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Brexit and Irish Consumers

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BREXIT AND IRISH CONSUMERS¹

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ABSTRACT

Concerns about the impact of Brexit on the Irish economy have tended to focus on the challenges to exporting firms. However, as the UK is a significant source of imports into the Irish economy and there is considerable integration of the retail sectors in both countries, the imposition of tariffs or other increases in trading costs could pass through to increased prices for Irish consumers. This paper examines the contribution of UK imports to overall household expenditure in Ireland and their exposure to tariffs and other cost increases from possible restrictions on trade. Our approach generates an estimate of potential increases in the level of CPI of between 2 per cent and 3.1 per cent. In the estimated scenarios, these increases are the equivalent of between €892 (increase in non-tariff trade costs) and €1,360 (tariffs plus other trade cost increases) in the annual cost of its consumption basket for the average household. This assumes that there is no switching or changes in expenditure patterns in response to the cost increases so gives an upper bound to the cost increase effects. We also find that these effects are very unevenly distributed across households. Households with lower income levels would face considerably higher percentage increases as they tend to consume a higher share of products that would be most affected by increases in tariffs and trade costs.

INTRODUCTION

Since the decision of the UK government to leave the EU there has been significant evidence put forward that the potential introduction of trade barriers could impact negatively on Irish exporters and on the Irish economy overall. One further channel through which Brexit could impact on Ireland that has received less attention so far is through price increases on imports. The UK is a significant source of imports into the Irish economy with 28 per cent of Irish goods imports originating in the UK in 2016 as compared to the UK accounting for 14.6 per cent

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of Irish goods exports. Irish consumers and Irish firms could therefore face significant price increases in the event of tariffs being applied to these products.

The potential effect of Brexit on consumer prices was highlighted in the early scoping study prior to the referendum undertaken by Barrett et al. (2015). This raised a concern about the high level of Irish imports sourced in the UK and that the integrated nature of retail sectors could result in the exposure of households to increased prices and, also on a wider scale, that this could have a negative impact on the competitiveness of the Irish economy and raise prices for consumers.

Brexit may impact on consumer prices through a number of channels. Firstly, Brexit has already impacted significantly on the Sterling/Euro exchange rate and these changes have an impact on import prices and consumer prices. A large literature has considered the degree to which exchange rate changes pass through to prices. This has found that exchange rate changes are typically not completely passed through to prices and depends on the market structure (see Auer and Schoenle, 2016). For Ireland, Morgenroth (2000) showed that while exchange rate volatility has a negative effect on Irish exports to the UK in the short-run, the long-run impact is zero. More recent evidence by Reddan and Rice (2017) found that only 10 per cent of the exchange rate change is passed through to consumer prices in Ireland.

Secondly, if Brexit results in increased trade barriers between the UK and the EU then this is likely to reduce competition in the Irish market from abroad, and lower competition allows local firms to charge higher prices. Research has indeed shown that tariffs lead to higher prices being charged by local firms (Konings and Vandenbusche, 2005).

Thirdly, trade barriers such as tariffs raise the cost of traded products, which may be passed through to the consumer in higher retail prices. Surprisingly, the literature on the direct effect of trade barriers on consumer prices is quite limited. Blonigen and Haynes (2002) found that antidumping duties, that is tariff duties designed to prevent the importation of goods at prices likely to damage domestic firms, are more than fully passed through. One recent related paper by Hwang (2016) on South Korea examined tariff reductions in the aftermath of joining the World Trade Organisation (WTO), and found that how price falls in this case were passed on to consumers was determined strongly by the level of competition within the retail sector and within product categories. Similar results were obtained by De Loecker et al. (2016) who found that some of the benefits of lower tariffs were absorbed by firms through higher mark-ups. It is likely that the

level of competition and availability of substitutes would also be significant factors in how price increases would be passed onto consumers. A recent paper by Clarke et al. (2017) analysed the potential effect of Brexit on consumer prices in the UK. They found that the imposition of tariffs under a scenario where trade between the UK and the EU is subject to WTO tariffs would increase the average cost of living in the UK by 1 per cent. Their analysis also showed that the impact differs across households with the unemployed, families with children and pensioners being most affected.

This paper focuses on the consumer side of Brexit by looking at the contribution of UK imports to overall household expenditure in Ireland and how exposed this might be to tariffs or other related cost increases. The key question posed is to quantify how substantial this effect might be and how it could vary across households. We do this by combining data on trade, tariffs and other costs that could increase in the event of the UK exit from the EU and comparing this to Irish household expenditure.

Our approach generates an estimate of potential increases in the level of Consumer Price Index (CPI) of between 2 per cent and 3.1 per cent. These increases are the equivalent of between €892 (increase in non-tariff trade costs) and €1,360 (tariffs plus other trade cost increases) in the annual cost of its consumption basket for the average household. This increase is calculated in the absence of any change in consumer behaviour away from these products. While some expenditure shifts would be expected in response to prices changes, the extent to which households adjust depends in large part on the range of substitutes available and their prices. We do not model the dynamics of that response, keeping the focus of the paper on measuring the size of the initial price shift to which Irish consumers could potentially be exposed. The estimated effects in terms of the increase in the household basket could therefore be regarded as upper bounds of the household impact. We also make no assumption regarding further exchange rate movements which could offset or amplify the effects.

Of possibly more concern than the size of this average impact is that these effects are very unevenly distributed across households. We show that households with lower income levels consume a higher share of products that would be most affected by increases in tariffs and trade cost and the overall effect is inversely related to the household income decile.

DATA SOURCES

In order to answer the question of how Brexit might impact on Irish CPI we combine data from a number of different sources – on trade flows, tariffs, non-tariff barriers and household expenditure. This section describes each source in turn and the assumptions that underlie the subsequent analysis.

Trade data

The first source is trade data from the customs records collected by the Central Statistics Office which we used to examine at a product-by-product level what Ireland imports from the UK. These data are collected at the 6-digit product level as defined by the international Harmonized System (HS). We also look at total Irish imports for each product in order to generate the UK share of total imports.

Tariff data

The second source of data relates to our estimates of how significant price increases could be in the introduction of tariffs. The assumption made is that in the absence of a trade deal or transitional arrangement, the EU's register of 'most favoured nation' tariffs listed with the WTO would be the fall-back position, either come March 2019 or at the end of a transition period. The uncertainty of both the final arrangements and their timing need to be borne in mind throughout the discussion of the following scenarios. The WTO schedule that we use as our baseline scenario are the tariffs applied by the EU to all external countries without a trade agreement and are therefore the highest level of tariffs that would be likely to apply, as any specific deal would be to lower tariffs on some if not all product lines. The WTO tariffs vary widely across products with many subject to a zero tariff while some products are subject to a tariff as high as 80 per cent (for some beef products). 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 per cent of the value of the product plus €303 per 100 kg (Lawless and Morgenroth, 2016). This implies that the aggregate impact of Brexit under a WTO scenario is a function of the detailed trade patterns and considerable variation in the impacts across countries, sectors, firms and households are possible. So far, the focus has been largely on the cross-country impacts with a focus on exporting firms with limited focus on how households might be exposed to changes in the trading environment.

Non-tariff barriers

As well as tariffs, potential increases in prices could be passed on to consumers arising from cost increases if additional customs procedures or other barriers to trade are applied. It is important to stress that many of these non-tariff barriers could come into place even in the event of a deal reducing tariffs considerably from their WTO levels, particularly if the UK exits the Customs Union. For this reason, we treat non-tariff barriers as our lower-bound estimate and an outcome combining WTO tariffs plus non-tariff barriers as our upper estimate. As it is difficult to envisage the imposition of tariffs without any degree of non-tariff barriers (even in basic administration costs) being incurred, we present calculations based on either non-tariff barriers alone or based on a combination of non-tariff barriers and tariffs. In order to estimate the non-tariff barrier effects, we take data from the estimates generated by the World Bank by Kee et al. (2009) and described in IntertradeIreland (2017). 'Non-tariff barriers' is the term applied to a wide range of policy measures other than tariffs that restrict or discourage international trade flows. Some examples of non-tariff barriers on goods trade can include quantity limits, subsidies to domestic production and implicit barriers arising from technical requirements such as licensing, labelling, standards and sanitary and phyto-sanitary rules (rules designed to protect health and food safety). Non-tariff barriers also include administrative requirements that add cost or delays to imports such as customs inspections and documentation.

Given their variety and complexity, non-tariff barriers can be difficult to measure. Research carried out by Kee et al. (2009) on behalf of the World Bank combine a wide range of non-tariff barriers at a detailed product level and convert them to an ad-valorem tariff (or price) equivalent. Their work provides estimates for 4,575 HS six-digit product categories which we match to the trade flow data from the CSO. Their central estimate for all non-tariff barriers is equivalent to applying a 12 per cent tariff. However, the tariff equivalent on some products can be many times this average effect. In over half of the products where non-tariff barriers are in effect, they find that the price effect of the non-tariff barrier is higher than the tariff.

Looking at the pattern of non-tariff barriers across countries, Kee et al. (2009) show that richer countries tend to impose lower barriers on trade. On this basis, we assume that any potential non-tariff barriers between the EU and UK would be one-quarter of those estimated by Kee et al. (2009) given that the EU and UK will be starting from a point of completely harmonised regulatory and safety standards. This is in line with the approach taken by Dhingra et al. (2016) when estimating the effect on the UK economy of the UK exiting the EU. They use non-tariff barrier estimates of EU-US trade but assume that the level that would apply

to EU-UK trade would be between one-quarter (in their optimistic scenario) and three-quarters (in their pessimistic scenario) of the US level.

Non-tariff barriers have moved to the forefront of a number of recent major trade negotiations. For example, the Comprehensive Economic and Trade Agreement (CETA)² between the EU and Canada removes almost all tariffs on goods between the signatories with a small number of exceptions in agricultural products bringing it extremely close to complete free trade. The bulk of the CETA text revolves around the removal or reduction of non-tariff barriers in both goods and services, highlighting that these are considered significant impediments to trade.

A further issue to be borne in mind in terms of non-tariff barriers affecting Irish retail prices is the extent to which imports from other countries to Ireland are transhipped through the UK. Comparing trade and transport data sources, Lawless and Morgenroth (2017) estimate that approximately 11 per cent of Irish import volumes from markets other than the UK are transported across the UK 'land-bridge'. Although no tariffs would be imposed on these imports post-Brexit as they do not originate in the UK, there is the possibility that increased administration costs (e.g. to verify that the goods are destined for Ireland and not for the UK domestic market) and associated port delays could have a knock-on effect of increasing the cost of delivering those products to Ireland.

Household expenditure data

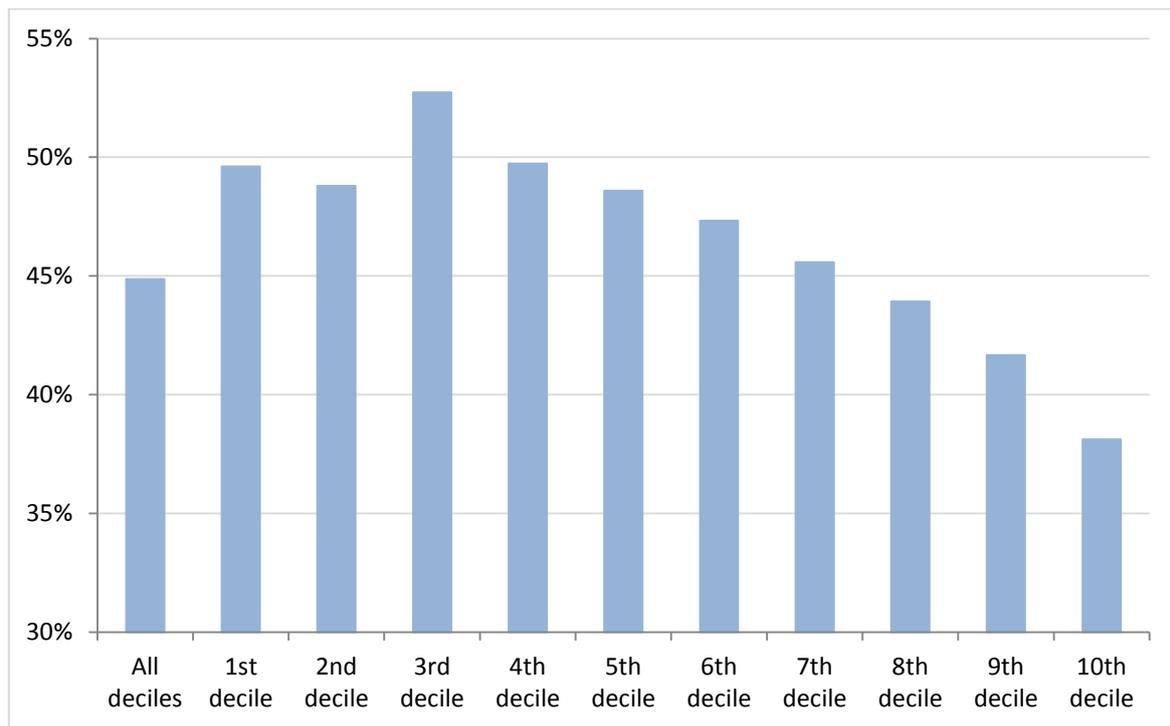
The level of current trade from the UK to Ireland and associated potential price increases are then combined with measures of how important these products are in the consumption expenditure baskets of households in order to gauge how this might affect different households and overall CPI. The data for this come from the Household Budget Survey (HBS) collected by the CSO in 2015-2016. The HBS is a large scale survey (over 6,800 households) that collects information on household expenditure patterns in order to appropriately weight price changes by their importance in household consumption for the Consumer Price Index. It provides very detailed information on expenditure at a product level, by households overall and also by income decile. We use the overall expenditure shares to generate our CPI aggregate estimate and provide additional evidence on the distributional differences of these trade related price increases across different household income groups (specifically we divide households into ten groups – deciles – based on their income levels).

² <http://ec.europa.eu/trade/policy/in-focus/ceta/ceta-chapter-by-chapter>.

The first item of note in gauging household exposure to tariff related price increases is that the share of goods in the household basket declines considerably as household income increases. Households in higher income deciles tend to spend relatively more on services and are therefore somewhat less exposed to increases in good prices as is shown in Figure 1. On average across all households, approximately 45 per cent of expenditure is on goods and the other 55 per cent is on services (with housing being the single largest component). This share of goods in total expenditure ranges from 53 per cent in the third decile to just 35 per cent in the highest income group.

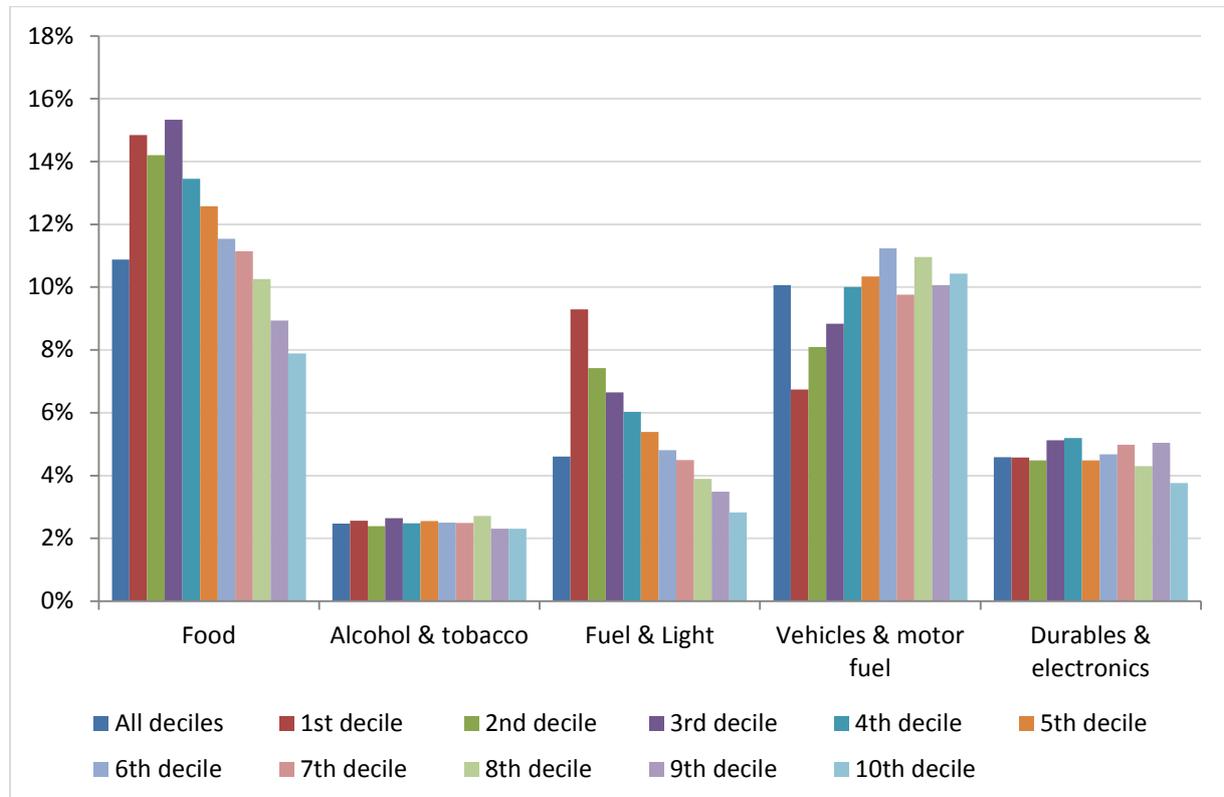
We choose a number of specific examples of products where expenditure shares across household deciles differ and show these in Figure 2. We particularly note that the share of household expenditure on food declines considerably as household income increases. The poorest household groups allocate up to 15 per cent of their total expenditure to food and this declines to just 8 per cent for the highest income group. This is an important determinant of our overall results as food products have the highest tariff listings in the EU's WTO tariff schedule and this therefore gives an early indication of how the distribution of post-Brexit tariffs could differ in their impact across household types. Other expenditure areas where we find considerable household income variation, such as the lowest income households spending a much higher fraction of their total expenditure on fuel and light (9 per cent compared to 3 per cent in higher income households), will be less affected by Brexit as tariffs in these product areas tend to be low. Working in the opposite direction, higher income households tend to spend somewhat more on vehicles and motor fuels. The share of spending in other areas such as alcohol and electronics are flatter over the income distribution.

FIGURE 1 SHARE OF GOODS IN HOUSEHOLD EXPENDITURE BY INCOME DECILE



Source: Authors' calculations from Household Budget Survey, 2015-2016.

FIGURE 2 VARIATION IN EXPENDITURE SHARES BY INCOME DECILE



Source: Authors' calculations from Household Budget Survey, 2015-2016.

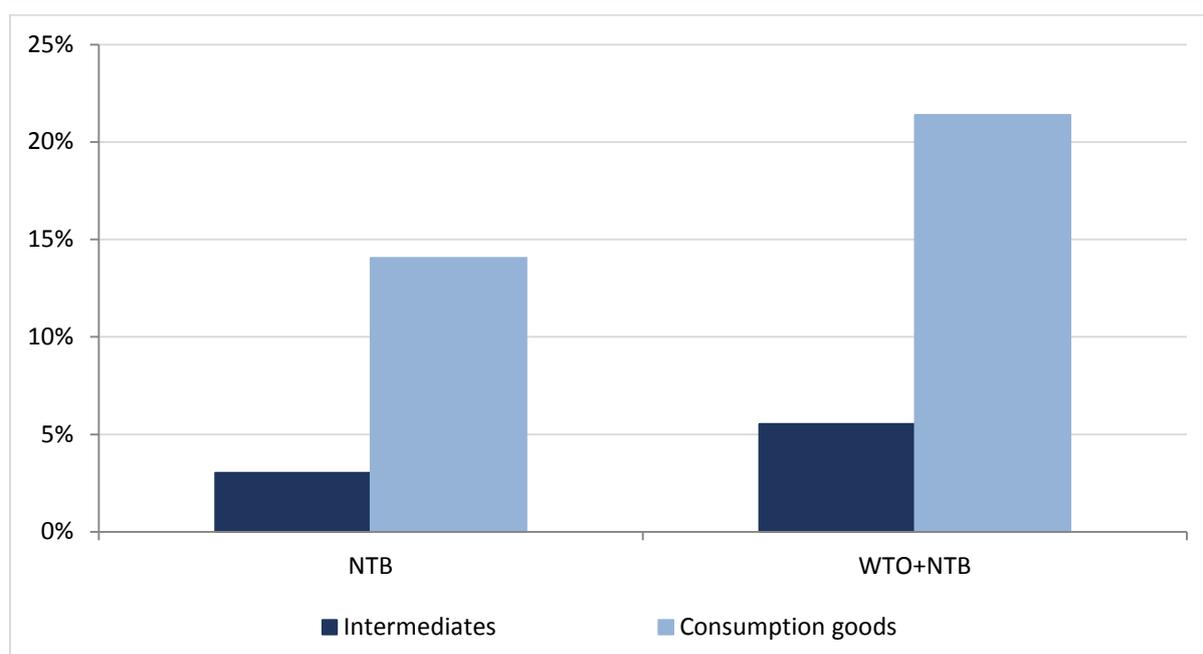
ESTIMATION METHODOLOGY

In order to estimate how increased import costs might affect prices of consumer goods we combine the data sources described above in a number of different steps. The first of these is to match the WTO tariffs and product level estimates of the potential cost increases associated with non-tariff barriers to the imports from the UK and calculate the corresponding price effect. This gives a range of price increases at a product-by-product level.

These products then need to be distinguished between intermediate and capital goods that would be primarily used by firms, and consumption goods used by households. Our method of doing this was to match the product codes used in the trade data (HS codes) to those used in the Household Budget (COICOP codes). In order to line up the two different systems, the trade codes were first converted into an intermediate classification called the Common Product Classification (CBC) and then converted again into the COICOP classification using concordances from the UN. This procedure gives us a matching between the imports and products reported as being purchased by households.

In order to allocate the price increases we make an assumption that any product listed in the HBS is purchased entirely by households. This will give an upper estimate as many of the products reported in the trade data (for example tea, coffee and laptop computers) will also be purchased by firms. However, although this may overestimate the direct effect of price increases faced by the consumer, the indirect effect should also be considered as increased costs for inputs used by Irish firms may also in many cases be passed on to the final consumer.

FIGURE 3 CONSUMPTION AND INTERMEDIATE GOOD TARIFF AND NTB EXPOSURES



Source: Authors' calculations from CSO trade data, WTO tariff rates and non-tariff barriers (Kee et al., 2009).

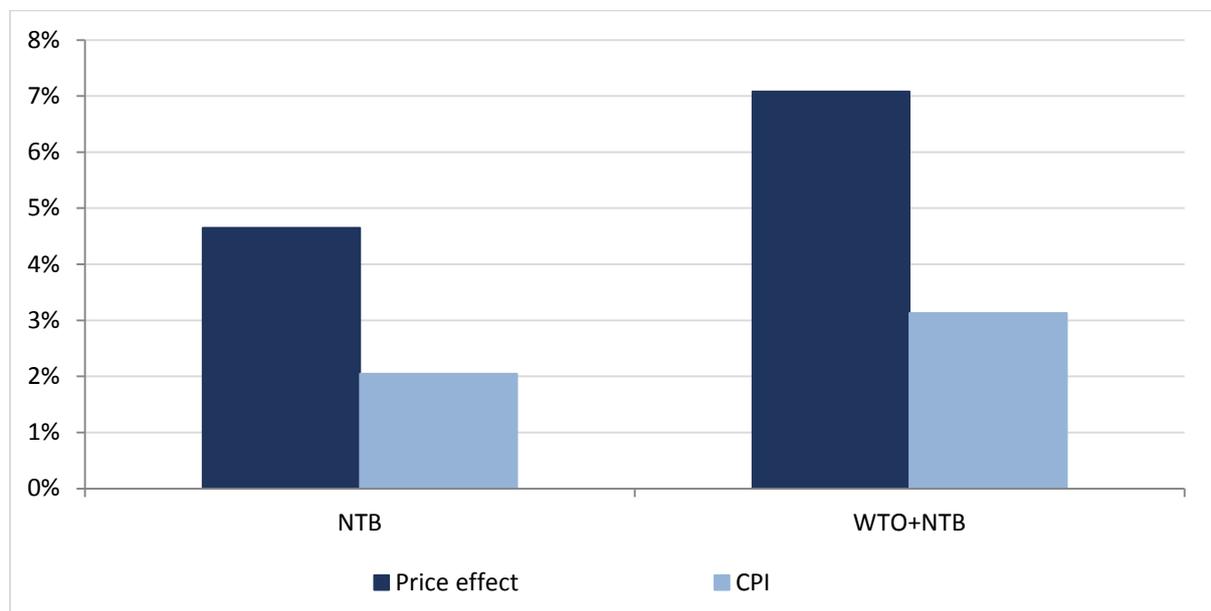
Figure 3 shows how the tariff and non-tariff barrier cost increases vary across consumer and intermediate (all non-consumer) products. The non-tariff barrier (NTB) estimated price increases are over four times greater for consumption products than for non-consumption goods. Combining the non-tariff barriers with the WTO-registered tariffs generates a total price increase exposure of 5.5 per cent on UK imports of non-consumption goods and an increase of up to 21 per cent for consumption goods.³

The next step of the methodology is to estimate how important the UK imports are in overall household spending for each product. To do this we calculate imports from the UK as a proportion of the total purchase of those goods by the households. However, as already mentioned some of the imported products, even though classified here as consumption products, may also be purchased by firms. To minimise any overestimate of household exposure, we also compare the UK import share to total imports in each product category and use the lower of the two if there is any discrepancy. For example, when expressed as a share of household expenditure, imports of tea and coffee from the UK exceeded 100 per cent so this was replaced by the UK share of total imports in this product category which was 54 per cent.

³ The WTO tariff impact alone on intermediates is 2.5 per cent whereas the tariff impact on consumption products is over 7 per cent.

We now have an importance weight on each product for the UK share of each product. Figure 4 shows how the overall price increase for goods is generated by aggregating across all products, weighted by the share of these products imported from the UK. The price effect bars show how this scales down the overall tariff impacts shown in Figure 3, as they are now multiplied by the market share of the UK imports to give an overall impact on the price levels of these goods in the Irish economy. The CPI bars then show how these price increases translate into an overall CPI effect by further weighting the products by their importance in the household expenditure basket.

FIGURE 4 PRICE INCREASES AND AGGREGATE CPI EFFECT



Source: Authors' calculations from CSO trade data, Household Budget Survey, WTO tariff rates and non-tariff barriers (Kee et al., 2009).

The tables in the Appendix give more detail on this by showing for each sector the tariff or non-tariff barrier increase in the cost of imports from the UK, the share of the UK in total expenditure and the combination to give the overall implied price effect. To take the example of bread and cereals, Table A.1 shows that the estimated tariff equivalent of non-tariff barriers on these products is 36 per cent. Imports from the UK are equivalent to 59 per cent of Irish household expenditure in this product category so the impact on the total sector price of tariffs on the UK imports would be 21 per cent (36 per cent times 59 per cent). The concentration of the highest non-tariff barriers on food products is evident in Table A.1 with meat imports facing a 62 per cent tariff equivalent and milk, cheese and eggs facing a 43 per cent tariff equivalent. Table A.2 shows the combined non-tariff barrier estimates and Table A.3 the direct effect of tariffs alone.

The tariff schedule shows that food and clothing tariffs are generally well in excess of 10 per cent while those on other manufactured products are relatively modest – zero rates on medical products and motor fuels, 1 per cent on electronics and 3 per cent on household appliances for example. Of manufactured products, only motor vehicles (cars, motorcycles and parts) face significant tariff rates at approximately 8 per cent.⁴ As discussed earlier, the method we followed was to apply tariffs and non-tariff barriers at the most disaggregated level possible and it should be noted that the rates summarised for the broad categories in the tables do mask some substantial variations even within the same category – meat tariffs for example range from approximately 10 per cent on chicken to over 80 per cent on some beef products.

The overall impact on Irish price levels of changes in trade costs on imports from the UK will also crucially depend on how important the UK is as a source of that product. Given the integration of retail and grocery markets, it is perhaps not surprising to see in Table A.1 that the UK is the origin of a substantial share of many products – most particularly in fresh and processed foods but also in household and personal non-durables (categories which include cleaning products and toiletries for example). It should be emphasised again at this point that such price increases on particular products would be likely to result in some changes in consumer choices being made but it is not possible to gauge in advance how large these would be without more detailed information on substitutes available and levels of competition in different product areas.

The cross-product detail on non-tariff barriers in Table A.1 (and the combined effects of tariffs and non-tariff barriers in Table A.2) also shows a sharp difference between the impacts on food and manufactured products. They suggest in fact that even in the event of a trade deal that removes tariffs entirely, there may be a significant price impact on Irish consumers unless such a deal also minimises non-tariff barriers.

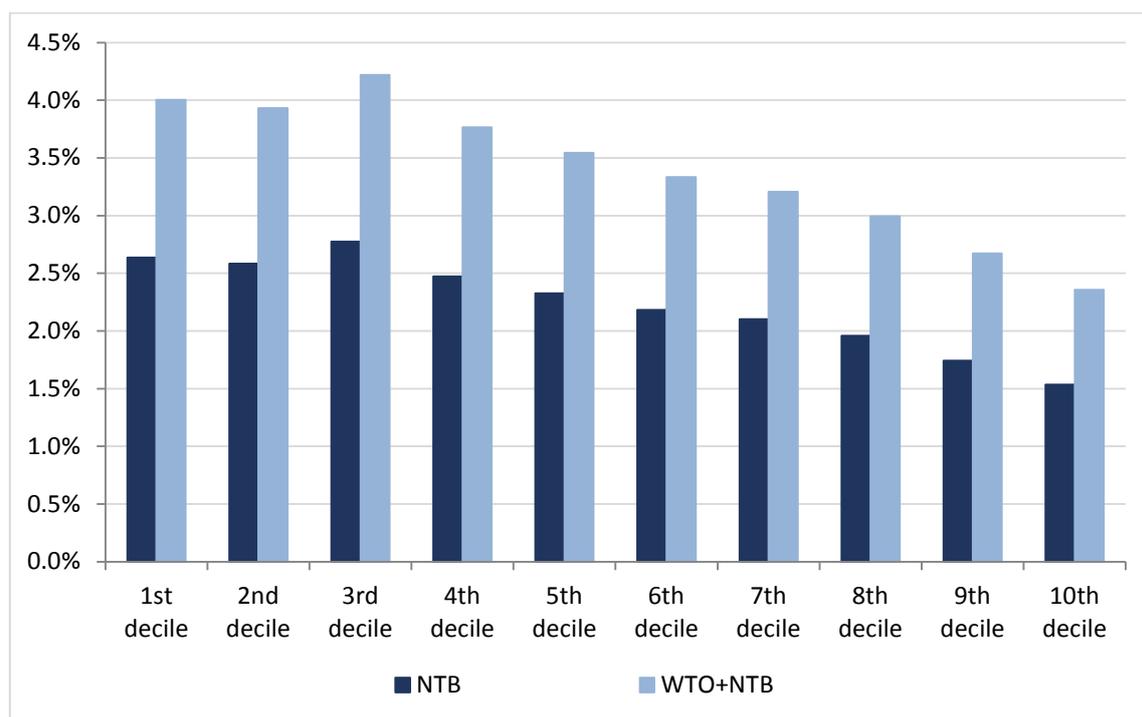
The final step is to translate these product level price changes into an overall CPI impact which is done by aggregating over all the price increases for each product and weighting them by the importance of that product in household consumption. This generates an estimate of potential increases in the level of CPI of between 2 per cent in the non-tariff barriers scenario and 3.1 per cent when both tariffs and non-tariff barriers are applied. These increases are the equivalent

⁴ The trade data do not distinguish between new and second-hand cars.

of between €892 and €1,360 in the annual cost of its consumption basket for the average household. The relatively larger impact of the non-tariff barrier costs compared to the tariffs is noteworthy although it should be emphasised that the international estimates used to proxy these costs are likely to be less accurate than the tariff estimates which come directly from the EU schedule published with the WTO.

It should further be stressed that the CPI increase calculated here does not take account of any change in consumer behaviour in reaction to price increases, which is beyond the scope of the present exercise. The extent to which households adjust depends in large part on the range of substitutes available, ease of switching both for consumers and for retailer supply chains and the prices, which could also be affected by exchange rate movements (which to date have made UK imports more competitive). We do not model the dynamics of that response, keeping the focus of the paper on measuring the size of the price shift to which Irish consumers could potentially be exposed.

The Household Budget Survey also provides detail on the expenditure patterns of different types of households. Dividing households into ten equally sized groups based on their income in Figure 5 shows that our estimated impact of post-Brexit cost increases has a substantial distributional effect. Households in the lowest income decile face increases of around 70 per cent higher than those in the highest income group. Households in the lowest income group would face a 4 per cent increase in prices in the event of both tariffs and non-tariff barrier obstacles being implemented. Table 1 converts the percentage increases into monetary amounts based on the annual average expenditure of each household income group. The 4 per cent increase for the lowest income households is equivalent to a €634 annual increase in cost of their current expenditure basket for these households, or €12 extra on their current weekly spending of €305. The percentage change effects are similar for the bottom three groups and then taper off gradually as household income increases. These generate higher monetary amounts however as spending levels are also going up. The 4.2 per cent increase for the third income group is equivalent to extra costs of €1,104 and the 3.8 per cent increase for the fourth group is an increase of €1,191. For the highest income households, the effects in the worst-case scenario would be 2.4 per cent. This is equivalent to an increased cost of their spending basket of €2,086 per year. The difference in percentage impact is largely due to the higher share of household expenditure accounted for by food by lower income households.

FIGURE 5 VARIATION ACROSS HOUSEHOLD INCOME DECILES

Source: Authors' calculations from CSO trade data, Household Budget Survey, WTO tariff rates and non-tariff barriers (Kee et al., 2009).

TABLE 1 INCREASE IN BASKET COST BY INCOME DECILE

	Non-tariff barriers €	Tariffs + NTB €
1st decile	419	634
2nd decile	531	809
3rd decile	727	1,104
4th decile	780	1,191
5th decile	849	1,294
6th decile	933	1,425
7th decile	1,013	1,549
8th decile	1,130	1,724
9th decile	1,181	1,812
10th decile	1,361	2,086

Source: Authors' calculations from CSO trade data, Household Budget Survey, WTO tariff rates and non-tariff barriers (Kee et al., 2009).

CONCLUSIONS

This paper combines trade, tariffs and non-tariff barrier costs to estimate scenarios for the potential impact of Brexit on Irish imports. We examine how these trade changes could impact on households by linking the importance of each of the traded products to consumption expenditure baskets of households collected by the Household Budget Survey. In estimating exposure to trade policy

changes, a number of characteristics of different household income levels play an important role. Firstly, the share of goods in the household basket declines considerably as household income increases, with households in higher income deciles spending 35 per cent of their income on goods compared to 53 per cent in the third decile. Secondly, looking at specific categories of goods, we find that the share of household expenditure on food declines considerably as household income increases. This is an important determinant of our overall results as food products have the highest tariff listings in the EU's WTO tariff schedule, which we assume would be the fall-back position in the absence of a trade deal or transition agreement by the Brexit deadline of March 2019.

Comparing tariff and non-tariff barrier cost increases across consumer and intermediate inputs shows consumer goods to be considerably more exposed to changes in trade regime. The WTO tariff impact on products used as intermediate inputs for further processing is 2.5 per cent whereas the impact on consumption products is over 7 per cent. A similar pattern applies to estimates of non-tariff barriers which also fall disproportionately heavily on final consumption products, most notably food.

Aggregating over the individual price increases for each product and weighting them by the importance of that product in household consumption gives us an estimate of potential increases in the level of CPI. Our estimate impacts range from 2 per cent in the non-tariff barrier scenario to an impact of 3.1 per cent when both tariffs and non-tariff barriers are applied. These increases are the equivalent of between €892 and €1,360 in the annual cost of its consumption basket for the average household. This assumes no change in consumer spending patterns as we try here to focus on the change in prices faced by households at the point of the imposition of a new trade regime. Given the size of the possible increases for some product categories, some change in consumer behaviour away from these products would be likely although we do not model this explicitly. The extent of switching would depend on a number of factors such as the range of substitutes available and their prices. In some instances, the effect could be of a reduction in the number of varieties on offer in certain product groups if the price increases considerably.

We also find that the potential post-Brexit cost increases could have a substantial distributional effect. Households in the lowest income decile face increases of around 70 per cent higher than those in the highest income group. Households in the lowest income group would face a 4 per cent increase in prices in the event of both tariffs and non-tariff barrier obstacles being implemented compared to 2.4 per cent for the highest income group. This is largely due to the higher share of household expenditure accounted for by food by lower income households.

REFERENCES

- Auer, R. and R. Schoenle (2016). 'Market Structure and Exchange Rate Pass-through', *Journal of International Economics*, Vol. 98, pp. 60-77.
- Barrett, A., A. Bergin, J. FitzGerald, D. Lambert, D. McCoy, D., E. Morgenroth, I. Siedschlag and Z. Studnicka (2015). *Scoping the Possible Economic Implications of Brexit on Ireland*. Research Series No. 48. Dublin; Economic and Social Research Institute.
- Bergin, A., A. Garcia-Rodriguez, N. McInerney, E. Morgenroth and D. Smith (2017). 'Modelling the Medium to Long Term Potential Economic Impact of Brexit on Ireland', *The Economic and Social Review*, Vol. 48(3), pp.305-316.
- Blonigen, B. and S. Haynes (2002). 'Antidumping Investigation and the Pass-through of Antidumping Duties and Exchange Rates', *American Economic Review*, Vol. 92(4), pp. 1044-1061.
- Clarke, S., I. Serwicka and A. Winters (2017). 'With Brexit Raise the Cost of Living?', *National Institute Economic Review*, No. 242, pp.37-50.
- CSO (2017). *Household Budget Survey 2015-2016*, available at: www.cso.ie/en/releasesandpublications/ep/p-hbs/hbs20152016.
- De Loecker, J., P. Goldberg, A. Khandelwal and N. Pavcnik (2016). 'Prices, Markups, and Trade Reform', *Econometrica*, Vol. 84(2), pp. 445-510.
- Dhingra, S., G. Ottaciano, T. Sampson and J. Van Reenen (2016). 'The consequences of Brexit for UK trade and living standards', London School of Economics, Centre for Economic Performance Brexit Paper No. 2.
- Hwang, K-I. (2016). 'Tariffs, Intermediaries and Consumer Prices', University of Nottingham, mimeo.
- InterTradeIreland (2017). *Potential Impact of WTO Tariffs on Cross-Border Trade*, available at www.intertradeireland.com
- Kee, H.L., A. Nicita and M. Olarreaga (2009). 'Estimating Trade Restrictiveness Indices' in *The Economic Journal*, 119 (January), 172-199.
- Konings, J. and H. Vandenbusche (2005). 'Antidumping protection and markups of domestic firms', *Journal of International Economics*, Vol. 65(1), pp. 151-165.
- Lawless, M. and E. Morgenroth (2016). 'The Product and Sector Level impact of a Hard Brexit across the EU', ESRI Working Paper No.550.
- Lawless, M. and E. Morgenroth (2017). 'Ireland's Trade and Transport Connections', ESRI Working Paper No.573.
- Morgenroth, E. (2000). 'Exchange Rates and trade: The case of Irish exports to Britain', *Applied Economics*, Vol. 32 (1), pp. 107-110.
- Reddan, P. and J. Rice (2017). 'Exchange Rates Pass-Through to Domestic Prices', *Central Bank of Ireland Economic Letter*, Vol. 2017 No. 8.

APPENDIX

TABLE A.1 NTB ESTIMATES

	NTB tariff equivalent %	UK import share %	Implied price increase %
Bread and cereals	36	59	21
Meat	62	24	15
Fish and seafood	20	57	11
Milk, cheese and eggs	79	38	30
Oils and fats	46	27	13
Fruit	25	14	3
Vegetables	27	14	4
Sugar, jam, chocolate and confectionery	55	32	18
Processed foods	27	44	12
Coffee, tea and cocoa	29	54	16
Mineral waters, soft drinks, juices	27	56	15
Spirits	9	27	2
Wine	14	3	0
Beer	6	8	0
Tobacco	53	3	1
Garments and clothing accessories	18	22	4
Shoes and other footwear	24	13	3
Household maintenance and repair goods	4	5	0
Fuel and light	0	21	0
Electronic, photographic and IT	1	18	0
Household non-durable goods	5	46	2
Personal non-durable goods	1	68	1
Furniture	8	36	3
Household appliances and tools	3	38	1
Reading material and stationery	1	27	0
Vehicles	8	11	1
Motor fuel	0	42	0
Medical and therapeutic products	0	11	0
Jewellery and watches	4	36	1
Toys and games	10	31	3

Source: Authors' calculations from CSO trade data, Household Budget Survey and non-tariff barriers (Kee et al, 2009).

TABLE A.2 WTO TARIFFS + NTB ESTIMATES

	Combined tariff equiv. %	UK import share %	Implied price increase %
Bread and cereals	52	59	30
Meat	100	24	24
Fish and seafood	30	57	17
Milk, cheese and eggs	122	38	46
Oils and fats	69	27	19
Fruit	34	14	5
Vegetables	36	14	5
Sugar, jam, chocolate and confectionery	84	32	27
Processed foods	34	44	15
Coffee, tea and cocoa	37	54	20
Mineral waters, soft drinks, juices	40	56	23
Spirits	16	27	4
Wine	22	3	1
Beer	7	8	1
Tobacco	91	3	2
Garments and clothing accessories	30	22	6
Shoes and other footwear	35	13	5
Household maintenance and repair goods	7	5	0
Fuel and light	0	21	0
Electronic, photographic and IT	2	18	0
Household non-durable goods	9	46	4
Personal non-durable goods	2	68	1
Furniture	12	36	4
Household appliances and tools	6	38	2
Reading material and stationery	3	27	1
Vehicles	16	11	2
Motor fuel	0	42	0
Medical and therapeutic products	0	11	0
Jewellery and watches	7	36	3
Toys and games	14	31	4

Source: Authors' calculations from CSO trade data, Household Budget Survey, WTO tariff rates and non-tariff barriers (Kee et al, 2009).

TABLE A.3 WTO TARIFFS

	WTO tariff rate %	UK import share %	Implied price increase %
Bread and cereals	16	59	9
Meat	38	24	9
Fish and seafood	10	57	6
Milk, cheese and eggs	43	38	16
Oils and fats	23	27	6
Fruit	9	14	1
Vegetables	9	14	1
Sugar, jam, chocolate and confectionery	29	32	9
Processed foods	8	44	3
Coffee, tea and cocoa	7	54	4
Mineral waters, soft drinks, juices	13	56	7
Spirits	7	27	2
Wine	8	3	0
Beer	0	8	0
Tobacco	38	3	1
Garments and clothing accessories	11	22	2
Shoes and other footwear	10	13	1
Household maintenance and repair goods	3	5	0
Fuel and light	0	21	0
Electronic, photographic and IT	1	18	0
Household non-durable goods	4	46	2
Personal non-durable goods	1	68	0
Furniture	4	36	2
Household appliances and tools	3	38	1
Reading material and stationery	1	27	0
Vehicles	8	11	1
Motor fuel	0	42	0
Medical and therapeutic products	0	11	0
Jewellery and watches	4	36	1
Toys and games	4	31	1

Source: Authors' calculations from CSO trade data, Household Budget Survey and WTO tariff rates.