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EU-US trade structure and risks

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This paper maps out the trade relationship in goods between the two largest trading blocs in the global economy – the EU and US. We use detailed product category information to provide an in-depth description of current trade flows between the two markets, with a particular focus on how Irish-US trade patterns compare to those of the EU overall. Along with the overall size of the trade flows, we highlight the extent of diversification in terms of the number of products particularly dependant on the US market. We then examine the structure of current bilateral tariff rates and how these vary across product types. This is done at the most granular level possible, using the product level trade flows compiled by the United Nations and matching them to current tariff levels. This structure is then used to assess potential changes proposed to these tariffs, using the US June 2020 tariff announcement and EU retaliation as illustrations.

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1. Introduction

Ireland is one of the most open countries to international trade in the world and this has underpinned a considerable portion of our economic growth across several decades. This openness brings some vulnerability, however, with changes in the international trading environment impacting Ireland very directly. Moreover, increases in trade tensions and trade protectionism could exert downward pressure on Irish economic growth.

As a small open economy Ireland has benefited from increased globalisation and the removal of barriers to trade over recent decades. This openness to trade has been a key factor in the improvement in living standards and employment since the 1990s. Ireland's connection to the US and membership of the EU single market have both been crucial in that regard. However, in recent years there has been growing dissatisfaction with globalisation evident in political discourse across many countries. In particular, the emergence of trade tensions with China have generated political pressure for greater protectionism within the US. There has also been some increase in trade tensions between the US and the EU with an announcement of additional tariffs applied to imports into the US from the EU in retaliation for a long-running trade dispute regarding airplane production.[2] While the trade disagreement between the US and the EU is currently relatively minor, there is a risk that continued actions on both sides may result in the further retaliatory imposition of tariffs and other barriers to trade. Any increases in trade tensions between the EU and US risks slowing growth in two of Ireland's key export markets, representing the export destinations of two-thirds of Irish goods exports in 2019.

Within the US, the President has reasonably significant power in matters of international trade. The Trade Act of 1974 stipulates that the President of the US can increase tariffs up to 15% for a period of 150 days against countries with large balance-of-payments surpluses (Devereaux Lewis, 2016).[3] The current average US import tariff is approximately 2.1 per cent which gives a considerable margin for increases in protectionism. In their analysis, Vandenbussche et al. (2017) consider a scenario whereby US import tariffs are increased to 15 per cent across all sectors. They treat this as an upper bound for the protectionist measures that might be taken by the US administration in an analysis of exposure to trade policy changes for Belgium. They also consider a more modest increase in tariffs to bring them up to 5% in every sector, which they argue would be more plausible. Overall, they find that the export

[2] The full enforcement list of products from the US government is here: https://ustr.gov/sites/default/files/enforcement/301Investigations/Review_of_Action_Enforcement_of_U.S._WTO_Rights_in_Large_Civil_Aircraft_Dispute_June_23_2020.pdf and discussion of the Irish products affected is covered here: https://www.rte.ie/news/business/2019/1010/1082396-362m-worth-of-irish-goods-face-25-tariff-in-the-us/

[3] Some of the tariffs in retaliation for the airplane dispute reached 25% but this was agreed with WTO for specific case and were not under the general power of the 1975 Act.

value that will be lost ranges between 5 and 24 per cent, depending on the extent of the US import tariff increase.

As mentioned previously, over the last year or so there has been an escalation of trade tensions between the US and EU. Last year, the US imposed import tariffs on a range of exports from the EU while the EU has recently, in November 2020, imposed import tariffs on a range of exports from the US. The dispute relates to a longstanding issue surrounding aircraft subsidies. In 2006, the US filed a case with the World Trade Organisation (WTO) claiming that the aircraft manufacturer Airbus had received $22 billion in subsidies. The EU responded with a counter case alleging that Boeing had received $23 billion in subsidies in the US. Over the interim years, the WTO has ruled that both sides unfairly subsidised their aircraft makers.

In 2018, the WTO's appeal body upheld a 2016 ruling that the EU had supported Airbus with subsidised loans for the development of new aircraft which amounted to subsidies. Ruling on the US sanctions request, the WTO in October 2019 allowed the US to impose tariffs on up to $7.5 billion worth of EU goods. After this, the US imposed tariffs of up to 25% on some EU products. The list was modified in February 2020, increasing the tariff on aircraft from 10 per cent to 15 per cent, and again in June 2020, with additional product lines under consideration for increased import tariffs by the US (see annex 2 and annex 3 in the Federal Register). Last year, the WTO ruled that the favourable subsidies and supports provided by the US to Boeing had hurt Airbus sales. As a result, in November 2020, the WTO allowed the EU to impose tariffs of up to $4 billion on US goods and a range of tariff increases was announced by the European Commission.[4]

This paper examines the potential direct exposure to Ireland and other countries across the EU of increases in US import tariffs.[5] This will be done at the most granular level possible, using the product level trade flows compiled by the United Nations and matching them to current tariff levels. This data is available at a very detailed level, covering approximately 5,200 product codes. This allows us to provide a description of current trade flows, highlighting where products are particularly dependent on the US market and categorising them by current tariff level. We then use this data structure to generate a broad counterfactual scenario of exposure to increases in tariffs across the entire product range.

[4] The announcement statement is https://ec.europa.eu/commission/presscorner/detail/en/IP_20_2048 and the preliminary list of products being considered for tariff increases is detailed at https://trade.ec.europa.eu/doclib/docs/2019/april/tradoc_157861.pdf. The final list of products subject to import tariffs is detailed at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:L:2020:373:TOC

[5] We only consider tariffs imposed on goods in this analysis. The proposed Tariff Schedule in the Federal Register announced in June 2020 only considers goods imports. This tariff schedule was published in April 2019 and subsequently updated in July 2019, December 2019 and June 2020.

The US is a key trading partner for the EU representing approximately one-fifth of EU exports and 13 per cent of overall imports to the rest of the world but a large degree of heterogeneity exists across countries. In particular, 28 per cent of Ireland's exports to the rest of the world are destined for the US while 17 per cent of its imports originate from the US, though much of this trade is influenced by large US multinational enterprises currently based in Ireland. As a key trading partner, the EU is particularly vulnerable to any increase in US import tariffs.

Taking account of overall trade between the EU and US, average tariffs applied at present in both directions are relatively low. The average EU-28 tariff on goods imported from the US is 1.7 per cent while the US tariff on goods sourced in the EU is slightly lower at 1.6 per cent. Irish trade with the US encounters tariffs just below the EU average, with an average rate of 1.5 per cent on imports from the US and 1.3 per cent on exports to the US. By linking the product-level trade data with the new US import tariff schedule, we find that the product lines affected by the tariff announcement in the Federal Register in June 2020 are primarily in three sectors – with almost all export trade in the dairy sector affected and over 40 per cent of the beverages and milling sector products incurring tariff increases. The size of the increase is most significant in the beverages sector where tariffs increase by 10.5 percentage points from 0.76 per cent to 11.32 per cent.

For the EU-28 overall, the relevant products account for 3.7 per cent of current exports to the US and the tariffs being applied to total trade would increase from 1.6 per cent to 2.31 per cent. In monetary terms, this would translate into an increase in tariffs due of €2.8 billion. The share of trade from Ireland to the US is also one of the larger exposures at 4 per cent of trade. This would result in an increase in tariff payments of €277 million if no reduction occurred in the volume of exports. Combining the tariff increases with sector level trade elasticities estimated by Imbs and Mejean (2016) suggests that if all of the tariff was passed into prices, trade between the EU-28 and US would fall by 3.7 per cent (equivalent to 0.7 per cent of the EU's total external trade). Some countries, such as Greece and Cyprus, would see much larger reductions in trade with the US. The effect of the June 2020 tariffs on Ireland could see a reduction of approximately 4 per cent on exports to the US (1 per cent of total Irish exports) accounted for primarily by falls in beverages exports. This paper examines the impact of US import tariffs on EU goods which are currently under consideration and are outlined in annex 2 and 3 in the June 2020 Federal Register. The paper also examines the impact of increases in EU import tariffs on goods imported from the US.

The rest of the paper is structured as follows. Section 2 examines the trade flow of goods between the European Union and the US. Section 3 examines the exposure of each EU country to US trade. Section 4 presents the current tariff structure on goods trade between the EU and US. Section 5 examines

how the potential changes in US tariffs on EU products outlined in June 2020 and how these are distributed across countries and sectors across the EU. Section 6 estimates how these tariff levels could impact export trade flows. Section 7 looks at the potential size of retaliatory EU tariffs on imports from the US. Finally, section 8 concludes.

2. Total goods trade flows between EU and US

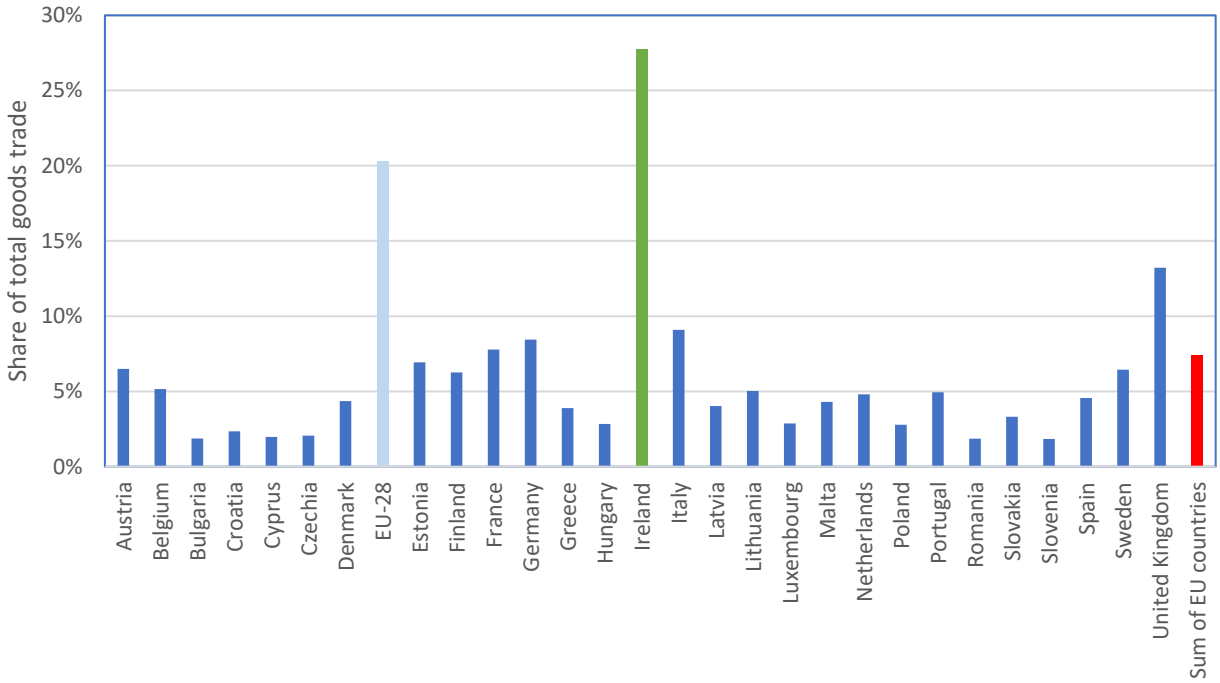
In this section, we examine the extent of the trade relationship between the US and each EU member state, using data on trade in goods for 2018 from the United Nations ComTrade database. The US accounts for approximately one-fifth of the exports from the EU-28 to the rest of the world, as shown in Figure 1.[6] This makes the US the largest individual trade partner for the EU-28 bloc, when focusing on trade outside the EU itself. For individual EU member states, Figure 1 shows the share of exports to the US as a proportion of their total exports, which includes exports to other EU countries. Measured in this way, the average share of the US in exports across member states is 7 per cent, reflecting the importance of intra-EU trade for most member states.

Considerable variation is evident in Figure 1 in the share of country exports going to the US. Ireland stands out quite substantially with the US accounting for 28 per cent of goods exports in 2018. For the majority of individual countries in the EU, this share is below 5 per cent. The share tends to be smallest for countries in central and eastern Europe. The larger member states such as France, Germany and Italy send approximately 8 per cent of their goods exports to the US with the share from Spain being slightly lower at just under 5 per cent.

Figure 2 presents the variation in the share of imports from the US in total imports across the EU. The US accounts for 13 per cent of overall EU-28 imports from outside of the EU. For most member states, the US accounts for a relatively smaller share of imports than it did of exports. Ireland again stands out as the most closely connected with the US in terms of trade with 17 per cent of imports originating in the US. The UK and Netherlands have the next highest shares of import accounted for by the US (9 and 8 per cent respectively) while Germany and France source approximately 6 per cent of their goods imports from the US.

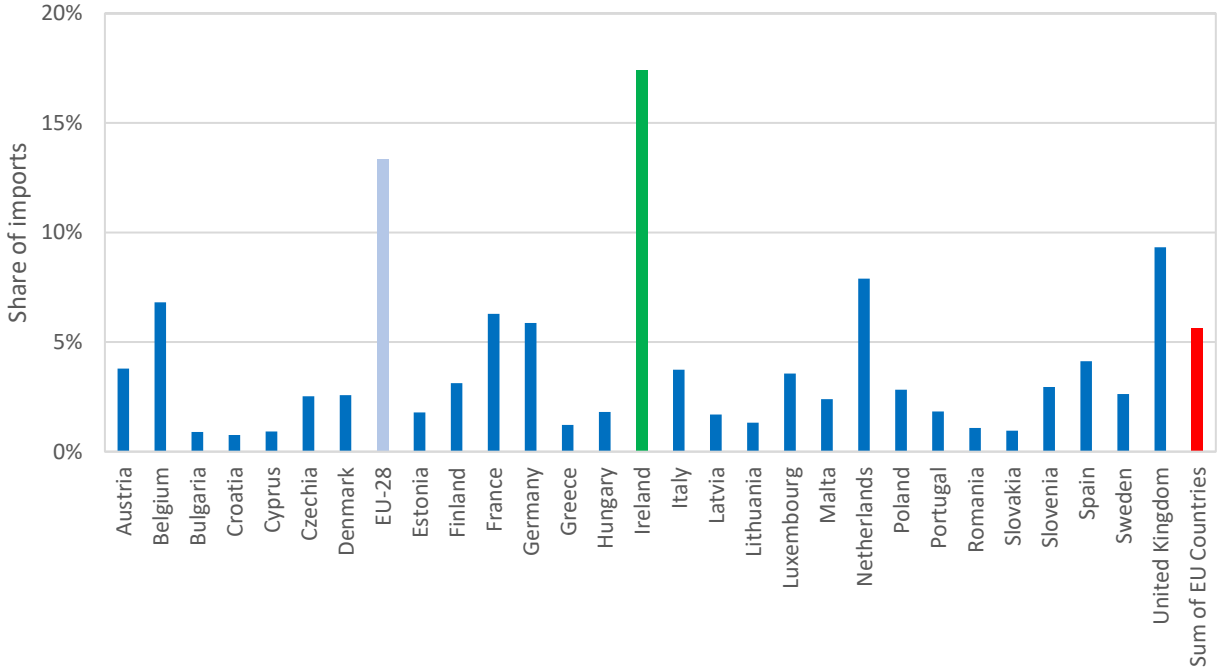
[6] As the trade data relates to 2018, the United Kingdom is included in the EU aggregate data. We do not take into account any changes to UK tariffs that may be implemented after the end of the Brexit transition period.

FIGURE 1: EXPORTS TO US AS SHARE OF TOTAL EXPORTS



Source: Authors calculations using UN ComTrade data for 2018. Note: EU-28 bar represents share of US in trade with non-EU countries whereas individual country bars and sum of EU countries includes trade with other EU members.

FIGURE 2: IMPORTS FROM US AS SHARE OF TOTAL IMPORTS



Source: Authors calculations using UN ComTrade data for 2018. Note: EU-28 bar represents share of US in trade with non-EU countries whereas individual country bars and sum of EU countries includes trade with other EU members.

The shares accounted for by the US in both exports and imports for Ireland are considerably greater than those of any other EU member. Table 1 shows how the sectoral structure of Irish trade compares with that of the EU-28 aggregate. In both directions of trade, we find that Irish-US trade is quite strongly concentrated in a single sector compared to the level of dispersion in overall EU-US trade.

The share of Irish exports to the US in the chemicals and pharmaceutical sector is particularly dominant, making up almost two-thirds of total Irish exports to the US, likely reflecting the influence of US-owned multinational firms in this sector. While we focus solely on goods trade in this paper, the relationship between trade and investment flows, particularly in the pharmaceutical sector, are clearly important for Irish trade with the US and also at an aggregate level and these overlapping linkages would be worth more detailed analysis.

In contrast to the pattern for Ireland, chemicals and pharmaceuticals make up under 20 per cent of total EU-28 exports to the US. Machinery and electrical equipment and transportation are two of the largest export sectors for the EU-28 to the US but account for a relatively small share of Irish-US exports.

In the other direction, the share of the chemical and pharmaceutical sector in Irish imports from the US is similar to the EU-28 average. The main deviation in the structure of imports across sectors is the large share accounted for by transportation in Ireland compared to the EU overall with close to half of Irish imports from the US coming from transport products, specifically imports of aeroplanes.

TABLE 1: SECTORAL STRUCTURE OF TOTAL EU GOODS TRADE WITH THE US

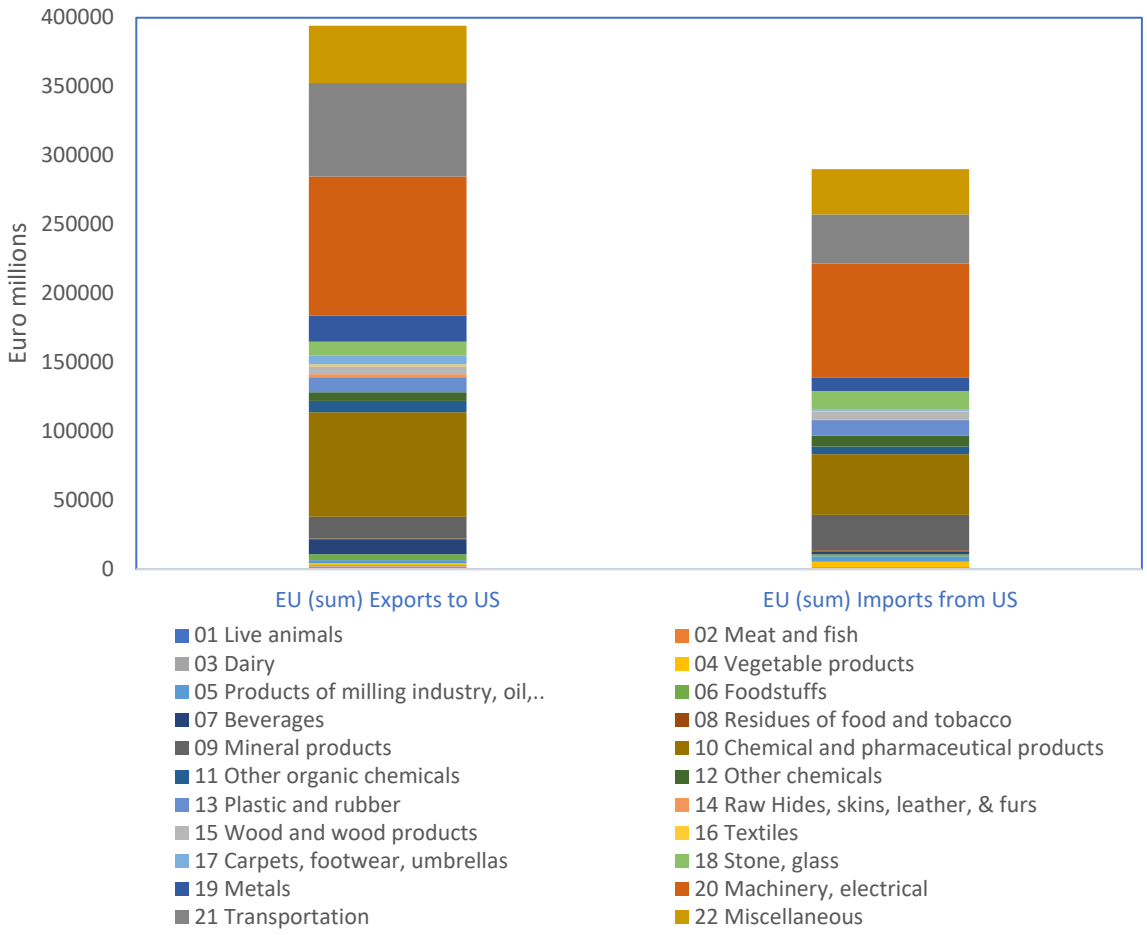
	Exports to US		Imports from US	
	Ireland	**EU**	**Ireland**	**EU**
Live animals	0.04%	0.11%	0.16%	0.04%
Meat and fish	0.08%	0.38%	0.01%	0.46%
Dairy	0.52%	0.29%	0.02%	0.02%
Vegetable products	0.01%	0.35%	0.05%	1.33%
Products of milling industry, oil	0.02%	0.54%	0.32%	1.37%
Foodstuffs	0.13%	1.08%	0.23%	0.51%
Beverages	1.57%	2.78%	0.11%	0.58%
Residues of food and tobacco	0.03%	0.11%	1.17%	0.42%
Mineral products	0.27%	4.01%	2.70%	8.85%
Chemical and pharmaceutical products	65.93%	19.24%	17.50%	15.18%
Other organic chemicals	5.82%	2.09%	1.27%	1.89%
Other chemicals	0.85%	1.58%	2.12%	2.70%
Plastic and rubber	0.61%	2.76%	2.93%	3.92%
Raw Hides, skins, leather & furs	0.01%	0.58%	0.02%	0.19%
Wood and wood products	0.02%	1.44%	0.59%	1.83%
Textiles	0.05%	0.33%	0.11%	0.31%
Carpets, footwear, umbrellas	0.05%	1.68%	0.13%	0.38%
Stone, glass	0.21%	2.51%	1.01%	4.56%
Metals	0.33%	4.79%	1.52%	3.30%
Machinery, electrical	6.57%	25.61%	14.42%	28.57%
Transportation	2.21%	17.22%	47.97%	12.28%
Miscellaneous	14.69%	10.54%	5.62%	11.31%
Total	100%	100%	100%	100%

Source: Authors calculations using UN ComTrade data for 2018.

Figures 3 and 4 also represent the sectoral structure of EU and Irish trade (respectively) with the US. The figures show the absolute values of the trade flows for both exports and imports in each case to illustrate the trade balance as well as the relative shares of different sectors. The EU exported €394 billion of goods to the US in 2018 and imported goods worth €290 billion. The machinery and electrical

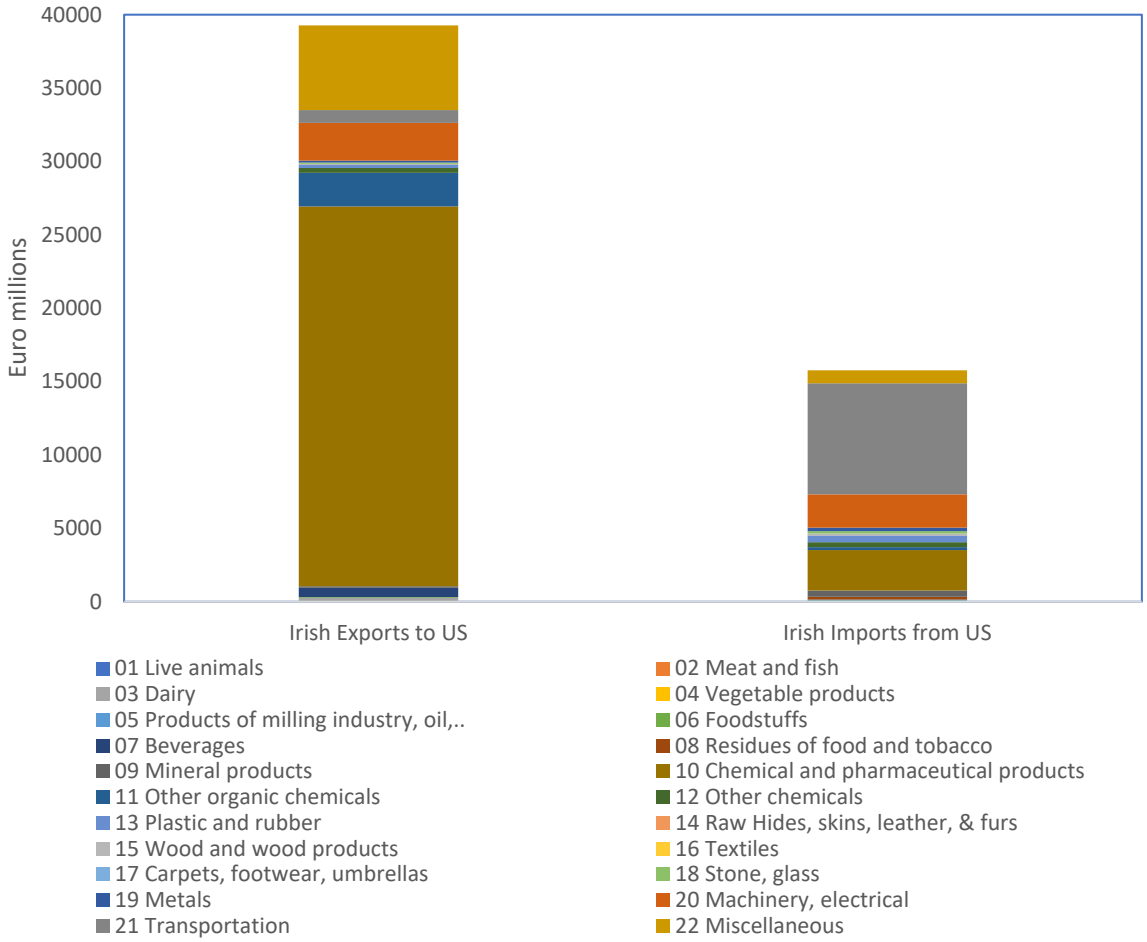
sector, transport and miscellaneous products (which are mainly consumer products) are the largest sectors in both directions. Irish exports to the US amounted to over €39 billion in 2018 compared to imports of €15.8 billion. Figure 4 shows clearly the sectoral concentration of exports in the chemicals and pharmaceutical sector and concentration of imports in transportation equipment.

FIGURE 3: SECTORAL STRUCTURE OF TOTAL EU GOODS TRADE WITH THE US



Source: Authors calculations using UN ComTrade data for 2018.

FIGURE 4: SECTORAL STRUCTURE OF IRISH GOODS TRADE WITH THE US



Source: Authors calculations using UN ComTrade data for 2018.

Table 2 shows how important the US is as an export and import partner for trade in each sector for the EU-28 total and Ireland as a share of total world trade. The final row reflects the total share of Irish and EU trade with the US as shown earlier in Figures 1 and 2. This shows that the US accounts for 28% of Irish exports and that chemical and pharmaceutical exports to the US make up the bulk of this as noted in the sectoral shares previously. However, this table provides a rescaling of the flows which shows that this sector is not only a major share of Irish exports to the US but that the exports of this sector to the US make up a substantial proportion (18%) of *total* Irish goods trade. No other individual sector's trade with the US makes up such a substantial proportion of an EU country's world trade.

TABLE 2: SHARE OF US IN IRISH AND EU TOTAL WORLD TRADE BY SECTOR

	Exports		Imports	
	Ireland	**EU-28**	**Ireland**	**EU-28**
Live animals	0.01%	0.02%	0.03%	0.01%
Meat and fish	0.02%	0.08%	0.00%	0.06%
Dairy	0.14%	0.06%	0.00%	0.00%
Vegetable products	0.00%	0.07%	0.01%	0.17%
Products of milling industry, oil	0.01%	0.11%	0.06%	0.19%
Foodstuffs	0.04%	0.22%	0.04%	0.06%
Beverages	0.44%	0.56%	0.02%	0.08%
Residues of food and tobacco	0.01%	0.02%	0.20%	0.06%
Mineral products	0.07%	0.78%	0.47%	1.30%
Chemical and pharmaceutical products	18.30%	4.01%	3.05%	1.91%
Other organic chemicals	1.61%	0.42%	0.22%	0.24%
Other chemicals	0.24%	0.32%	0.37%	0.34%
Plastic and rubber	0.17%	0.56%	0.51%	0.49%
Raw Hides, skins, leather, & furs	0.00%	0.12%	0.00%	0.03%
Wood and wood products	0.01%	0.29%	0.10%	0.26%
Textiles	0.01%	0.07%	0.02%	0.04%
Carpets, footwear, umbrellas	0.01%	0.33%	0.02%	0.05%
Stone, glass	0.06%	0.51%	0.18%	0.66%
Metals	0.09%	0.98%	0.26%	0.45%
Machinery, electrical	1.82%	5.18%	2.51%	3.84%
Transportation	0.61%	3.46%	8.35%	1.69%
Miscellaneous	4.08%	2.12%	0.98%	1.40%
All sectors	**27.76%**	**20.27%**	**17.41%**	**13.33%**

Source: Authors calculations using UN ComTrade data for 2018.

The previous tables showed the shares of total trade accounted for by the US and how this is spread across sectors. Table 3 next calculates how reliant each individual sector is on the US by comparing the sector's exports (or imports) to the US to total exports (or imports) of that sector by Ireland and by the EU-28. This shows that the US is a particularly dominant market for a number of sectors but

that this varies considerably, particularly for Ireland with some sectors reporting very small shares of total exports going to the US. We noted earlier that Irish exports to the US are significantly dominated by the chemicals and pharmaceuticals sector. Table 3 shows that for Irish exports by this sector, slightly more than one-third go to the US. The Irish export sector most reliant on the US market is beverages, with almost 43 per cent of the sector's exports sold in the US. Some other sectors, such as vegetable products or wood products, have close to no reliance on the US as a market for their exports.

TABLE 3: SHARE OF US TRADE RELATIVE TO SECTOR TOTAL

	Exports		Imports	
	Ireland	**EU**	**Ireland**	**EU**
Live animals	3.7%	14.7%	9.9%	54.9%
Meat and fish	0.7%	8.7%	0.1%	3.6%
Dairy	7.9%	10.5%	0.4%	3.8%
Vegetable products	1.4%	8.3%	0.6%	7.9%
Products of milling industry, oil	4.3%	17.0%	7.4%	17.2%
Foodstuffs	1.7%	12.1%	1.4%	6.7%
Beverages	42.8%	35.3%	2.0%	23.6%
Residues of food and tobacco	3.4%	4.4%	16.7%	8.8%
Mineral products	6.2%	13.6%	6.7%	6.2%
Chemical and pharmaceutical products	34.9%	36.0%	18.2%	27.9%
Other organic chemicals	28.2%	15.9%	9.5%	22.2%
Other chemicals	8.1%	17.8%	27.1%	33.4%
Plastic and rubber	15.4%	15.4%	15.4%	15.6%
Raw Hides, skins, leather, & furs	1.4%	12.8%	1.5%	3.3%
Wood and wood products	1.0%	12.7%	5.4%	16.8%
Textiles	10.7%	10.8%	12.1%	5.1%
Carpets, footwear, umbrellas	4.4%	13.8%	0.8%	0.9%
Stone, glass	17.3%	11.0%	16.5%	16.6%
Metals	9.7%	17.4%	9.1%	7.2%
Machinery, electrical	16.9%	20.4%	16.1%	15.8%
Transportation	16.3%	22.5%	30.7%	24.2%
Miscellaneous	38.6%	19.4%	13.8%	15.2%

Source: Authors calculations using UN ComTrade data for 2018.

3. Diversification and concentration

In the previous section, we profiled the sectoral structure of trade between the US and both the EU aggregate and Ireland. In this section, we look at the extent of diversification or concentration of these trade flows at a more granular level by looking at measures of concentration and ranking at the product level. The United Nations ComTrade database provides trade flow information on over 5000 individual products (defined at the 6-digit level of Harmonised System (HS) trade classification). Here, we look at two measures of product concentration. The first method is to look at the share of the largest individual product line and the share of the top ten products in total exports to the US and benchmark this against the same shares in total world trade for each EU member. This gives us a simple and intuitive sense of how trade is concentrated but has the disadvantage of using only a small portion of the product line information. The second method is to calculate a more formal concentration index which uses information on all of the products – the Hirshmann-Herfindahl Index (HHI).

Table 4 presents the first metric of concentration, showing the share of exports to the US by each EU member state accounted for by the single largest product line and by the ten largest products. The same calculation is also done for total world trade of each country to establish if exports to the US are more or less concentrated than would be expected by the overall export structure of each country. For EU-28 aggregate trade outside of the EU (i.e. not including intra-EU flows), the largest product line makes up 7 per cent of exports to the US and the top ten products contribute 26 per cent of total exports. The world export equivalents are 3.3 per cent and 4 per cent respectively, showing much greater concentration of US trade in a smaller group of products. That the type of products exported to an individual country would be narrower than those of the country's overall trade structure is unsurprising but the extent to which a very small number of product lines dominate exports to the US for many EU countries is nonetheless striking.

In general, smaller countries appear to have a greater degree of concentration in top products whereas larger countries export a more diversified range of products. Ireland by this measure falls somewhere in the middle, more concentrated than most of the larger countries but not to the same degree as many of the other smaller member states. The largest individual product line for Ireland makes up 14 per cent of exports to the US and the top ten account for 66 per cent of total exports, almost all of which are in the chemical and pharmaceutical sector. In contrast, the largest individual product accounts for less than one per cent of total Irish world exports.

TABLE 4: CONCENTRATION OF EXPORTS TO US IN TOP AND TOP TEN PRODUCTS

	Share of exports to US		Share of exports to World	
	Top product	**Top 10 products**	**Top product**	**Top 10 products**
Austria	9%	41%	5.3%	7%
Belgium	17%	51%	1.5%	3%
Bulgaria	8%	44%	4.1%	20%
Croatia	31%	72%	1.8%	8%
Cyprus	46%	88%	4.5%	9%
Czechia	4%	23%	0.8%	2%
Denmark	5%	23%	11.0%	14%
Estonia	36%	78%	3.6%	9%
EU-28	7%	26%	3.3%	4%
Finland	15%	46%	9.3%	14%
France	7%	40%	2.4%	4%
Germany	12%	30%	4.2%	6%
Greece	14%	64%	2.7%	6%
Hungary	17%	43%	3.6%	6%
Ireland	14%	66%	0.8%	2%
Italy	6%	28%	2.0%	3%
Latvia	63%	81%	2.2%	12%
Lithuania	62%	83%	2.2%	7%
Luxembourg	17%	62%	3.3%	9%
Malta	44%	77%	2.1%	8%
Netherlands	10%	34%	0.5%	1%
Poland	13%	35%	0.5%	3%
Portugal	25%	48%	0.9%	4%
Romania	8%	41%	3.2%	7%
Slovakia	71%	80%	0.5%	3%
Slovenia	6%	33%	1.3%	5%
Spain	11%	30%	0.3%	2%
Sweden	12%	36%	4.3%	8%
United Kingdom	8%	38%	4.3%	5%

Source: Authors calculations using UN ComTrade data for 2018.

In contrast, the HHI measure uses all of the available product data to create another metric of concentration. This index is commonly used for measuring competition amongst firms by aggregating market shares and we apply the same concept to measure concentration in product shares of exports

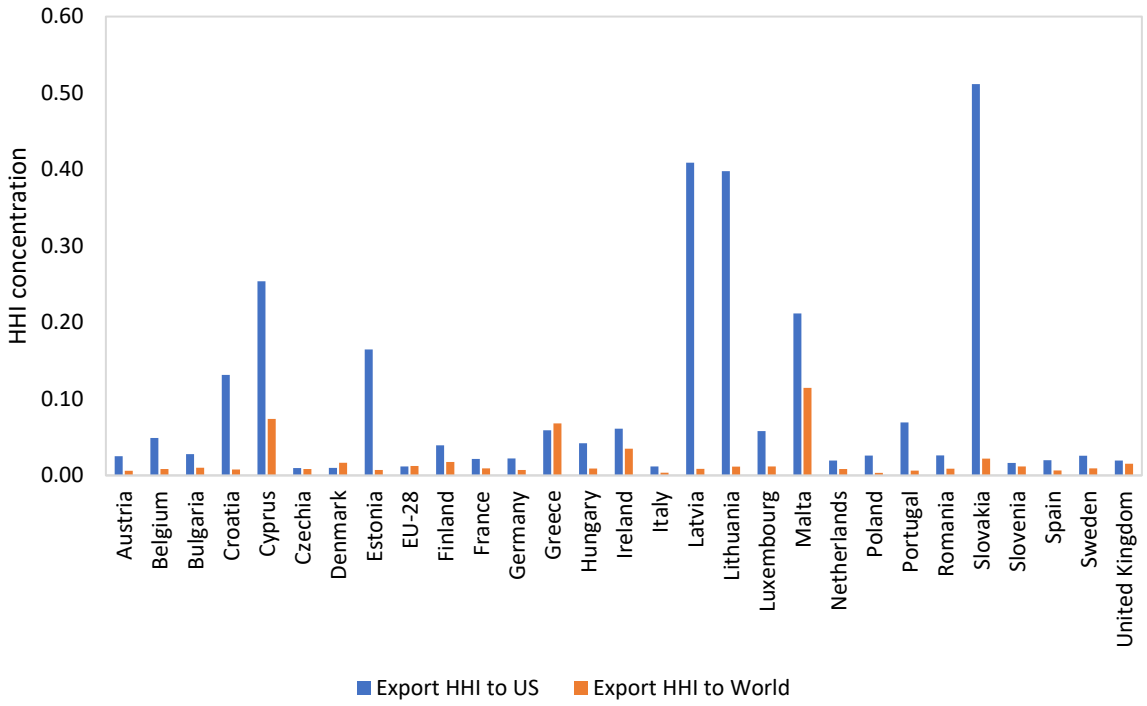
in this context. The index is the sum over all products of the squared market share of each product. The index is expressed as:

$$HHI = \sum_{i=1}^{N} s_i^2$$

Where s_i is the market share of product i and the total number of products range from i = 1,…N. By squaring the product shares, greater weight is attached to large values. The index ranges from almost zero, where all products would have equal market shares (and hence very small individual values) to one, where a single product accounts for all trade. In order to provide a comparison value, we calculate the HHI both for each country's trade with the US and also its total world trade. Figure 5 presents the HHI values for each country's exports and Figure 6 shows the equivalent calculations for imports. Similar to the results for the top product shares, we find that product concentration is greater when looking at trade with the US compared to the level of overall diversification in each country's exports or imports.

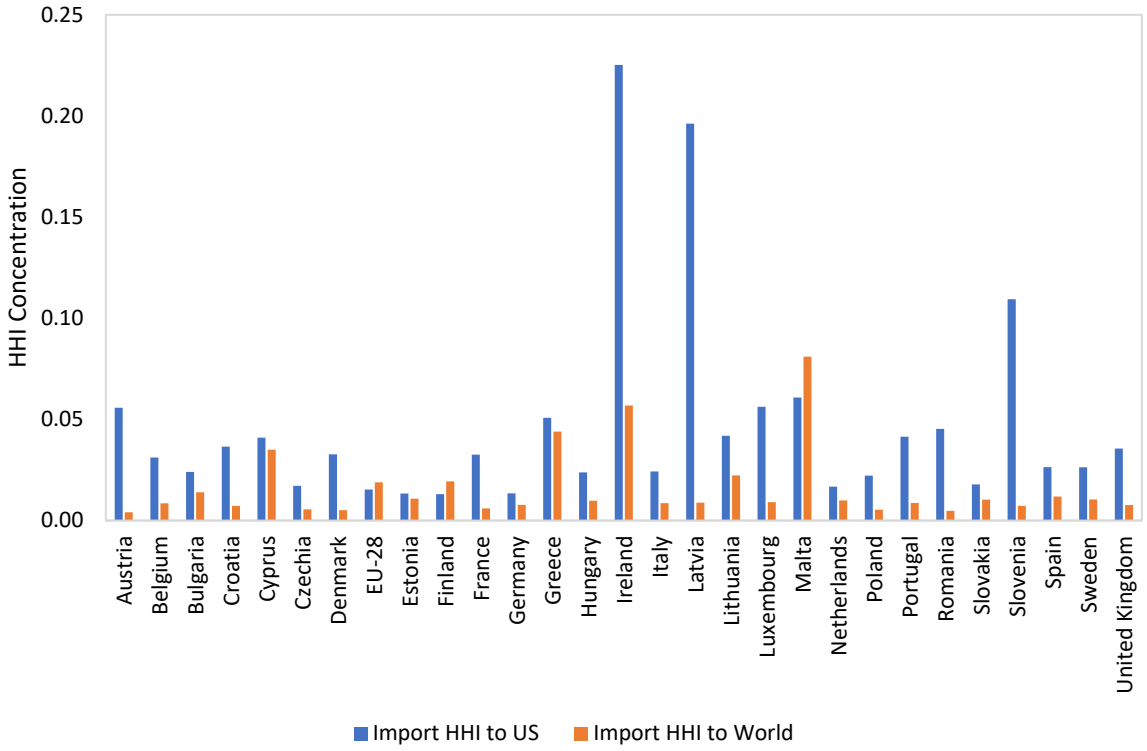
Ireland has the ninth highest HHI measure of export concentration to the US among EU member countries at 0.06, which is double the concentration of total Irish exports (0.03). A small number of countries (Slovakia, Latvia and Lithuania) have HHI measures over 0.4 indicating a very strong degree of concentration in a few products. In terms of imports from the US, Ireland has the most concentrated import structure, with an HHI value of 0.23. Only Latvia (0.2) and Slovenia (0.11) also have values greater than 0.1. In contrast, the HHI index for overall Irish imports is 0.6. This much higher import concentration figure is due largely to the high share of one specific product "Aeroplanes and other aircraft; of an unladen weight exceeding 15,000kg" which made up 47 per cent of Irish imports from the US in 2018.

FIGURE 5: CONCENTRATION OF EXPORTS TO US RELATIVE TO TOTAL EXPORT CONCENTRATION (HHI)



Source: Authors calculations using UN ComTrade data for 2018.

FIGURE 6: CONCENTRATION OF IMPORTS FROM US RELATIVE TO TOTAL IMPORT CONCENTRATION (HHI)



Source: Authors calculations using UN ComTrade data for 2018.

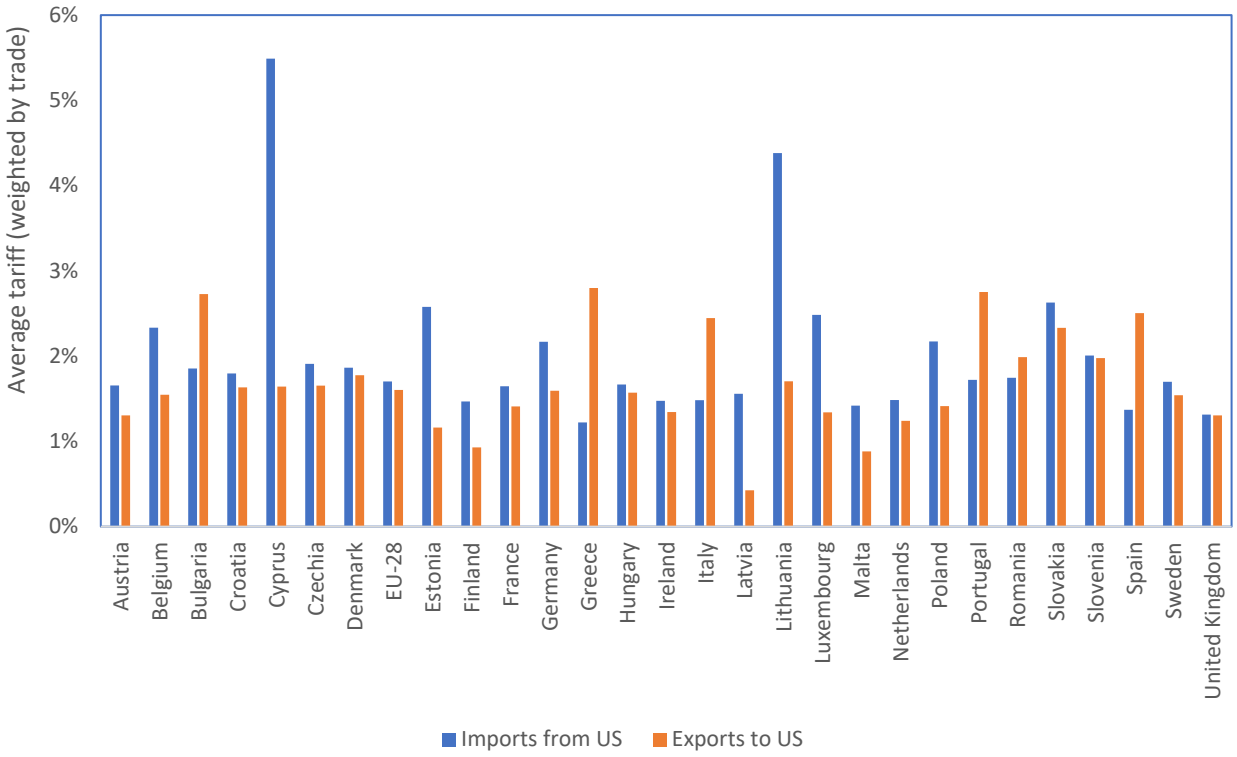
4. Tariff structure and variation across products

This section turns to the current tariff structure on trade between the EU and US. We compare ad-valorem equivalents of tariffs across the full range of traded products described above sourced from the trade data hub *Market Access Map.* Ad-valorem equivalents combine tariffs based on a percentage of the value of the goods traded and any tariffs based on quantities or other measures. As we will see in the next section on exposure to changes in these tariffs, one limitation to be borne in mind is that some tariffs may be applied to goods at a finer degree of granularity than the trade data allows us to map (specific varieties of a food product for example). However, the 5000 products detailed in the trade data gives us a great deal of detail on the structure of trade and tariffs between the EU and US.

Figure 7 compares the implied tariffs on trade applied by the EU on US imports and those applied by the US on EU exports to the US.[7] The variation across countries comes from the weighting of tariffs by the share of each product in the country's trade. Higher values, therefore, reflect that more trade is concentrated in the specific products and sectors with higher tariff rates applied and the variation across sectors is shown in Figure 8. Taking overall trade between the EU and US, average tariffs applied in both directions are relatively low. The average EU-28 tariff on goods imported from the US is 1.7 per cent while the US tariff on goods sourced in the EU is slightly lower at 1.6 per cent. Irish trade with the US encounters tariffs just below the EU average, with an average rate of 1.5 per cent on imports from the US and 1.3 per cent on exports to the US. The reason for this can be seen in the sectoral structure of tariffs in Figure 8 (aggregated to a 2-digit sector level). Here we find that there is a zero rate of tariffs on pharmaceutical products (both for imports and export), which was earlier found to be the dominant sector for Irish exports to the US. Ireland's largest import category from the US, aircraft, also incurs a relatively low tariff in the EU schedule of rates at 1.3 per cent.

[7] EU member states all fall under World Trade Organisation (WTO) Most Favoured Nation (MFN) tariffs with respect to trade with the US.

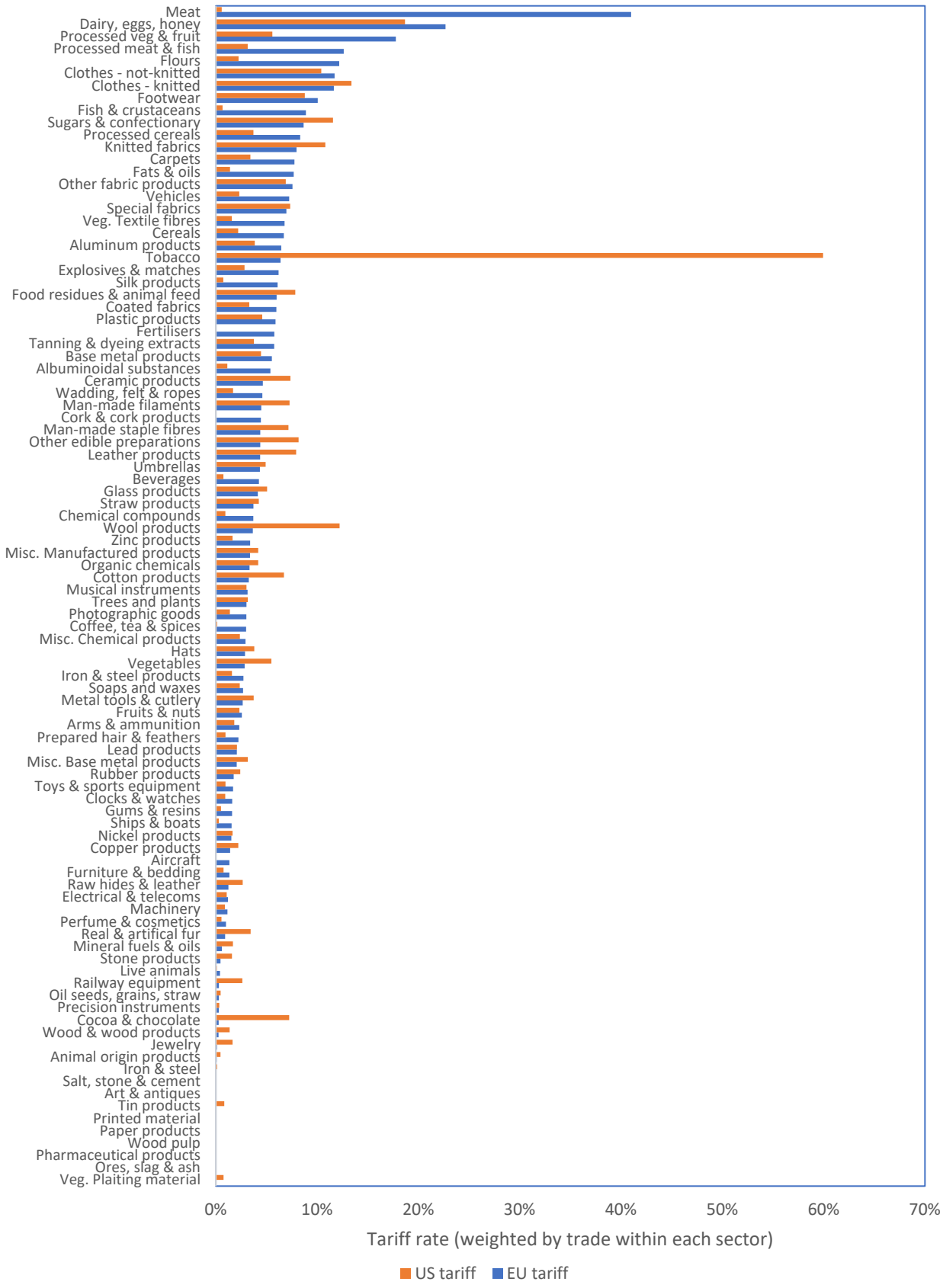
FIGURE 7: IMPLIED TARIFFS ON EU-US TRADE (WEIGHTED AVERAGE BY COUNTRY)



Source: Authors calculations using Market Access Map.

When we look at the tariff schedules by sector, the most striking aspect is that the EU tariff rates are quite substantially higher in food sectors, a feature noted in the context of Brexit by Lawless and Morgenroth (2019). This graph also reflects only the tariff rate being applied and not any other restrictions that may apply to trade, such as agricultural standards. Rates across manufactured products are generally considerably lower and, in most cases, not dramatically different between the EU and US. For example, the EU applies an average rate of 1.2 per cent on machinery and the US applies a rate of 0.9 per cent.

FIGURE 8: IMPLIED TARIFFS ON EU-28-US TRADE BY SECTOR



Source: Authors calculations using UN ComTrade data for 2018 and tariffs from Market Access Map.

The variation in tariff rates shown in Figure 8 reflects sectoral averages across groups of products but there can also be reasonably considerable variation in tariffs applied even within these narrow sectors. The composition of trade is therefore an important factor in the tariff actually incurred by each country. Another way to reflect this and to take into account the trade as well as tariff structure is to examine the share of trade that falls into different tariff ranges. We therefore divide the tariffs into seven groups, ranging from zero rates to product lines with tariffs greater than 50 per cent. We then calculate the share of product lines (based on a count of HS trade codes) and the share of trade value that fall into each tariff bucket. Table 5 presents these calculations for overall trade between the EU-28 and the US and Table 6 does the same for Irish-US trade.

Table 5 shows that the EU applies a zero tariff rate to 24 per cent of product lines and a rate lower than 3 per cent to a further 22 per cent of products. These account for 44 per cent and 37 per cent of trade values. This leaves 18.3 per cent of US imports to the EU facing tariffs greater than 3 per cent. Likewise EU exports to the US are concentrated in low tariff products with just over half of exports encountering no tariffs and a further 32 per cent facing tariffs below 3 per cent. At the other end of the range, the EU applies tariffs at rates over twenty per cent to around 4.6 per cent of product lines from the US but the share of imports these account for is fairly negligible (whether this is due to the higher tariffs or other reasons is not explored here). The pattern of Irish imports from the US across the tariff bands is reasonably similar to the EU average although with a smaller share of trade in the zero rate category and a higher share in the band between zero and 3 per cent (where the main product of aeroplanes falls). Irish exports to the US, with the high concentration of chemicals and pharmaceuticals, have a much greater incidence of zero tariffs being faced.

TABLE 5: DISTRIBUTION OF EU-US TRADE BY TARIFF BANDS

	EU-28 imports from US			EU-28 exports to US	
Tariff band	**Share of products**	**Share of value**		**Share of products**	**Share of value**
0	24.3%	44.2%		38.2%	50.8%
0.1% to 3%	22.1%	37.5%		19.9%	32.4%
3.1% to 6%	20.5%	10.0%		21.8%	12.8%
6.1% to 10%	18.0%	5.2%		9.3%	2.2%
10.1% to 20%	10.5%	3.0%		7.6%	1.5%
20.1% to 50%	2.0%	0.2%		0.8%	0.2%
Over 50%	2.6%	0.0%		2.4%	0.0%
	100.0%	100.0%		100.0%	100.0%

Source: Authors calculations using UN ComTrade data for 2018 and tariffs from Market Access Map.

TABLE 6: DISTRIBUTION OF IRISH-US TRADE BY TARIFF BANDS

	Irish imports from US			Irish exports to US	
	Share of products	**Share of value**		**Share of products**	**Share of value**
0	18.2%	31.8%		28.4%	67.7%
0.1% to 3%	20.1%	57.7%		16.4%	7.4%
3.1% to 6%	16.5%	4.5%		18.6%	23.8%
6.1% to 10%	12.6%	5.2%		7.0%	0.4%
10.1% to 20%	7.7%	0.8%		5.4%	0.7%
20.1% to 50%	1.2%	0.0%		0.7%	0.0%
Over 50%	23.7%	0.0%		23.5%	0.0%
	100.0%	100.0%		100.0%	100.0%

Source: Authors calculations using UN ComTrade data for 2018 and tariffs from Market Access Map.

5. Exposure of EU countries and sectors to US tariff changes

This section examines how the potential changes in US tariffs on EU products outlined in June 2020 would impact countries and sectors across the EU based on the current export structure described throughout the paper. The details of the tariffs are taken from the official *Federal Register* and matched to the best possible degree to the trade data. In many cases, the announced tariffs relate to a finer degree of product definition than the trade data (8-digit products rather than the 6-digit level) so the estimates here err on the side of overestimating the effects as we apply the higher tariff to all 8-digit varieties of our 6-digit level product codes. In the tariff schedule, the individual tariffs are typically only applied to specific countries. However, in this paper we make the assumption that the tariff schedules applies to all EU countries. We then compare the new rate with the existing one and calculate the change this would involve in tariffs due provided that no change occurred in the volumes of trade taking place.

The tariff increases cover a broad range of sectors but are applied to a narrow set of products within each sector – specific types of cheese for example – so the structure of trade has a crucial role to play in how they impact across countries. Table 7 shows the share of exports to the US that are in the product lines affected by the tariff announcement from each EU country and the size of the change on the tariff rate and on tariff charges that would be due. For the EU-28 overall, the relevant products account for 3.7 per cent of current exports to the US and the tariffs being applied to total trade would

increase from 1.6 per cent to 2.31 per cent. In monetary terms, this would translate into an increase in tariffs due of €2.8 billion.

TABLE 7: EXPOSURE TO US JUNE 2020 TARIFF ANNOUNCEMENT ACROSS EU COUNTRIES

	Share of Trade Affected	Current tariff rate	New tariff rate	Absolute change in rate pp	Tariff increase €'000
Austria	2.0%	1.30%	1.72%	0.42	€ 40,526
Belgium	0.5%	1.55%	1.66%	0.12	€ 24,214
Bulgaria	3.0%	2.73%	3.05%	0.32	€ 1,707
Croatia	2.6%	1.63%	2.19%	0.56	€ 1,901
Cyprus	21.3%	1.64%	4.36%	2.72	€ 2,299
Czechia	0.7%	1.65%	1.82%	0.17	€ 6,044
Denmark	5.2%	1.78%	2.86%	1.08	€ 43,318
EU-28	3.7%	1.60%	2.31%	0.71	€ 2,802,657
Estonia	0.2%	1.16%	1.18%	0.02	€ 205
Finland	0.5%	0.93%	0.99%	0.07	€ 2,671
France	9.6%	1.41%	3.12%	1.71	€641,802
Germany	2.2%	1.59%	1.96%	0.37	€ 413,932
Greece	17.5%	2.80%	6.38%	3.58	€ 46,538
Hungary	0.3%	1.57%	1.63%	0.06	€ 1,711
Ireland	4.0%	1.34%	2.05%	0.71	€ 277,168
Italy	5.6%	2.44%	3.59%	1.15	€ 484,677
Latvia	0.1%	0.42%	0.44%	0.02	€ 79
Lithuania	0.7%	1.70%	1.75%	0.05	€ 736
Luxembourg	2.6%	1.34%	1.78%	0.44	€ 1,639
Malta	0.1%	0.88%	0.89%	0.01	€ 10
Netherlands	0.9%	1.24%	1.38%	0.14	€ 32,400
Poland	3.9%	1.41%	2.33%	0.91	€ 56,347
Portugal	8.0%	2.75%	4.21%	1.45	€ 45,068
Romania	0.5%	1.99%	2.05%	0.06	€ 772
Slovakia	0.0%	2.33%	2.33%	0.00	€ 103
Slovenia	1.1%	1.98%	2.16%	0.19	€ 1,056
Spain	7.9%	2.50%	4.19%	1.69	€ 214,263
Sweden	0.4%	1.54%	1.62%	0.08	€ 7,097
United Kingdom	3.9%	1.30%	2.18%	0.87	€ 480,548

Source: Authors calculations using UN ComTrade data for 2018, current tariffs from Market Access Map and US June 2020 rates from Federal Register (Vol. 85, No. 124, June 26, 2020).

As the affected products include a number of specialities of Greece and Cyprus, such as olive oil and lemons, these two countries have closer to twenty per cent of their exports to the US affected by the tariff announcement with the average tariffs more than doubling for both of these countries and this is also the case for France despite having a smaller share of product lines affected. The share of trade from Ireland to the US is also one of the larger exposures at 4 per cent of trade affected and a percentage increase in tariffs of 53% (or 0.71 percentage points with absolute values going from a rate of 1.34 to 2.05). This would result in an increase in tariff payments of €277 million if no reduction occurred in the volume of exports.

Table 8 shows that the product lines affected by the tariff announcement are primarily in three sectors – with almost all export trade in the dairy sector affected and over 40 per cent of the beverages and milling sector products incurring tariff increases. The size of the increase is most significant in the beverages sector where tariffs increase by 10.5 percentage points from 0.76 per cent to 11.32 per cent. This results in approximately 41% of the increase in tariff payments that would be due to fall on the beverages sector.

The next most affected sector in monetary terms is the transportation sector which would account for 26 per cent of the new tariffs to be paid despite having a smaller share of product lines affected. Other sectors where tariffs increase more substantially, such as wood products, mainly account for smaller shares of overall trade so the tariff rate increases do not result in additional payments that are as large as those in beverages, transport and products of milling.

A number of sectors have no change in tariffs, including chemicals and pharmaceuticals which is an important factor for Ireland given the overall concentration of exports to the US in this sector. Table 9 shows where the exposure for Ireland would be greatest with the beverages and transportation sectors accounting for the majority of the impact on tariff payments. The beverages sector includes a specific increase in the tariff on Irish whiskey as well as on liquors. These rates increase from a relatively low base by more than 20 percentage points. The US market is a key export destination for Irish whiskey (59 per cent of total Irish exports of whiskey go to the US) and liqueurs and cordials (50 per cent of total Irish exports of liqueurs and cordials go to the US). The transportation sector tariff increase goes from 0.01% to 13.5% and covers a greater share of the product lines exported by Ireland in this sector compared to the EU average.

TABLE 8: EXPOSURE TO US JUNE 2020 TARIFF ANNOUNCEMENT ACROSS EU-28 SECTORS

	Share of Trade Affected	Current tariff rate	New tariff rate	Absolute change in rate	Tariff increase €'000
Live animals	0.00%	0.11%	0.11%	0.00	€ 0
Meat and fish	28.57%	1.00%	7.94%	6.94	€ 102,244
Dairy	95.08%	18.68%	24.38%	5.70	€ 64,689
Vegetable products	12.51%	2.40%	5.42%	3.02	€ 40,917
Products of milling industry, oil	42.40%	1.31%	11.49%	10.18	€ 215,397
Foodstuffs	19.42%	6.33%	10.80%	4.47	€ 187,925
Beverages	43.80%	0.76%	11.32%	10.56	€ 1,153,222
Residues of food and tobacco	0.00%	18.68%	18.68%	0.00	€ 0
Mineral products	0.00%	1.65%	1.65%	0.00	€ 0
Chemical and pharmaceutical products	0.00%	1.11%	1.11%	0.00	€ 0
Other organic chemicals	0.00%	1.24%	1.24%	0.00	€ 0
Other chemicals	0.00%	2.15%	2.15%	0.00	€ 0
Plastic and rubber	0.00%	3.97%	3.97%	0.00	€ 0
Raw Hides, skins, leather, & furs	0.00%	7.03%	7.03%	0.00	€ 0
Wood and wood products	3.79%	0.40%	1.34%	0.95	€ 53,329
Textiles	0.00%	4.95%	4.95%	0.00	€ 0
Carpets, footwear, umbrellas	7.20%	9.29%	10.21%	0.92	€ 60,049
Stone, glass	0.00%	3.00%	3.00%	0.00	€ 0
Metals	0.41%	1.95%	2.03%	0.08	€ 15,090
Machinery, electrical	0.65%	0.95%	1.11%	0.16	€ 162,462
Transportation	7.21%	1.72%	2.80%	1.08	€ 731,940
Miscellaneous	0.16%	0.46%	0.50%	0.04	€ 15,393

Source: Authors calculations using UN ComTrade data for 2018, current tariffs from Market Access Map and US June 2020 rates from Federal Register (Vol. 85, No. 124, June 26, 2020).

TABLE 9: EXPOSURE TO US JUNE 2020 TARIFF ANNOUNCEMENT ACROSS IRISH SECTORS

	Share of Trade Affected	Current tariff rate	New tariff rate	Absolute change in rate pp	Tariff increase €'000
Live animals	0.00%	0.00%	0.00%	0.00	€0
Meat and fish	58.01%	1.44%	15.83%	14.39	€4,477
Dairy	99.37%	17.35%	25.14%	7.80	€15,811
Vegetable products	0.17%	1.81%	1.85%	0.04	€1
Products of milling industry, oil	0.00%	0.41%	0.41%	0.00	€0
Foodstuffs	1.84%	12.05%	12.51%	0.46	€242
Beverages	90.14%	0.02%	22.56%	22.53	€138,980
Residues of food and tobacco	0.00%	2.41%	2.41%	0.00	€0
Mineral products	0.00%	2.00%	2.00%	0.00	€0
Chemical and pharmaceutical products	0.00%	1.65%	1.65%	0.00	€0
Other organic chemicals	0.00%	1.02%	1.02%	0.00	€0
Other chemicals	0.00%	1.29%	1.29%	0.00	€0
Plastic and rubber	0.00%	5.40%	5.40%	0.00	€0
Raw Hides, skins, leather, & furs	0.00%	7.42%	7.42%	0.00	€0
Wood and wood products	8.66%	0.40%	2.57%	2.17	€175
Textiles	0.00%	6.17%	6.17%	0.00	€0
Carpets, footwear, umbrellas	23.40%	9.26%	11.50%	2.24	€406
Stone, glass	0.00%	1.98%	1.98%	0.00	€0
Metals	0.10%	2.65%	2.67%	0.02	€24
Machinery, electrical	0.02%	0.17%	0.18%	0.00	€115
Transportation	89.90%	0.01%	13.49%	13.48	€116,856
Miscellaneous	0.01%	0.07%	0.07%	0.00	€82

Source: Authors calculations using UN ComTrade data for 2018, current tariffs from Market Access Map and US June 2020 rates from Federal Register (Vol. 85, No. 124, June 26, 2020).

The next set of tables apply a tariff of 25 per cent to a further group of products listed as 'being considered' for tariff increases by the US in the June 2020 *Federal Register*. For this set of products in Annex 2 of the *Federal Register* no tariff level was specified, so we impose the upper limit of the tariff level (i.e. 25 per cent) outlined in the earlier analysis. Though this analysis is hypothetical at this point it does provide an indication of the possible further future exposure to increases in the tariff level. It is also important to note that the results based on this exercise are in addition to the rates modelled in Table 7. Table 10 shows the share of exports to the US that are in the product lines affected by the

tariff announcement from each EU country and the size of the change on the tariff rate and on tariff charges that would be due.

TABLE 10: EXPOSURE TO US FURTHER POTENTIAL TARIFFS ACROSS EU COUNTRIES (ANNEX 2)

	Share of Trade Affected	Current tariff rate	New tariff rate	Absolute change in rate pp	Tariff increase €'000
Austria	1.40%	1.72%	2.11%	0.39	€ 38.037
Belgium	1.27%	1.66%	1.96%	0.30	€ 61,267
Bulgaria	13.70%	3.05%	6.24%	3.20	€ 17,045
Croatia	2.95%	2.19%	2.86%	0.67	€ 2,302
Cyprus	0.78%	4.36%	6.07%	1.71	€1,446
Czechia	4.43%	1.82%	2.83%	1.00	€ 35,513
Denmark	1.20%	2.86%	3.13%	0.27	€ 11,000
EU-28	2.43%	2.31%	2.97%	0.66	€ 2,623,680
Estonia	0.47%	1.18%	1.29%	0.11	€ 1,109
Finland	1.32%	0.99%	1.29%	0.30	€ 11,904
France	7.28%	3.12%	5.31%	2.19	€ 819,865
Germany	1.57%	1.96%	2.48%	0.52	€ 577,918
Greece	1.01%	6.38%	6.59%	0.21	€ 2,765
Hungary	0.23%	1.63%	1.68%	0.05	€ 1,560
Ireland	0.10%	2.05%	2.27%	0.22	€ 86,243
Italy	5.58%	3.59%	4.69%	1.10	€ 465,415
Latvia	2.22%	0.44%	0.96%	0.52	€ 2,690
Lithuania	2.05%	1.75%	2.22%	0.46	€ 6,575
Luxembourg	1.62%	1.78%	2.36%	0.58	€ 2,138
Malta	0.04%	0.89%	0.90%	0.01	€ 12
Netherlands	1.76%	1.38%	1.82%	0.43	€ 98,022
Poland	3.06%	2.33%	3.05%	0.72	€ 44,464
Portugal	3.45%	4.21%	5.15%	0.94	€ 29,284
Romania	1.02%	2.05%	2.29%	0.24	€ 3,001
Slovakia	0.42%	2.33%	2.41%	0.08	€ 2,056
Slovenia	4.33%	2.16%	3.00%	0.84	€ 4,736
Spain	5.29%	4.19%	5.34%	1.15	€ 145,457
Sweden	0.96%	1.62%	1.84%	0.22	€ 19,996
United Kingdom	0.87%	2.18%	2.45%	0.27	€ 150.046

Source: Authors calculations using UN ComTrade data for 2018, current tariffs from Market Access Map, US June product listings from Federal Register (Vol. 85, No. 124, June 26, 2020) with an assumption imposed that the increase in tariffs would be to 25% for all products listed in Annex 2. Note that these are in addition to the rates already modelled in Table 7.

For the EU-28 overall, the relevant products account for 2.4 per cent of current exports to the US and the tariffs being applied to total trade would increase from 2.31 per cent to almost 3 per cent. In monetary terms, this would translate into an increase in tariffs due of €2.6 billion. The countries with the largest share of trade affected by the tariffs outlined in annex 2 of the *Federal Register* are Bulgaria (13.7 per cent), France (7.3 per cent) and Italy (5.6 per cent). The share of trade from Ireland to the US is one of the smallest exposures at 0.1 per cent of trade affected and a percentage increase in tariffs of 11% (or 0.2 percentage points with absolute values going from a rate of 2.05 to 2.27). This would result in an increase in tariff payments of €86 million if no reduction occurred in the volume of exports.

Table 21 in the annex shows the share of exports to the US that are in the product lines affected by the tariff announcement as outlined in annex 3 of the Federal Register which are currently under consideration. Once again, we impose the upper limit of the tariff level of the tariff level (i.e. 25 per cent) as outlined in the earlier analysis. The share of trade affected by these tariffs is smaller than the tariffs previously examined. The EU-28 average share of trade affected is 1.3 per cent while the Netherlands has the largest share of trade affected at 4.2 per cent. This would result in an increase in tariff payments for the EU-28 overall of €1.1 billion if no reduction occurred in the volume of exports.

Table 11 shows that the product lines affected by the tariff announcement are primarily in three sectors –raw hides, skins, leather and furs, beverages and stone and glass. The size of the increase is most significant in the raw hides, skins, leather and furs sector where tariffs increase by 5.6 percentage points from 7 per cent to 12.6 per cent. However, this only results in 4 per cent of the increase in tariff payments falling in this sector. The most affected sector in monetary terms is the transportation sector which would account for 28 per cent of the new tariffs. Table 22 in the annex shows the EU-28 sectors most affected by the tariffs outlined in Annex 3 of the Federal Register. The sectors with the largest share of trade affected are food, vegetables and beverages.

Once again, a number of sectors have no change in tariffs, while sectors which do have an increase in tariffs, the impacts are typically smaller than for that applied in the earlier part of the analysis. Table 12 shows where the exposure for Ireland would be greatest with the transportation sectors accounting for the majority of the impact on tariff payments. The overall impact in this case would be an increase in tariff payments of €86 million if no change in the volume of trade occurred. However, it is important to note that the analysis based on the products set out in annex 2 of the *Federal Register* is hypothetical at this point in time as they were currently under consideration while no tariff schedule has been published for these products. Table 23 in the annex shows the Irish sectors most affected by the tariffs outlined in Annex 3 of the Federal Register. The sectors with the largest share of trade

affected are food, beverages and electrical and machinery equipment. The overall impact on Irish trade would be an increase in tariff payments of €42 million if no reduction in the volume of trade took place.

TABLE 11: EXPOSURE TO US FURTHER POTENTIAL TARIFFS ACROSS EU SECTORS (ANNEX 2)

	Share of Trade Affected	Current tariff rate	New tariff rate	Absolute change in rate pp	Tariff increase €'000
Live animals	0.00%	0.11%	0.11%	0.00	€ 0
Meat and fish	12.41%	7.94%	10.99%	3.05	€ 44,968
Dairy	0.00%	24.38%	24.38%	0.00	€ 0
Vegetable products	0.02%	5.42%	5.43%	0.00	€ 57
Products of milling industry, oil	0.00%	11.49%	11.49%	0.00	€ 0
Foodstuffs	10.77%	10.80%	12.99%	2.19	€ 92,084
Beverages	22.91%	11.32%	16.74%	5.42	€ 591,910
Residues of food and tobacco	0.00%	18.68%	18.68%	0.00	€ 0
Mineral products	0.00%	1.65%	1.65%	0.00	€ 0
Chemical and pharmaceutical products	0.00%	1.11%	1.11%	0.00	€ 165
Other organic chemicals	5.14%	1.24%	2.47%	1.23	€ 100,927
Other chemicals	0.00%	2.15%	2.15%	0.00	€ 0
Plastic and rubber	0.00%	3.97%	3.97%	0.00	€ 0
Raw Hides, skins, leather, & furs	33.01%	7.03%	12.60%	5.58	€ 127,507
Wood and wood products	1.53%	1.34%	1.73%	0.38	€ 21,456
Textiles	4.48%	4.95%	5.76%	0.82	€ 10,667
Carpets, footwear, umbrellas	2.09%	10.21%	10.69%	0.49	€ 31,716
Stone, glass	23.10%	3.00%	7.71%	4.71	€ 465,955
Metals	5.36%	2.03%	3.24%	1.21	€ 230,707
Machinery, electrical	0.06%	1.11%	1.13%	0.01	€ 14,680
Transportation	1.45%	2.80%	3.88%	1.08	€ 732,921
Miscellaneous	1.57%	0.50%	0.88%	0.38	€ 157,960

Source: Authors calculations using UN ComTrade data for 2018, current tariffs from Market Access Map, US June product listings from Federal Register (Vol. 85, No. 124, June 26, 2020) with an assumption imposed that the increase in tariffs would be to 25% for all products listed in Annex 2. Note that these are in addition to the rates already modelled in Table 8.

TABLE 12: EXPOSURE TO US FURTHER POTENTIAL TARIFFS ACROSS IRISH SECTORS (ANNEX 2)

	Share of Trade Affected	Current tariff rate	New tariff rate	Absolute change in rate pp	Tariff increase €'000
Live animals	0.00%	0.00%	0.00%	0.00	€ 0
Meat and fish	3.37%	15.83%	16.61%	0.79	€ 245
Dairy	0.00%	25.14%	25.14%	0.00	€ 0
Vegetable products	0.00%	1.85%	1.85%	0.00	€ 0
Products of milling industry, oil	0.00%	0.41%	0.41%	0.00	€ 0
Foodstuffs	0.95%	12.51%	12.69%	0.18	€ 94
Beverages	0.00%	22.56%	22.56%	0.00	€ 4
Residues of food and tobacco	0.00%	2.41%	2.41%	0.00	€ 0
Mineral products	0.00%	2.00%	2.00%	0.00	€ 0
Chemical and pharmaceutical products	0.00%	1.65%	1.65%	0.00	€ 4
Other organic chemicals	0.27%	1.02%	1.08%	0.06	€ 1,369
Other chemicals	0.00%	1.29%	1.29%	0.00	€ 0
Plastic and rubber	0.00%	5.40%	5.40%	0.00	€ 0
Raw Hides, skins, leather, & furs	0.42%	7.42%	7.49%	0.07	€ 2
Wood and wood products	0.04%	2.57%	2.58%	0.01	€ 1
Textiles	60.01%	6.17%	18.59%	12.42	€ 2,242
Carpets, footwear, umbrellas	0.58%	11.50%	11.62%	0.12	€ 23
Stone, glass	4.99%	1.98%	2.70%	0.72	€ 604
Metals	7.93%	2.67%	4.65%	1.98	€ 2,603
Machinery, electrical	0.00%	0.18%	0.18%	0.00	€ 24
Transportation	0.48%	13.49%	22.60%	9.11	€ 78,944
Miscellaneous	0.01%	0.07%	0.07%	0.00	€ 86

Source: Authors calculations using UN ComTrade data for 2018, current tariffs from Market Access Map, US June product listings from Federal Register (Vol. 85, No. 124, June 26, 2020) with an assumption imposed that the increase in tariffs would be to 25% for all products listed in Annex 2. Note that these are in addition to the rates already modelled in Table 9.

6. Estimating the impact on trade flows

In the previous section, we examined the change in average tariffs across countries and sectors and the cost this would incur in terms of tariff charges if trade volumes remained unchanged. This section examines the impact a tariff-induced price increase might have on trade flows, assuming the full tariff increase was incorporated into the price charged. We do this by combining the trade and tariff data already described with price elasticities of trade at a sector level from Imbs and Mejean (2016) following the work on the impact of Brexit by Lawless and Morgenroth (2019). The median elasticity

estimates they generate range from a low of -2.8 for tobacco products to highs of -10.9 for measuring equipment and -10.5 for wearing apparel.

Before presenting the results, we note that there are some limitations to this approach that should be borne in mind in interpreting the results. Firstly, as we do not have any detailed information on market structure, we make the assumption that the full tariff amount would be incorporated into the price. In practice, particularly if the tariffs are temporary in nature, some of the incidence could be absorbed by producers. Secondly, while we have very detailed information on the products traded and tariffs, the trade elasticity estimates calculated by Imbs and Mejean (2016) are at a much higher sectoral level which may not perfectly capture the impact for every individual product.[8]

Combining the tariff-induced price increases and elasticity estimates generates reductions in exports from each EU country to the US as shown in Table 13. We present separate calculations for the impact of the June 2020 tariffs and the potential additional products being considered for tariff increases (labelled as Annex 2 and Annex 3 tariffs). The first three columns of Table 13 show the estimated impact of these tariff schedules on the trade flow between each EU country and the US. The last three columns scale show the impact by the share of the US in each country's total exports to give an estimate of the impact on overall exports.

The impact is largest for countries with a large share of affected agricultural exports, with both Cyprus and Greece estimated to be high by reductions of close to 20 per cent of their US exports in each tariff scenario. While this is a considerable reduction in exports to the US, the effect on total exports is quite modest at 0.4 per cent for Cyprus and 0.7 per cent for Greece in each scenario as the US is not a particularly large destination market.

The impact on total Irish exports is larger at 1.1 per cent for the June tariff schedule, 1.1 per cent for the Annex 2 tariffs and 0.1 per cent for the Annex 3 tariffs even though the effect on Irish exports to the US is much smaller than that of Cyprus and Greece. The estimates show Irish exports to the US reducing by 4.0 per cent when faced with the June 2020 tariffs, by 4.1 per cent if the higher rate hypothesised for the Annex 2 tariffs was applied and by 0.5 per cent if the tariffs in Annex 3 were applied. Overall, Ireland has one of the largest reductions in total trade from these tariffs despite having a reduction in exports to the US very close to the EU-28 average. This reflects the much greater share of the US in Irish exports compared to other EU countries as was shown in Figure 1.

[8] 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. We use the median elasticity they calculate for each sector in our calculations.

TABLE 13: ESTIMATED TRADE VOLUME RESPONSE ACROSS EU MEMBERS TO US TARIFF INCREASES

	Reduction in exports to US			Reduction in exports to World		
	June tariffs	Annex 2 tariffs	Annex 3 tariffs	June tariffs	Annex 2 tariffs	Annex 3 tariffs
Austria	-2.0%	-3.4%	-0.4%	-0.1%	-0.2%	0.0%
Belgium	-0.5%	-1.8%	-2.1%	0.0%	-0.1%	-0.1%
Bulgaria	-3.0%	-16.3%	-1.2%	-0.1%	-0.3%	0.0%
Croatia	-2.6%	-5.4%	-0.5%	-0.1%	-0.1%	0.0%
Cyprus	-21.3%	-22.1%	-1.0%	-0.4%	-0.4%	0.0%
Czechia	-0.7%	-5.1%	-0.6%	0.0%	-0.1%	0.0%
Denmark	-5.2%	-6.2%	-2.3%	-0.2%	-0.3%	-0.1%
EU-28	-3.7%	-6.0%	-1.4%	-0.7%	-1.2%	-0.3%
Estonia	-0.2%	-0.7%	-0.1%	0.0%	0.0%	0.0%
Finland	-0.5%	-1.8%	-0.8%	0.0%	-0.1%	-0.1%
France	-9.6%	-16.8%	-1.0%	-0.7%	-1.3%	-0.1%
Germany	-2.2%	-3.7%	-1.2%	-0.2%	-0.3%	-0.1%
Greece	-17.5%	-18.4%	-11.4%	-0.7%	-0.7%	-0.4%
Hungary	-0.3%	-0.5%	-0.1%	0.0%	0.0%	0.0%
Ireland	-4.0%	-4.1%	-0.5%	-1.1%	-1.1%	-0.1%
Italy	-5.6%	-10.8%	-1.1%	-0.5%	-1.0%	-0.1%
Latvia	-0.1%	-2.3%	-2.4%	0.0%	-0.1%	-0.1%
Lithuania	-0.7%	-2.7%	-0.3%	0.0%	-0.1%	0.0%
Luxembourg	-2.6%	-4.2%	-0.2%	-0.1%	-0.1%	0.0%
Malta	-0.1%	-0.1%	0.0%	0.0%	0.0%	0.0%
Netherlands	-0.9%	-2.6%	-4.2%	0.0%	-0.1%	-0.2%
Poland	-3.9%	-6.9%	-1.7%	-0.1%	-0.2%	0.0%
Portugal	-8.0%	-11.3%	-0.8%	-0.4%	-0.6%	0.0%
Romania	-0.5%	-1.4%	-0.7%	0.0%	0.0%	0.0%
Slovakia	0.0%	-0.4%	-0.1%	0.0%	0.0%	0.0%
Slovenia	-1.1%	-5.4%	-0.3%	0.0%	-0.1%	0.0%
Spain	-7.9%	-12.9%	-2.4%	-0.4%	-0.6%	-0.1%
Sweden	-0.4%	-1.3%	-3.2%	0.0%	-0.1%	-0.2%
United Kingdom	-3.9%	-4.8%	-1.0%	-0.5%	-0.6%	-0.1%

Source: Authors calculations using UN ComTrade data for 2018, current tariffs from Market Access Map, US June product listings from Federal Register (Vol. 85, No. 124, June 26, 2020) and trade elasticities from Imbs and Mejean (2016).

Tables 14 and 15 examine how these potential trade reductions would impact across sectors if the full amount was passed into price increases. Table 14 presents the calculations for sectors across all of the EU and total EU external trade (i.e. not including intra-EU trade). Table 15 presents the estimates for Irish sectors.

TABLE 14: ESTIMATED TRADE VOLUME RESPONSE ACROSS EU SECTORS TO US TARIFF INCREASES

	Reduction in exports to US			Reduction in exports to World		
	June tariffs	**Annex 2 tariffs**	**Annex 3 tariffs**	**June tariffs**	**Annex 2 tariffs**	**Annex 3 tariffs**
Live animals	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Meat and fish	-28.6%	-38.9%	0.0%	-2.5%	-3.4%	0.0%
Dairy	-95.1%	-95.1%	0.0%	-9.9%	-9.9%	0.0%
Vegetable products	-12.5%	-1.2%	-16.8%	-1.0%	-0.1%	-1.4%
Products of milling industry, oil	-42.4%	-42.4%	-3.0%	-7.2%	-7.2%	-0.5%
Foodstuffs	-19.4%	-30.2%	-46.3%	-2.3%	-3.6%	-5.6%
Beverages	-43.8%	-66.7%	-17.4%	-15.5%	-23.6%	-6.1%
Residues of food and tobacco	0.0%	0.0%	-13.0%	0.0%	0.0%	-0.6%
Mineral products	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Chemical and pharmaceutical products	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Other organic chemicals	0.0%	-5.1%	0.0%	0.0%	-0.8%	0.0%
Other chemicals	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Plastic and rubber	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Raw Hides, skins, leather, & furs	0.0%	-33.0%	0.0%	0.0%	-4.2%	0.0%
Wood and wood products	-3.8%	-5.3%	0.0%	-0.5%	-0.7%	0.0%
Textiles	0.0%	-4.5%	0.0%	0.0%	-0.5%	0.0%
Carpets, footwear, umbrellas	-7.2%	-9.3%	0.0%	-1.0%	-1.3%	0.0%
Stone, glass	0.0%	-22.4%	0.0%	0.0%	-2.5%	0.0%
Metals	-0.4%	-5.8%	-1.1%	-0.1%	-1.0%	-0.2%
Machinery, electrical	-0.6%	-0.7%	-1.0%	-0.1%	-0.1%	-0.2%
Transportation	-7.2%	-8.7%	0.0%	-1.6%	-1.9%	0.0%
Miscellaneous	-0.2%	-1.7%	0.0%	0.0%	-0.3%	0.0%

Source: Authors calculations using UN ComTrade data for 2018, current tariffs from Market Access Map, US June product listings from Federal Register (Vol. 85, No. 124, June 26, 2020) and trade elasticities from Imbs and Mejean (2016).

The impact falls primarily on food and beverages sectors both for the EU overall and for Ireland in terms of trade with the US. When we look at the impacts on total trade, the tariffs on the beverages sector account for the largest reduction in sectoral trade both for Ireland and for the EU-28 followed by the dairy sector. Both sectors have trade with the US reduced by well over 90 per cent but the beverages sector is more reliant on trade with the US, so its total export fall is correspondingly greater. One notable difference in the sectoral patterns between Ireland and the EU-28 overall is the impact on the transportation sector. The estimates for EU-28 exports of transport equipment to the US are

7.2 per cent for the June 2020 tariffs and 8.7 per cent for the Annex 2 tariffs. For Ireland, however, these impacts are much greater with reductions of 89 per cent for the June tariffs and 90 per cent for the Annex 2 tariffs. This reflects the much narrower range of transport products being exported from Ireland and that these are the products that tariff increases are focused on. Of course, these results are only indicative as Ireland is not one of the countries subject to import tariffs on aircraft exports. Overall, the impacts of the annex 3 tariffs are much smaller than that of the June and Annex 2 tariffs.

TABLE 15: ESTIMATED TRADE VOLUME RESPONSE ACROSS IRISH SECTORS TO US TARIFF INCREASES

	Reduction in exports to US			Reduction in exports to World		
	June tariffs	**Annex 2 tariffs**	**Annex 3 tariffs**	**June tariffs**	**Annex 2 tariffs**	**Annex 3 tariffs**
Live animals	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Meat and fish	-58.0%	-59.9%	0.0%	-0.4%	-0.4%	0.0%
Dairy	-99.4%	-99.4%	0.0%	-7.8%	-7.8%	0.0%
Vegetable products	-0.2%	0.0%	0.0%	0.0%	0.0%	0.0%
Products of milling industry, oil	0.0%	0.0%	-5.8%	0.0%	0.0%	-0.2%
Foodstuffs	-1.8%	-2.8%	-34.2%	0.0%	0.0%	-0.6%
Beverages	-90.1%	-90.1%	-8.9%	-38.6%	-38.6%	-3.8%
Residues of food and tobacco	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Mineral products	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Chemical and pharmaceutical products	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Other organic chemicals	0.0%	-0.3%	0.0%	0.0%	-0.1%	0.0%
Other chemicals	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Plastic and rubber	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Raw Hides, skins, leather, & furs	0.0%	-0.4%	0.0%	0.0%	0.0%	0.0%
Wood and wood products	-8.7%	-8.7%	0.0%	-0.1%	-0.1%	0.0%
Textiles	0.0%	-60.0%	0.0%	0.0%	-6.4%	0.0%
Carpets, footwear, umbrellas	-23.4%	-24.0%	0.0%	-1.0%	-1.1%	0.0%
Stone, glass	0.0%	-5.0%	0.0%	0.0%	-0.9%	0.0%
Metals	-0.1%	-8.0%	-7.5%	0.0%	-0.8%	-0.7%
Machinery, electrical	0.0%	0.0%	-3.6%	0.0%	0.0%	-0.6%
Transportation	-89.9%	-90.4%	0.0%	-14.6%	-14.7%	0.0%
Miscellaneous	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Source: Authors calculations using UN ComTrade data for 2018, current tariffs from Market Access Map, US June product listings from Federal Register (Vol. 85, No. 124, June 26, 2020) and trade elasticities from Imbs and Mejean (2016).

7. EU tariffs on imports from the US

In October 2020, the World Trade Organisation allowed the EU to raise tariffs up to $4 billion worth of imports from the US as a countermeasure for the US subsidies on aircraft. These tariffs took effect on the 10th November 2020. The countermeasures were aimed at bringing the EU to the same tariff level as the US, with comparable tariffs on each side based on two WTO decisions related to aircraft subsidies. They include additional tariffs of 15% on aircraft as well as additional tariffs of 25% on a range of other products imported from the U.S. The tariffs introduced by the EU mirror the tariff imposed by the US in the context of the WTO case on subsidies to Airbus.[9] This section, therefore, examines how the changes in EU tariffs on imports from the US outlined in November 2020 would impact countries and sectors across the EU based on the current import structure described throughout the paper.

The details of the tariffs are taken from the official Journal of the European Union and matched to the best possible degree to the trade data. Once again the announced tariffs relate to a finer degree of product definition than the trade data (8-digit products rather than the 6-digit level) so the estimates here err on the side of overestimating the effects as we apply the higher tariff to all 8-digit varieties of our 6-digit level product codes. We then compare the new rate with the existing one and calculate the change this would involve in tariffs due provided that no change occurred in the volumes of trade taking place.

Table 16 shows the share of imports from the US that are in the product lines affected by the tariff announcement to each EU country and the size of the change on the tariff rate and on tariff charges that would be due. For the EU-28 overall, the relevant products account for 7 per cent of current imports from the US and the tariffs being applied to total trade would increase from 1.7 per cent to 2.75 per cent. In monetary terms, this would translate into an increase in tariffs due of €2.8 billion.

[9] We make the assumption that the EU import tariffs on goods from the US are applicable to all EU member states. As it is not clear from the documentation if the imports are applied on the same individual countries as the US import tariffs we apply it to all EU member states.

TABLE 16: EXPOSURE TO EU NOVEMBER 2020 TARIFF ANNOUNCEMENT ACROSS EU COUNTRIES

	Share of Trade Affected	Current tariff rate	New tariff rate	Absolute change in rate pp	Tariff increase €'000
Austria	3%	1.65%	2.19%	0.53	€ 31,390
Belgium	2%	2.33%	2.73%	0.39	€ 103,057
Bulgaria	16%	1.85%	4.46%	2.60	€ 7,458
Croatia	5%	1.80%	2.88%	1.08	€ 1,942
Cyprus	4%	5.49%	6.39%	0.90	€ 757
Czechia	12%	1.91%	3.67%	1.76	€ 69,595
Denmark	2%	1.86%	2.32%	0.46	€ 10,215
EU-28	7%	1.70%	2.75%	1.05	€ 2,762,060
Estonia	4%	2.58%	3.51%	0.94	€ 2,809
Finland	1%	1.47%	1.77%	0.31	€ 6,330
France	3%	1.64%	2.12%	0.48	€ 168,438
Germany	2%	2.17%	2.53%	0.37	€ 236,093
Greece	4%	1.22%	2.07%	0.85	€ 5,680
Hungary	1%	1.67%	1.95%	0.29	€ 5,157
Ireland	47%	1.48%	7.99%	6.52	€ 1,027,323
Italy	2%	1.48%	1.87%	0.39	€ 61,864
Latvia	1%	1.56%	1.74%	0.18	€ 486
Lithuania	2%	4.38%	4.78%	0.39	€ 1,612
Luxembourg	8%	2.48%	3.63%	1.15	€ 8,002
Malta	10%	1.42%	2.88%	1.46	€ 2,129
Netherlands	5%	1.48%	2.31%	0.83	€ 277,247
Poland	13%	2.17%	4.14%	1.97	€ 126,197
Portugal	6%	1.72%	2.67%	0.95	€ 14,074
Romania	16%	1.74%	4.19%	2.44	€ 21,816
Slovakia	2%	2.63%	3.04%	0.41	€ 3,068
Slovenia	4%	2.01%	2.65%	0.65	€ 5,849
Spain	6%	1.37%	2.26%	0.89	€ 116,776
Sweden	15%	1.70%	3.93%	2.23	€ 84,272
United Kingdom	5%	1.31%	2.09%	0.78	€ 414,435

Source: Authors calculations using UN ComTrade data for 2018, current tariffs from Market Access Map and EU November 2020 rates from Official Journal of the EU (Vol. 63, June 9, 2020).

The country most affected by the EU import tariffs on US goods is Ireland with close to half of Irish imports from the US affected. In this case the tariff rate increases from 1.5 per cent to 8 per cent. This would result in tariff payments of approximately €1bn if no change occurred in the volumes of trade

taking place. The large exposure of Irish trade to these tariff increases is explained by the 15% tariff on imports of aircraft which represent half of Irish goods imports from the US. The countries with the largest shares of imports affected by the EU import tariffs are Romania (16 per cent), Bulgaria (16 per cent) and Sweden (15 per cent). The expected tariff increase for these countries is small however.

Table 17 shows that the product lines affected by the tariff announcement are predominantly in two sectors – with almost 60 per cent of import trade in the foodstuffs sector affected and 45 per cent of the transportation sector incurring tariff increases. The size of the increase is most significant in the foodstuffs sector where tariffs increase by 12.4 percentage points from 7.72 per cent to 20.15 per cent. In monetary terms the sectors which incurs the largest tariff increase is the transportation sector accounting for 76 per cent of the increase in tariff payments.

TABLE 17: EXPOSURE TO EU NOVEMBER 2020 TARIFF ANNOUNCEMENT ACROSS EU-28 SECTORS

	Share of Trade Affected	Current tariff rate	New tariff rate	Absolute change in rate pp	Tariff increase €'000
Live animals	0.00%	0.42%	0.42%	0.00	€ 0
Meat and fish	7.65%	13.19%	14.72%	1.53	€ 17,679
Dairy	7.32%	22.68%	22.68%	0.00	€ 0
Vegetable products	12.08%	3.37%	5.21%	1.84	€ 63,690
Products of milling industry, oil	8.15%	1.20%	3.15%	1.95	€ 72,531
Foodstuffs	58.84%	7.72%	20.15%	12.43	€ 158,570
Beverages	18.27%	4.27%	7.76%	3.49	€ 51,995
Residues of food and tobacco	24.06%	6.10%	10.89%	4.80	€ 53,903
Mineral products	0.00%	0.55%	0.55%	0.00	€ 0
Chemical and pharmaceutical products	0.00%	1.06%	1.06%	0.00	€ 0
Other organic chemicals	0.66%	2.50%	2.64%	0.14	€ 6,661
Other chemicals	1.80%	3.17%	3.56%	0.39	€ 25,994
Plastic and rubber	2.61%	5.20%	5.69%	0.49	€ 47,817
Raw Hides, skins, leather, & furs	11.58%	2.07%	4.45%	2.37	€ 11,829
Wood and wood products	0.00%	0.09%	0.09%	0.00	€ 0
Textiles	0.50%	4.45%	4.57%	0.12	€ 927
Carpets, footwear, umbrellas	0.00%	9.00%	9.00%	0.00	€ 0
Stone, glass	0.00%	0.67%	0.67%	0.00	€ 0
Metals	0.00%	2.89%	2.89%	0.00	€ 0
Machinery, electrical	0.37%	1.17%	1.26%	0.09	€ 71,108
Transportation	45.03%	3.16%	9.40%	6.25	€ 2,087,741
Miscellaneous	1.39%	0.43%	0.76%	0.33	€ 91,615

Source: Authors calculations using UN ComTrade data for 2018, current tariffs from Market Access Map and EU November 2020 rates from Official Journal of the EU (Vol. 63, June 9, 2020).

Table 18 shows where the exposure for Ireland would be greatest with the transportation and foodstuffs sectors accounting for the majority of the impact on tariff payments. The transportation sector accounts for almost all of the tariff increase in monetary terms with the tariff rate increasing by 13.4 percentage points from 1.4 per cent to 14.7 per cent.

TABLE 18: EXPOSURE TO EU NOVEMBER 2020 TARIFF ANNOUNCEMENT ACROSS IRISH SECTORS

	Share of Trade Affected	Current tariff rate	New tariff rate	Absolute change in rate	Tariff increase €'000
Live animals	0.00%	0.19%	0.19%	0.00	€ 0
Meat and fish	1.50%	7.06%	7.39%	0.33	€ 6
Dairy	0.00%	41.99%	41.99%	0.00	€ 0
Vegetable products	36.60%	4.27%	12.11%	7.84	€ 676
Products of milling industry, oil	40.24%	7.04%	16.48%	9.44	€ 4,767
Foodstuffs	58.38%	6.87%	18.41%	11.54	€ 4,212
Beverages	15.42%	2.02%	5.86%	3.84	€ 690
Residues of food and tobacco	6.73%	6.96%	8.64%	1.68	€ 3,101
Mineral products	0.00%	0.47%	0.47%	0.00	€ 0
Chemical and pharmaceutical products	0.00%	1.26%	1.26%	0.00	€ 0
Other organic chemicals	3.01%	3.98%	4.56%	0.58	€ 1,173
Other chemicals	0.71%	3.21%	3.36%	0.15	€ 503
Plastic and rubber	1.08%	5.72%	5.93%	0.21	€ 949
Raw Hides, skins, leather, & furs	29.94%	4.89%	10.91%	6.02	€ 167
Wood and wood products	0.00%	0.09%	0.09%	0.00	€ 0
Textiles	0.00%	4.76%	4.76%	0.00	€ 0
Carpets, footwear, umbrellas	0.00%	8.84%	8.84%	0.00	€ 0
Stone, glass	0.00%	1.15%	1.15%	0.00	€ 0
Metals	0.00%	2.67%	2.67%	0.00	€ 0
Machinery, electrical	0.06%	0.62%	0.64%	0.01	€ 329
Transportation	97.79%	1.36%	14.71%	13.35	€ 1,009,826
Miscellaneous	0.45%	0.19%	0.29%	0.10	€ 923

Source: Authors calculations using UN ComTrade data for 2018, current tariffs from Market Access Map and EU November 2020 rates from Official Journal of the EU (Vol. 63, June 9, 2020).

The next two tables examine the impact a tariff-induced price increase might have on trade flows, assuming the full tariff increase was incorporated into the price charged. Once again we do this by combining the trade and tariff data already described with price elasticities of trade at a sector level from Imbs and Mejean (2016). It is important to emphasise that there are some limitations to this approach that should be borne in mind in interpreting the results. Firstly, as we do not have any

detailed information on market structure, we make the assumption that the full tariff amount would be incorporated into the price. In practice, particularly if the tariffs are temporary in nature, some of the incidence could be absorbed by producers. Secondly, while we have very detailed information on the products traded and tariffs, the trade elasticity estimates calculated by Imbs and Mejean (2016) are at a much higher sectoral level which may not perfectly capture the impact for every individual product. Combining the tariff-induced price increases and elasticity estimates generates reductions in imports to each EU country from the US is presented in Table 19.

TABLE 19: ESTIMATED TRADE VOLUME RESPONSE ACROSS EU MEMBERS TO EU TARIFF INCREASES

	Imports from US	Imports from World
Austria	-3.28%	-0.12%
Belgium	-2.19%	-0.15%
Bulgaria	-15.66%	-0.14%
Croatia	-4.64%	-0.04%
Cyprus	-4.09%	-0.04%
Czechia	-11.75%	-0.30%
Denmark	-2.27%	-0.06%
EU-28	-6.91%	-0.92%
Estonia	-4.12%	-0.07%
Finland	-1.38%	-0.04%
France	-2.98%	-0.19%
Germany	-1.96%	-0.11%
Greece	-3.50%	-0.04%
Hungary	-1.27%	-0.02%
Ireland	-47.42%	-8.25%
Italy	-2.38%	-0.09%
Latvia	-0.84%	-0.01%
Lithuania	-1.66%	-0.02%
Luxembourg	-8.00%	-0.28%
Malta	-10.30%	-0.25%
Netherlands	-4.79%	-0.38%
Poland	-13.21%	-0.37%
Portugal	-6.24%	-0.11%
Romania	-15.55%	-0.17%
Slovakia	-1.88%	-0.02%
Slovenia	-3.55%	-0.10%
Spain	-6.04%	-0.25%
Sweden	-15.18%	-0.40%
United Kingdom	-5.02%	-0.47%

Source: Authors calculations using UN ComTrade data for 2018, current tariffs from Market Access Map and EU November 2020 rates from Official Journal of the EU (Vol. 63, June 9, 2020) and trade elasticities from Imbs and Mejean (2016).

The impact is largest for countries with a large share of affected agricultural and transportation exports, with Bulgaria, Romania and Sweden estimated to be high by reductions of close to 16 per cent of their imports from the US. While this is a considerable reduction in imports from the US, the effect on total imports is quite modest at less than half a per cent as the US is not a particularly large source of imports. The impact on total Irish imports is much larger at 47 per cent for the EU tariff schedule. This translates to an 8 per cent fall in Irish imports from the world. Once again this reflects the much greater share of the US in Irish imports compared to other EU countries as was shown in Figure 2.

Tables 20 examines how these trade reductions would impact across EU-28 and Irish sectors if the full amount was passed into price increases. The impact falls primarily on foodstuff, transportation and beverages sectors both for the EU overall and for Ireland in terms of trade with the US.

TABLE 20: ESTIMATED TRADE VOLUME RESPONSE ACROSS EU-28 AND IRISH SECTORS TO EU TARIFF INCREASES

	EU 28 Sectors		Irish Sectors	
	Imports from US	**Imports from World**	**Imports from US**	**Imports from World**
Live animals	0.0%	0.0%	0.0%	0.0%
Meat and fish	-7.6%	-0.3%	-1.5%	0.0%
Dairy	-7.3%	-0.3%	0.0%	0.0%
Vegetable products	-12.1%	-1.0%	-36.6%	-0.2%
Products of milling industry, oil	-8.1%	-1.4%	-40.2%	-3.0%
Foodstuffs	-58.8%	-4.0%	-58.4%	-0.8%
Beverages	-18.3%	-4.3%	-15.4%	-0.3%
Residues of food and tobacco	-17.3%	-1.5%	-6.7%	-1.1%
Mineral products	0.0%	0.0%	0.0%	0.0%
Chemical and pharmaceutical products	0.0%	0.0%	0.0%	0.0%
Other organic chemicals	-0.7%	-0.1%	-3.0%	-0.3%
Other chemicals	-1.8%	-0.6%	-0.7%	-0.2%
Plastic and rubber	-2.6%	-0.4%	-1.1%	-0.2%
Raw Hides, skins, leather, & furs	-11.6%	-0.4%	-29.9%	-0.5%
Wood and wood products	0.0%	0.0%	0.0%	0.0%
Textiles	-0.5%	0.0%	0.0%	0.0%
Carpets, footwear, umbrellas	0.0%	0.0%	0.0%	0.0%
Stone, glass	0.0%	0.0%	0.0%	0.0%
Metals	0.0%	0.0%	0.0%	0.0%
Machinery, electrical	-0.4%	-0.1%	-0.1%	0.0%
Transportation	-45.0%	-10.9%	-97.8%	-30.0%
Miscellaneous	-1.4%	-0.2%	-0.5%	-0.1%

Source: Authors calculations using UN ComTrade data for 2018, current tariffs from Market Access Map and EU November 2020 rates from Official Journal of the EU (Vol. 63, June 9, 2020) and trade elasticities from Imbs and Mejean (2016).

When we look at the impacts on total trade, the tariffs on the foodstuffs sector account for the largest reduction in sectoral trade for the EU-28 followed by the transportation sector. This translates into a 4 per cent fall from the foodstuffs sector and 11 per cent from the transportation in terms of imports to the world. For Ireland, the largest falls in trade with the US are once again for the transportation and foodstuffs sectors. The estimated in imports from the US in the transportation sector is 98 per cent with this resulting in a 30 per cent fall in total imports from this sector to Ireland.

8. Conclusion

As a small open economy, Ireland is especially vulnerable to changes in the international trading environment. In recent years increased trade tensions involving the US and China, and perhaps more relevant for Ireland between the US and Europe, have frequently been identified as a significant external risk to the Irish economy. This paper has accordingly examined the potential direct exposure to Ireland and other EU countries of increases in US import tariffs.

At the aggregate level, the average tariffs applied on trade between the EU and US in both directions at present are relatively low. The average EU-28 tariff on goods imported from the US is 1.7 per cent while the US tariff on goods sourced in the EU is slightly lower at 1.6 per cent. Irish trade with the US encounters tariffs just below the EU average, with an average rate of 1.5 per cent on imports from the US and 1.3 per cent on exports to the US. The reason for lower Irish average tariffs can primarily be explained by the sectoral structure of tariffs where, for example, there is a zero rate of tariffs on pharmaceutical products which represent almost two thirds of Irish exports to the US while Ireland's largest import category from the US, aircraft, also incurs a relatively low tariff in the EU schedule of rates at 1.3 per cent. Over the last year, both the US and EU have announced tariff increases on their bilateral trade, arising from a long-running dispute on subsidies to the aircraft sector.

To examine first the potential impact of changes of US tariffs on EU products outlined in June 2020 across countries and sectors we made use of the tariff schedule outlined in the official *Federal Register* and then matched it to the best possible degree to the trade data. In many cases, however, the announced tariffs relate to a finer degree of product definition than the trade data (8-digit products rather than the 6-digit level) so the estimates in this paper are likely to overestimate the effects as we apply the higher tariff to all 8-digit varieties of our 6-digit level product codes. We also assume that the tariffs are imposed on all EU member states equally even though this is not the case as outlined in the Federal Register.

Overall, we find that the product lines affected by the tariff announcement are primarily in three sectors – with almost all export trade in the dairy sector affected and over 40 per cent of the beverages and milling sector products incurring tariff increases. The size of the increase is most significant in the beverages sector where tariffs increase by 10.5 percentage points from 0.75 per cent to 11.32 per cent. For the EU-28 overall, the relevant products account for 3.7 per cent of current exports to the US and the tariffs being applied to total trade would increase from 1.6 per cent to 2.31 per cent. In monetary terms, this would translate into an increase in tariffs due of €2.8 billion. The share of trade from Ireland to the US is also one of the larger exposures at 4 per cent of trade affected. This would result in an increase in tariff payments of €277 million on Irish exports if no reduction occurred in the volume of exports. We also examined the impact of further import tariff increases on product lines which are currently under consideration by the US authorities. We found that while Ireland is less exposed to the tariffs under consideration, it could result in higher tariffs of €86 million if the new tariff levels were introduced.

If the increase in tariffs are passed into prices, then some decrease in trade volumes would be expected. We combine the tariff increases with trade elasticities using the approach taken for examining the impact of Brexit by Lawless and Morgenroth (2019). These elasticities are computed at a sector level and assume that all of the tariff is passed into prices. Both assumptions are likely to introduce some uncertainty into the estimates of volume changes at an individual product level which should be borne in mind. These calculations suggest that exports from the EU-28 and US would fall by 3.7 per cent (equivalent to 0.7 per cent of the EU's total external trade) following the imposition of the tariffs announced in June 2020.

The effect of these tariffs on Ireland is estimated at approximately 4 per cent on exports to the US (1.1 per cent of total Irish exports) with the bulk of the effect coming from the impact on the beverages sector. One finding of importance for Ireland is that although we estimate that Ireland would have a reduction in exports to the US that is very close to the EU-28 average, this translates into one of the largest reductions in total trade. This is because of the much greater share Irish exports that are destined for the US relative to the market's importance for other EU countries.

In response to the US tariffs, the EU announced a set of tariffs on imports from the US in October 2020. These included additional tariffs of 15% on aircraft as well as additional tariffs of 25% on a range of other products imported from the U.S. We calculated that, for the EU-28 overall, the relevant products account for 7 per cent of current imports from the US and the tariffs being applied to total trade would increase from 1.7 per cent to 2.75 per cent. In monetary terms, this would translate into an increase in tariffs due of €2.8 billion. Ireland emerges as the country most affected by the EU import

tariffs as almost half of Irish imports from the US affected, almost entirely as a result of the tariff on imports of aircraft.

References

Devereaux Lewis, Caitlain (2016). "Presidential Authority over Trade: Imposing Tariffs and Duties", *Congressional Research Service*. https://fas.org/sgp/crs/misc/R44707.pdf

Imbs, Jean and Isabelle Mejean (2016). "Trade Elasticities", *Review of International Economics*, Vol. 21, DOI: 10.1111/roie.12270.

Lawless, Martina and Edgar Morgenroth (2019) "The product and sector level impact of a hard Brexit across the EU, in *Contemporary Social Science*, Vol.14(2), pages 189-207.

Vandenbussche, Hylke, William Connell, Wouter Simons and Elena Zaurino "America First! What are the job losses for Belgium and Europe?" *VIVES Discussion paper* No.57 (January 2017).

Annex 1

TABLE 21: EXPOSURE TO US FURTHER POTENTIAL TARIFFS ACROSS COUNTRIES (ANNEX 3)

	Share of Trade Affected	Current tariff rate	New tariff rate	Absolute change in rate pp	Tariff increase €'000
Austria	0.39%	2.11%	2.19%	0.08	€ 8,238
Belgium	2.14%	1.96%	2.44%	0.48	€ 97,348
Bulgaria	1.15%	6.24%	6.47%	0.22	€ 1,188
Croatia	0.45%	2.86%	2.94%	0.08	€ 275
Cyprus	1.03%	6.07%	6.23%	0.16	€ 138
Czechia	0.60%	2.83%	2.96%	0.14	€ 4,780
Denmark	2.30%	3.13%	3.55%	0.42	€ 16,887
EU-28	1.28%	2.97%	3.26%	0.28	€1,123,919
Estonia	0.10%	1.29%	1.31%	0.02	€ 240
Finland	0.80%	1.29%	1.49%	0.20	€ 7,815
France	0.96%	5.31%	5.53%	0.22	€ 80,855
Germany	1.19%	2.48%	2.74%	0.26	€ 291,985
Greece	1.80%	6.59%	6.90%	0.31	€ 4,011
Hungary	0.07%	1.68%	1.69%	0.01	€ 319
Ireland	0.45%	2.27%	2.38%	0.11	€ 42,170
Italy	1.03%	4.69%	4.91%	0.22	€ 93,317
Latvia	2.43%	0.96%	1.56%	0.60	€ 3,064
Lithuania	0.27%	2.22%	2.27%	0.06	€ 803
Luxembourg	0.20%	2.36%	2.41%	0.04	€ 160
Malta	0.02%	0.90%	0.90%	0.00	€ 6
Netherlands	4.24%	1.82%	2.80%	0.99	€ 223,365
Poland	1.72%	3.05%	3.36%	0.31	€ 19,187
Portugal	0.46%	5.15%	5.25%	0.10	€ 3,231
Romania	0.69%	2.29%	2.45%	0.17	€ 2,097
Slovakia	0.11%	2.41%	2.44%	0.03	€ 702
Slovenia	0.33%	3.00%	3.07%	0.07	€ 391
Spain	1.21%	5.34%	5.55%	0.21	€ 26,832
Sweden	3.18%	1.84%	2.59%	0.75	€ 67,677
United Kingdom	1.03%	2.45%	2.69%	0.24	€ 129,972

Source: Authors calculations using UN ComTrade data for 2018, current tariffs from Market Access Map, US June product listings from Federal Register (Vol. 85, No. 124, June 26, 2020) with an assumption imposed that the increase in tariffs would be to 25% for all products listed in Annex 3. Note that these are in addition to the rates already modelled in Table 8 and Table 11.

TABLE 22: EXPOSURE TO US FURTHER POTENTIAL TARIFFS ACROSS EU SECTORS (ANNEX 3)

	Share of Trade Affected	Current tariff rate	New tariff rate	Absolute change in rate	Tariff increase €'000
Live animals	0.00%	0.11%	0.11%	0.00	€ 0
Meat and fish	0.00%	10.99%	10.99%	0.00	€ 0
Dairy	0.00%	24.38%	24.38%	0.00	€ 0
Vegetable products	16.79%	5.43%	9.62%	4.20	€ 56,879
Products of milling industry, oil	3.03%	11.49%	12.24%	0.74	€ 15,728
Foodstuffs	38.80%	12.99%	19.60%	6.60	€ 277,250
Beverages	17.36%	16.74%	21.08%	4.34	€ 473,681
Residues of food and tobacco	12.99%	18.68%	21.74%	3.07	€ 12,903
Mineral products	0.00%	1.65%	1.65%	0.00	€ 0
Chemical and pharmaceutical products	0.00%	1.11%	1.11%	0.00	€ 0
Other organic chemicals	0.00%	2.47%	2.47%	0.00	€ 0
Other chemicals	0.00%	2.15%	2.15%	0.00	€ 0
Plastic and rubber	0.00%	3.97%	3.97%	0.00	€ 0
Raw Hides, skins, leather, & furs	0.00%	12.60%	12.60%	0.00	€ 0
Wood and wood products	0.00%	1.73%	1.73%	0.00	€ 0
Textiles	0.00%	5.76%	5.76%	0.00	€ 0
Carpets, footwear, umbrellas	0.00%	10.69%	10.69%	0.00	€ 0
Stone, glass	0.00%	7.71%	7.71%	0.00	€ 0
Metals	1.11%	3.24%	3.47%	0.23	€ 44,058
Machinery, electrical	0.96%	1.13%	1.37%	0.24	€ 243,420
Transportation	0.00%	3.88%	3.88%	0.00	€ 0
Miscellaneous	0.00%	0.88%	0.88%	0.00	€ 0

Source: Authors calculations using UN ComTrade data for 2018, current tariffs from Market Access Map, US June product listings from Federal Register (Vol. 85, No. 124, June 26, 2020) with an assumption imposed that the increase in tariffs would be to 25% for all products listed in Annex 3. Note that these are in addition to the rates already modelled in Table 9 and Table 12.

TABLE 23: EXPOSURE TO US FURTHER POTENTIAL TARIFFS ACROSS IRISH SECTORS (ANNEX 3)

	Share of Trade Affected	Current tariff rate	New tariff rate	Absolute change in rate pp	Tariff increase €'000
Live animals	0.00%	0.00%	0.00%	0.00	€ 0
Meat and fish	0.00%	16.61%	16.61%	0.00	€ 0
Dairy	0.00%	25.14%	25.14%	0.00	€ 0
Vegetable products	0.00%	1.85%	1.85%	0.00	€ 0
Products of milling industry, oil	5.77%	0.41%	1.83%	1.41	€ 125
Foodstuffs	34.21%	12.69%	18.20%	5.51	€ 2,894
Beverages	8.88%	22.56%	24.78%	2.22	€ 13,692
Residues of food and tobacco	0.00%	2.41%	2.41%	0.00	€ 0
Mineral products	0.00%	2.00%	2.00%	0.00	€ 0
Chemical and pharmaceutical products	0.00%	1.65%	1.65%	0.00	€ 0
Other organic chemicals	0.00%	1.08%	1.08%	0.00	€ 0
Other chemicals	0.00%	1.29%	1.29%	0.00	€ 0
Plastic and rubber	0.00%	5.40%	5.40%	0.00	€ 0
Raw Hides, skins, leather, & furs	0.00%	7.49%	7.49%	0.00	€ 0
Wood and wood products	0.00%	2.58%	2.58%	0.00	€ 0
Textiles	0.00%	18.59%	18.59%	0.00	€ 0
Carpets, footwear, umbrellas	0.00%	11.62%	11.62%	0.00	€ 0
Stone, glass	0.00%	2.70%	2.70%	0.00	€ 0
Metals	7.50%	4.65%	6.20%	1.55	€ 2,042
Machinery, electrical	3.63%	0.18%	1.09%	0.91	€ 23,418
Transportation	0.00%	22.60%	22.60%	0.00	€ 0
Miscellaneous	0.00%	0.07%	0.07%	0.00	€ 0

Source: Authors calculations using UN ComTrade data for 2018, current tariffs from Market Access Map, US June product listings from Federal Register (Vol. 85, No. 124, June 26, 2020) with an assumption imposed that the increase in tariffs would be to 25% for all products listed in Annex 3. Note that these are in addition to the rates already modelled in Table 10 and Table 13.