the 4-digit level to maximise harmonisation.

Their central estimate for the average ad-valorem equivalent of all non-tariff barriers is 12 per cent. However, non-tariff barriers are not equally allocated across all trade and the tariff equivalent for the products where non-tariff barriers apply can be many times this average effect. Furthermore, in over half of the products where non-tariff barriers are in effect, the ad-valorem equivalent of the non-tariff barrier is higher than the tariff.

Looking at the pattern of non-tariff barriers across countries, Kee, Nicita and Olarreaga (2009) find that there is a relationship between the restrictiveness of trade and level of development (as measured by GDP per capita). Overall, richer countries tend to impose lower barriers on trade. When estimating the effect of the UK exiting the EU on the UK economy, Dhringa et al (2016) take this into account and apply non-tariff barrier increases of between one-quarter in their optimistic scenario and three-quarters in their pessimistic scenario. Broadly following this approach, our scenarios assume non-tariff barriers one-quarter of those estimated by Kee et al. We would also note that all of our estimates are quite static whereas in the case of the introduction of new requirements, there may be a higher initial cost as exporters learn about the new procedures that may then become less onerous as the customs routines and documentation become more familiar. The business may also find that a number of simplified customs routines are applicable that can reduce some of the burden.[5]

[4] UNCTAD describe the variety of non-tariff measures used here http://unctad.org/en/PublicationsLibrary/ditctab20122_en.pdf

[5] Examples of simplified customs procedures are given here: http://www.revenue.ie/en/customs/businesses/simplified-customs-procedures/index.html

3.3 Demand Response to Price Increases

The application of any tariffs and increased costs due to non-tariff barriers would be expected to feed through into prices. In the absence of information on market structure, it is assumed that the full tariff amount would be incorporated into the price, although in practice some of the incidence could be absorbed by producers. The impact of this price increase onto trade values across all of the products being traded is then examined. The total trade impact is a combination of the size of the price increase caused by the tariff and the sensitivity of each product to price changes.

Given our focus on the heterogeneity of the impact of a WTO scenario on countries and products, it is important that we allow the trade price elasticity to vary. Unfortunately, this cannot be done at the very detailed product level but sector level elasticity estimates have been calculated by Imbs and Mejean (2016).[6] These estimates provide a range of values for each sector and we take the effects generated by using the median elasticity estimate for each sector. The median elasticity estimates range from a low of -2.8 for tobacco products to highs of -10.9 for measuring equipment and -10.5 for wearing apparel. Food products, which are particularly of interest given the very high tariffs that they attract, have a relatively high median elasticity of -6.1.

[6] Imbs and Mejean (2016) define their sectors at the ISIC 2-digit level which we match to our HS products using concordances available from Eurostat's Ramon database of nomenclatures: ec.europa.eu/eurostat/ramon

4. Projected Impact on Total Trade – Alternative Scenarios

This section looks at a range of scenarios for how different types of trade arrangement and different exchange rate paths might affect the structure of trade. Note that these are not forecasts as the outcomes on trade will depend to a great extent on the detail of a final trade agreement. They are however indicative of where the current trade structure is most exposed to any potential increase in barriers to trade if an alternative arrangement is not in place.

- Scenario 1: WTO tariffs
- Scenario 2: WTO tariffs + 0.25* (World Bank NTBs)
- Scenario 3: WTO tariffs + 0.25* (World Bank NTBs) + 10% change in exchange rate

Table 4 presents the overall effects of each of the scenarios on the four trade flow directions along with the associated change in value. The base case of Scenario 1, where the tariffs were applied to 2016 trade data show exports from Ireland to Great Britain and to Northern Ireland both fall by 8%. Trade from Northern Ireland to Ireland and from Ireland to Northern Ireland are broadly similar in structure, as we saw in Table 1, so the trade falls are within a similar range. The reduction in Northern Ireland to Ireland trade is slightly higher at 11%, coming from the most significant difference in trade patterns, which is the high share of the dairy sector in Northern Irish trade. Trade from the rest of Great Britain to Ireland falls by more modest levels than the other three flows in this scenario, reflecting the broader composition of trade and the much lower share accounted for by the agri-food sector. The final column gives the aggregate impact on cross-border trade.

Table 4: Trade Flow Effects of Alternative Scenarios

	Ireland to GB	GB to Ireland	Ireland to NI	NI to Ireland	Total Cross-Border
2016 Trade (€millions)	13,400	15,600	1,646	1,050	2,696
Percentage Change					
Scenario 1: WTO only	-8%	-3%	-8%	-11%	-9%
Scenario 2: WTO + NTB	-12%	-6%	-14%	-19%	-16%
Scenario 3: WTO + NTB (10% ex rate)	-20%	+0.3%	-21%	-11%	-17%
Change in € millions					
Scenario 1: WTO only	-1,068	-468	-132	-115	-247
Scenario 2: WTO + NTB	-1,603	-936	-230	-200	-430
Scenario 3: WTO + NTB (10% ex rate)	-2,672	+47	-346	-116	-461

Adding in non-tariff barriers in Scenario 2 increases the extent of the trade falls in all directions, as would be expected from the inclusion of further costs to trading. The size of the increase in the fall in trade when non-tariff barrier estimates are included is quite considerable, almost doubling the effect for most of the flows. This emphasises the importance of minimising these barriers even in the case of tariff-free trade being agreed between the UK and EU.

One important economic factor to change compared to this 2016 trade data was the evolution of the Euro-Sterling exchange rate in the aftermath of the Brexit vote. In 2016 the average exchange rate was €1 = 82p. Scenario 3 includes a 10% fall in the value of sterling on this exchange rate giving a €1 = 90p. Applying the exchange rate changes to the trade data in this way assumes that the full effect passes through into prices. This is generally found to be unlikely for short-term movements in the exchange rate but may be more realistic if the new level persists for a considerable period.

The effect of the exchange rate movement is of course asymmetric, increasing the reductions in trade from Ireland to both Northern Ireland and Britain but offsetting the effect in the other direction. In the case of trade from Britain to Ireland, the exchange rate falls entirely offsets the price increases from the tariffs and non-tariff barriers so that trade increases in these cases. For Northern Ireland, the exchange rate effect mitigates the trade fall from tariffs and non-tariff barriers by close to half but still results in an overall fall in trade to Ireland of 11%.

[7] As the trade data is annual, the impact of fluctuations in the exchange rate throughout 2016 cannot be modelled in this paper.

5. Sector and Product Level Effects Projected Impact

The results on the aggregate trade flows already suggest that differences in sectoral composition play a significant role in determining the overall impact and this is what drives the fairly considerable differences in the application of the same tariff schedules to the different trade flows. Looking at the sectoral impacts of the three Scenarios in Tables 5 to 7, the disproportionate effects on the food-related sectors is evident. If we exclude Food and Textiles, the reductions in trade in the other sectors is relatively modest, rarely exceeding 2 or 3% in Scenario 1 or 2. The effect on the Mineral Products Sector (which includes petrol and accounts for 13.5% of imports to Ireland from Britain) is zero in the first scenario and positive in the later scenarios due to the exchange rate effect.

The main impact and driver of the overall effects therefore comes from the effect of tariffs and estimated non-tariff barriers on the food sectors. In the final scenario, the effect is mitigated for British and Northern Irish exports to Ireland by the exchange rate effect, although the estimated effect remains strongly negative. This is particularly the case for the Dairy sector, which is estimated to have the largest falls in trade if the full impact of the tariff and non-tariff barriers pass through into prices.

Table 5: Impact Across Sectors of Scenario 1				
	Ireland to GB	GB to Ireland	Ireland to NI	NI to Ireland
Live animals	-2%	0%	-15%	-18%
Meat and fish	-36%	-18%	-31%	-21%
Dairy	-28%	-19%	-31%	-39%
Vegetable products	-7%	-8%	-11%	-5%
Products of milling industry, oil, fats	-6%	-12%	-16%	-14%
Foodstuffs	-7%	-8%	-7%	-6%
Beverages	-2%	-3%	-1%	-1%
Residues of food and tobacco	-5%	-4%	-5%	-5%
Mineral products	0%	0%	0%	0%
Chemical and pharmaceutical products	0%	0%	-1%	-1%
Other organic chemicals	-4%	-1%	-3%	-3%
Other chemicals	-1%	-3%	-1%	-2%
Plastic and rubber	-2%	-2%	-2%	-2%
Raw hides, skins, leather, & furs	-1%	-2%	0%	-2%
Wood and wood products	-1%	0%	-1%	0%
Textiles	-3%	-4%	-4%	-3%
Carpets, footwear, umbrellas	-10%	-11%	-10%	-11%
Stone, glass	-1%	-2%	-1%	-1%
Metals	-1%	-1%	-1%	-1%
Machinery, electrical	-1%	-1%	-1%	-1%
Transportation	-2%	-5%	-3%	-4%
Miscellaneous	-3%	-2%	-6%	-7%
Scenario 1: WTO tariffs				

Table 6: Impact Across Sectors of Scenario 2				
	Ireland to GB	GB to Ireland	Ireland to NI	NI to Ireland
Live animals	-5%	-2%	-21%	-11%
Meat and fish	-54%	-30%	-51%	-35%
Dairy	-48%	-39%	-54%	-65%
Vegetable products	-13%	-17%	-20%	-16%
Products of milling industry, oil, fats	-16%	-24%	-29%	-28%
Foodstuffs	-21%	-22%	-20%	-18%
Beverages	-8%	-9%	-5%	-4%
Residues of food and tobacco	-12%	-11%	-12%	-11%
Mineral products	0%	0%	0%	0%
Chemical and pharmaceutical	0%	0%	-1%	-1%
Other organic chemicals	-4%	-1%	-3%	-3%
Other chemicals	-1%	-3%	-1%	-3%
Plastic and rubber	-2%	-2%	-2%	-3%
Raw hides, skins, leather, & furs	-1%	-2%	0%	-2%
Wood and wood products	-1%	0%	-1%	0%
Textiles	-14%	-15%	-16%	-12%
Carpets, footwear, umbrellas	-18%	-19%	-19%	-19%
Stone, glass	-1%	-2%	-1%	-1%
Metals	-1%	-1%	-1%	-1%
Machinery, electrical	-1%	-1%	-1%	-1%
Transportation	-3%	-5%	-3%	-5%
Miscellaneous	-5%	-3%	-9%	-13%
Scenario 2: WTO tariffs + 0.25*(World Bank NTBs)				

Table 7: Impact Across Sectors of Scenario 3				
	Ireland to GB	GB to Ireland	Ireland to NI	NI to Ireland
Live animals	-11%	4%	-30%	-3%
Meat and fish	-65%	-21%	-62%	-26%
Dairy	-59%	-29%	-66%	-52%
Vegetable products	-20%	-9%	-28%	-8%
Products of milling industry, oil, fats	-24%	-15%	-38%	-19%
Foodstuffs	-29%	-13%	-28%	-10%
Beverages	-14%	-3%	-11%	2%
Residues of food and tobacco	-20%	-4%	-19%	-4%
Mineral products	-5%	5%	-5%	4%
Chemical and pharmaceutical	-6%	5%	-6%	5%
Other organic chemicals	-10%	5%	-9%	3%
Other chemicals	-7%	3%	-7%	3%
Plastic and rubber	-7%	2%	-7%	2%
Raw hides, skins, leather, & furs	-7%	4%	-7%	4%
Wood and wood products	-6%	4%	-6%	4%
Textiles	-22%	-6%	-25%	-3%
Carpets, footwear, umbrellas	-29%	-7%	-30%	-7%
Stone, glass	-5%	3%	-6%	3%
Metals	-7%	4%	-7%	4%
Machinery, electrical	-8%	7%	-8%	6%
Transportation	-11%	4%	-12%	4%
Miscellaneous	-13%	4%	-16%	-6%
Scenario 3: WTO tariffs plus 0.25*(World Bank NTBs) + 10% exchange rate change				

SECTION 5
SECTOR AND PRODUCT LEVEL EFFECTS PROJECTED IMPACT

The importance of the Dairy sector to Northern Ireland can be seen even more clearly in Tables 8 to 10, which identify the four most affected products for each of the four trade directions and the share of the change in total trade that each of these products represent. In Tables 8 and 9, the shares are all of trade reductions, whereas once the exchange rate effect is introduced in Table 10, share of the offsetting trade increase for some trade flows from Northern Ireland and the rest of Britain into Ireland is apparent.

The most striking figure in each of these tables is that a single product explains approximately half of the estimated reduction in trade from Northern Ireland to Ireland. Milk and cream, which accounts for 15% of Northern Ireland's exports, effectively drives the overall estimated effect and explains why the total trade reductions estimated for Northern Ireland are so much larger than for the rest of the UK. Other effected products from Northern Ireland explain no more than 5% of the total estimated fall, emphasising strongly the importance of milk exports.

Exports from Ireland to both Northern Ireland and Great Britain are also relatively concentrated in terms of their exposure to the introduction of tariffs or trade restrictions, with around 40% of the overall effect being accounted for by just four products. They are mainly meat exports with 28% of the fall in trade to Britain being accounted for by fresh or chilled boneless bovine meat in Scenario 1. In the opposite trade direction, imports to Ireland from Britain are relatively more dispersed and in sectors less exposed to the introduction of tariffs with the result that exposure is considerably less concentrated in any individual products – in Scenario 1, the top four products account for 12% of the trade fall, a much smaller share than for the other three trade flow directions.

Table 8: Most Affected Products for Each Trade Direction in Scenario 1	
	Contribution to total change
Ireland to NI	
Carcasses of bovine animals, fresh or chilled	16%
Prepared or preserved meat, offal or blood	15%
Butter	5%
Fresh or chilled bovine meat, boneless	5%
Sum	**41%**
NI to Ireland	
Milk and cream (fat content > 1% but <= 6%, unsweetened)	51%
Fresh or chilled bovine meat, boneless	5%
Wheat or meslin flour	5%
Preparations for animal feeding (excl. dog / cat food)	2%
Sum	**63%**
Ireland to GB	
Fresh or chilled bovine meat, boneless	28%
Cheese (excl. fresh cheese)	9%
Prepared or preserved meat, offal or blood	8%
Frozen, boneless meat of bovine animals	5%
Sum	**50%**
GB to Ireland	
Fresh or chilled bovine meat, boneless	3%
Cheese (excl. fresh cheese)	3%
Bread, pastry, cakes, biscuits	3%
Cane or beet sugar	2%
Sum	**11%**
Scenario 1: WTO tariffs	

Table 9: Most Affected Products for Each Trade Direction in Scenario 2	
	Contribution to total change
Ireland to NI	
Carcasses of bovine animals, fresh or chilled	17%
Prepared or preserved meat, offal or blood	10%
Fresh or chilled bovine meat, with bone	6%
Butter	5%
Sum	**38%**
NI to Ireland	
Milk and cream (fat content > 1% but <= 6%, unsweetened)	47%
Fresh or chilled bovine meat, boneless	4%
Wheat or meslin flour	4%
Preparations for animal feeding (excl. dog / cat food)	4%
Sum	**59%**
Ireland to GB	
Fresh or chilled bovine meat, boneless	28%
Cheese (excl. fresh cheese)	8%
Prepared or preserved meat, offal or blood	6%
Butter	5%
Sum	**47%**
GB to Ireland	
Bread, pastry, cakes, biscuits	4%
Fresh or chilled bovine meat, boneless	3%
Cheese	3%
Chocolate and other preparations containing cocoa,	2%
Sum	**12%**
Scenario 2: WTO tariffs plus 0.25*(World Bank NTBs)	

Table 10: Largest Contribution to Trade Change by Product for Scenario 3	
Products with declining trade	Contribution to total change
Ireland to NI	
Carcasses of bovine animals, fresh or chilled	14%
Prepared or preserved meat, offal or blood	7%
Fresh or chilled bovine meat, boneless	5%
Butter	4%
Sum	**30%**
NI to Ireland	
Milk and cream (fat content > 1% but <= 6%, unsweetened)	56%
Fresh or chilled bovine meat, boneless	5%
Wheat or meslin flour	4%
Preparations for animal feeding (excl. dog / cat food)	2%
Sum	**67%**
Ireland to GB	
Fresh or chilled bovine meat, boneless	21%
Cheese (excl. fresh cheese)	6%
Prepared or preserved meat or offal of bovine animals	4%
Butter	4%
Sum	**35%**
GB to Ireland	
Bread, pastry, cakes, biscuits	5%
Fresh or chilled bovine meat, boneless	4%
Cheese (excl. fresh cheese)	4%
Cane or beet sugar	4%
Sum	**17%**
Products with Increasing trade	Contribution to total increase
NI to Ireland	
Liqueurs and cordials	6%
Medicaments put up in measured doses	3%
Cartons, boxes and cases (corrugated paper/ paperboard)	2%
Structures and parts of structures, of iron or steel	2%
Sum	**13%**
GB to Ireland	
Medium oils of petroleum or bituminous minerals	7%
Natural gas in gaseous state	6%
Medicaments put up in measured doses	3%
Light oils and preparations, of petroleum or bituminous minerals	2%
Sum	**18%**
Scenario 3: WTO tariffs plus 0.25*(World Bank NTBs) + 10% exchange rate change	

6. Conclusions

This paper examines the potential impact of trade between Ireland, Northern Ireland and Great Britain in the case of the application of EU third-country tariffs as registered with the WTO being applied and an increase in non-tariff barriers on goods trade. The scenarios presented are at an extreme end of a continuum of possible outcomes that a future UK-EU trading relationship might take. However, they highlight the large variation in the product and sectoral exposure to changes in tariffs and non-tariff barriers and may therefore be useful in targeting policy. The main findings of the scenario analysis are:

- WTO tariffs are levied on specific product lines and the variation across products can range from 0% to over 80%.
- Products with the highest tariffs are mainly in the food, clothes and tobacco sectors.
- As Irish cross-border trade has considerable agri-food content, higher tariffs would apply in a WTO scenario on Northern Irish trade compared to estimates for the UK as a whole.
- Although a substantial fraction of products would face no tariff, the small percentage of products that would incur tariffs of over 35% in a WTO scenario make up a significant share of cross-border trade.
- We estimate three scenarios - WTO tariffs, WTO tariffs plus non-tariff barrier estimates and a scenario including a 10% change in the exchange rate.
- Applying the WTO tariff schedule to 2016 trade levels is estimated to have an effect of reducing cross-border trade by 9%.
- The importance of non-tariff barriers is highlighted, almost doubling the effect to a 16% reduction in cross-border trade.
- Further exchange rate movement increases the reductions in trade from Ireland to both Northern Ireland and Britain but offsets some of the effect in the other direction. For Northern Ireland, the exchange rate effect reduces the estimated trade fall from tariffs and non-tariff barriers from 19% to 11%.
- The product and sectoral composition of trade play a significant role in terms of exposure to tariffs and non-tariff barriers. Reductions in trade for most sectors other than food are mainly in the range of between two or three per cent.
- The overall effect of tariffs and estimated non-tariff barriers is largely driven by their impact on the food sectors and most particularly in the meat and dairy sectors.
- Looking at products, we find that half of the estimated reduction in trade from Northern Ireland to Ireland comes from the effect of tariffs and non-tariff barriers on milk and cream.
- From Ireland, the overall impact is concentrated in meat exports with 28% of the fall in trade to Britain being accounted for by fresh or chilled boneless bovine meat.

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Appendix A: Inward and Outward Processing and Tariffs

A company based in any Member State can apply for an Inward Processing authorisation which allows products imported from a non-EU country to be processed within the Union. In this case the Customs Duty and VAT on importation of product to be processed is suspended until an end product is produced. If the end product is re-exported to another non-EU country then no duties or VAT are paid in the EU but the exported end product may be subject to duties in the destination country. If the end product is however not re-exported but is released for free circulation within the EU then duties are charged on the value of the end product (The company may opt to be charged on the value of the imported component part but the norm is that the value of the end product is used. A company must state their preference at the time of application.) The end product cannot be re-imported to the EU within 12 months of being exported – if the product is re-imported within that time frame all original import charges will be applied.

Inward Processing authorisations can be granted in relation to agricultural products/food stuffs but there are additional requirements including that the goods may be subject to additional agricultural regulations or standards. A further restriction is that for a set of 'sensitive products' the company applying for the authorisation must be able to prove one of the following:

- Unavailability of the same product, including commercial quality and technical characteristics, at 8-digit CN code level within the EU.
- Differences in price between goods produced in the EU and those intended to be imported, where the price of the comparable EU goods would not make the proposed commercial operation economically viable.
- Contractual obligations where comparable goods do not conform to the contractual requirements of the third country purchaser of the end product.
- The aggregate value of the goods to be placed under the inward processing procedure per applicant and calendar year for each 8 digit CN code does not exceed €150,000.

Sensitive products include meat, eggs, cereals, rice, sugar, olive oil, milk, wine, ethyl alcohol, unmanufactured tobacco and any fishery products subject to an autonomous quota.

Tariff exceptions can also apply to outward trade flows: a company based in the EU can apply for an Outward Processing authorisation allowing goods to be exported to a non-EU country to be processed there. Import duties are charged once the processed product is re-imported to the EU – duties/VAT are levied on the cost of the processing operations carried out in the third country i.e. the value of the end product less the value of the component part exported under the Outward Processing regime. The end product must be re-imported within the time limits set down in the authorisation (the standard period is 6 months but can be more or less).[8]

[8] Full details are available at http://www.revenue.ie/en/customs/businesses/economic/inward-processing.html and http://www.revenue.ie/en/customs/businesses/economic/outward-processing.html

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